Innocent
in
Palo Alto

From the Diary of a Think Tank Dweller
Giuliana Lavendel

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Introduction

This is not a history of PARC. It is a random batch of vignettes, which broke loose from my diary and my memory.

This is the way it was, inside.

Enter Innocent

It was the luck of the draw. I opened the door, and there was the job, waiting to be discovered. In those pioneer days (1970), we were throwing into the supercharged air questions which meant: Are you one of us? Will you help me? Will we rate a chance, with these tools we have?

The library is a main core tool, but in the beginnning we could only offer some dusty copies of Engineering Index. The computer was off limits, until a young man who would one day be nicknamed "Supreme Engineer" bought me accesss to the Dialog system for a couple of months. "You deserve this," he said, "and besides, I wanted to check if those computer people are as good as they think they are."

I came to visit, as a neighbor, the wife of a rocket scientist designing missiles in the Stanford Industrial Park. Before long I was hopping in daily to help out, pursued by eager patrons waving penciled notes with requests: On the magnetic susceptibility of metals? Computer editing advantages? What's new in raster scanning and why was Ada famous? And what did Turing think? What about the

kinship between high level programming and the complex constructs embroidery can produce? I can still demo the ornate Palestrina stitch I learned from the nuns in kindergarten.

I "designed" the TIC (Technical Information Center) at PARC following the notions I had developed, also observing the scientists' behavior and their demands and responses. I planned an elite, unusual operation, totally dedicated to customer service, and kept our doors open 24/7. We did not mind being called at home even on a Sunday afternoon. As I remember, this privilege was not abused.

My profile in Who's Who in America, ca. 1995, refers to me as "Information Research Executive." We communicated using all means available to us, including satellites, the Xerox Docutech, and writing fast. Our Monday Teller went around the world with our logo, developed in-house and covered by copyright to protect...the INNOCENT.

Chapter 1

The View from the Top

1.1 HELLO AGAIN, MR.GUTENBERG

Springtime in Washington for a meeting at Commerce, I have lunch and ricochet
shoptalk with Bob Kahn. He is the father and mother of the Internet, especially
here in DC. We linger, deep in conversation, on the stone steps of a federal build-
ing.

"Why do you ask *me*, Giuliana, whether the Internet is a turning point?" Bob
argues, "Would you ask Gutenberg whether moveable type has a future?"

1.2 HE GAVE THE WORD

Change of pace: I am in timeout zone, on the verandah of my California home,
struggling with the monumental Sunday edition of the New York Times. A well
known face smiles at me from Section 1: it is Charlie, Charles Simonyi, who
has built himself a 10 million dollar house on the "Gates Coast" of the Pacific
Northwest.

Perhaps I will write a story on it, and on the vintage Lamborghini Simonyi
drives, for *Corriere della Sera*, the number one Italian daily that published my
chronicles of Silicon Valley some time ago. Perhaps Charles will invite me to

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visit.

The last time I saw him I was having brunch in a modish hotel in San Francisco, on a Sunday, when Charlie appeared, saw me, and enveloped me in a bear hug. He had just come in on his Lear jet for his morning croissant. He wrote Word and thus launched Microsoft, before which there was nothing, some people would say.

1.3   VIVACE

My daughter – a fed executive and punctilious critic – observes that I am a collector, just like the local matrons who dig for flasks and other memorabilia dropped by gold miners on Whisky Hill, where the stagecoach used to stop. I collect people, I am told, and this is why I had such a marvelous time in my almost 30 years at PARC – only I did not realize it was marvelous then.

A swarm of special librarians comes to lunch on the PARC terrace, and the unanimous comment is: A country club! Did you ever? In fact, the cafeteria wing overlooking the Valley and San Francisco Bay at their most panoramic (three rainbows in the sky are a feature!) would have been reserved for Executive Row in many a corporation.

While mildly interested in discouraging three Martini lunches, PARC planners are valiantly pushing against isolation at the lunch table, a behavioral quirk afflicting scientists who will share a company meal and gossip only with colleagues of their own discipline (a subtle form of racism?). In the cafeteria, physicists will sit with physicists, chemists with chemists. They will look at any stray computer scientist as a squatter and vice versa.

Our awed visitors still wonder: "Do you really do any work here, with such view from your windows?" They do not know what kind of pressure cooker this is. A certain ferocity towards *hoi polloi* is part of our culture, and I am reminded of the cutie from Corporate who came, wide eyed, to present a gauche piece of

software she called "veevecsy." The scientist community, having been strongly invited to attend the presentation, was puzzled, until a voice was heard: *"She means Vivace! Like in Allegro Vivace!*

This brought down the house, and possibly also the visitor's career.

Such episodes could serve as comic relief in the play I might write some day about PARC, but honesty would force me to show also the other side of the coin. A shy, middle aged Asian engineer, female, from another division, tries to present an architectural solution for the Flying Documents Project when she is verbally attacked by our fiercest researchers, nicknamed the CSL (Computer Science Laboratory) Marines. She cringes in confusion, cannot continue the presentation, exits tearful. I was there, embarrassed.

1.4 THE FOUNDER

Today I went to the Archives with George Pake, the Research Center founder, to look through his "personal files" and reconstruct what we can about the beginnings of PARC. He looked older, stooped, and greyer than ever. I remember when I came, full of enthusiasm and entrepreneurial spirit, and was disappointed by his "grayness." I have since learned that he has an enormously willful, self-propelled personality, which belies his physique – he refers to it as "my unfortunate back." He has lived his life with relentless determination, having prepared his obituary long ago.

We went through boxes, and inhaled the dust of one of the most interesting experiments in the history of modern technology and innovation, in the experts' opinion. I said, "George, there are only yourself, controller 'Moneybags' Norb Beyer, and I left who know about this past." He said this was true, but added "Only you and Gloria cared about the history of PARC. Now Gloria is dead, and you are the only 'gatekeeper' left. (I edited the two volumes of PARC Selected

Papers *Decade of Research.*")

1.5   A PR0MISE

So I will tell the story with the view from inside, sidestepping the exculpatory narrative a tame writer from Los Angeles put together for management's delight. Sample: "When PARC was founded in 1970, Palo Alto was a college town surrounded by a rural area..." Yes, with pigs and cows, and H-P and Varian and Fairchild and Lockheed Missiles and Space scattered in between!
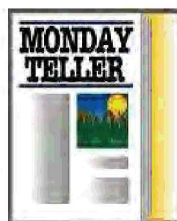
PARC Information Center: the management team. (Giuliana Lavendel and Kathy Jarvis).

Chapter 2

Tremblor at PARC

2.1 THE EARTH WAS SHAKING

Some visitors took fright but it was nothing on the Richter scale, only that the epicenter is practically a few yards away, in Foothill Park where families picnic and bobcats still circulate.

Our building is cantilevered, built by its Japanese designer to withstand much more destructive temblors than this one; actually, the building is like a garland of pods, five of them, thrown across a minor seismic fault which flows into the San Andreas.

We are in one of the foremost research places in the world, at PARC. I wonder how the visitors are taking this. There are always crowds of them: students, visiting professors and dignitaries. Xeroids from all over the world descend upon us like locusts. Officially, there are about 330 of us think tank dwellers, but on any given day the population in the building exceeds 500. Grady McKinley, the microscopist who left after his second heart bypass, counted 550 people on the telephone list.

I am sure that the Easterners have fled: MIT people are particularly prone to earthquake phobia, and will take off towards Coyote Hill, joining the horses at their eternal pasture, at the slightest sign of a tremblor. The old timers continue in

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their occupations, and some even remember that the building is cantilevered and that there are empty spaces covered by a metal plate between the pods we inhabit. I wonder if IBM, which has copied some of our architecture, has put in the gaps.

2.2 EARTHQUAKES CAN BE PERSONAL

Old timers at PARC are not bothered by earth tremors or storms. From PARC windows, we view some of the most spectacular rainbows, double and triple ones even – but the political battles still shake us. I remember a screaming match, the only one in which I was really involved in almost twenty years. He had promoted a clerk from a competing shop and given her a title similar to mine, with Information Resources in it. "Then she works for me, of course." "No, she doesn't; this is a big one!" I think he means the fight, but he is speaking of the earthquake, 6.5 on the Richter scale. Finally I notice the windows curving just a few inches from his head – it is a long, executive desk, I grab his arm, run to the doorway. This man is my mentor and my corporate guide, and my first thought is to protect him somehow; then I think of my staff.

2.3 MACHIAVELLIAN

Today I continue to talk on the phone, fatalistic, but I remember how I used to run out of the building with my Alto disk under my arm when an alarm sounded or the earth trembled under my feet. Early seventies, and I was one of the few privileged people in the world with a Personal Computer I could call my own.

All our Altos had names, like people. I named my first computer *Machiavelli*, in deference to the tactics I was forced to use for securing ownership.

2.4 PORTRAIT GALLERY

I should have stuck with it. I was bemoaning the budget situation, and the management's unreasonable position on it, when one of my students asked to speak to me. She had a marvelous idea.

Had I noticed how many handsome men circulated at PARC? And had I ever thought of making and selling a pin-up calendar, with some of the most notable specimens in appropriate settings – sprawled on the hood of their Mercedes convertible, or in bathing trunks at the side of a Silicon Valley pool? Or dressed for the ritual handball practice at the Decathlon Club?

I ran to my big boss ("Please don't tell my wife, Giuliana, or I will never speak with you again") and to other such executives, who represented in my mind "the men at PARC," without realizing that the proponent had in mind a much younger if untried set of candidates. I had the best acceptance from one of the most creative minds and best physiques in the Center, an electronics engineer in his seventies who often tried to retire but was always called back as irreplaceable.

"At my age, Giuliana," he declared, "I will accept, on the condition that I pose in the nude."

A dedicated runner and weight lifter.
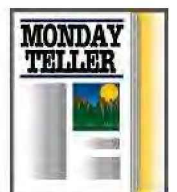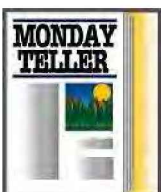
Chapter 3

Perspective

3.1 A NATONAL RESOURCE

Shadows from Boca Raton, Florida, haunt me as I sit through panoramic lunch in our cafeteria with some old time corporate attorneys. They are a knowledgeable, cynical group. Reciprocal trust runs high, and we talk shop as usual, sharing bitter-sweet feelings as the press calls PARC "The think tank famous for inventing ideas that made other people rich." How did we recover from the corporate wrath we experienced when Newsweek called us "a national resource" with Xerrox stock-holders footing the bill?

3.2 INSIDER'S VIEW

One of the group has a juicy story to tell, about a very senior executive from aerospace – an old-timer, seasoned engineer at the eve of retirement – who was hired by Xerox to run a division. "This guy is always being interviewed by the media people and is invariably asked how he feels about his employees and how – you know – they feel about him and other senior managers."

And how do they feel? We are all ears.

"Well," he says, "when I come to work in the morning I feel good; everybody

greets me deferentially, the girls are nicely dressed and coiffed, the men wear ties and nice shirts, looks to me like everything is right with the world."

And how do they feel about management, we wonder.

"Well, you must understand that I am up here, and I look *down* to where they are, so I see all those well groomed people. And what do they see? You must understand that they can only look *up* to us – and all they can see is assholes."

The consensus is that Xerox CEO Peter McCullough – a Canadian born, union loving, mostly uninspiring executive – launched PARC to spite IBM, in a fit of megalomania (*folie de grandeur*, in French, sounds better.) But he had no idea of what he was doing, and his troops of executives, known to the populace as "suits," were equally unaware of the impending revolution in the world of work. When PARC was founded, in 1970, IBM reigned supreme, cast as Big Brother Take All, in an ogre or gorilla role, which was later assumed by Microsoft.

3.3   THE BOCA EXTRAVAGANZA

In 1979 we had the Boca Raton extravaganza. We packed our Dorado computers, which had to be refrigerated, with their whole environment of printers, networks, user interfaces, and other portents, and sent them to Florida, in an attempt to per-suade global Xerox management, with wives and mistresses in tow, that PARC was for real.

Bravos were soon heard from the executives spouses and concubines, who wel-comed PARC innovation and understood its functionality. This was no surprise, because many of the women came from the secretarial ranks. But the men kept mum.

3.4   THE NAKED TRUTH

PARC Founder George Pake, incommunicado, decided to make one last attempt to break the Xerox executives' silence before they left. The exchange was witnessed by one of PARCs software architects, Bob Flegal, who happened to be present as CEO/President McCullough was boarding a limousine, airport bound. This is what Flegal heard::

George Pake: "We have shown you what PARC is about, and I trust we will hear from you soon. In the meantime, which presentation impressed you the most?"

McCullough thinks briefly, then responds: "I was most impressed by the sight of so many men typing."
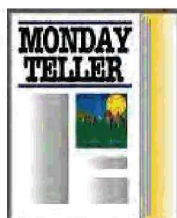
Chapter 4

Microcosm

4.1 CULTURE SHOCK

On vacation in Europe last year, a PARC scientist/best-seller-author/bongo-drummer and his wife were joined by a young researcher who had never been to Italy before. They landed at Leonardo da Vinci in Rome, took a cab to a hotel near via Condotti, and prepared for the ritual *passeggio*. They were about to merge with the crowd when the apprentice tourist stopped in his tracks, nonplussed:

"You would not believe it," he cried, "but all those guys and gals out there – they all look like Giuliana at PARC"!

I for one believe that Mediterraneans contribute to the global allure of the PARC population, and blend in successfully. In the cafeteria dessert line, however, the following conversation was overheard:

Mediterranean looking woman: "How I wish I was a six-footer like you guys."

Tall lean scientist: "If we rolled you out you would be."

4.2 LOOK AND FEEL

In fact, many PARC dwellers wonder if we cultivate a special look and feel which sets us apart from the rest of the genus scientists. Are we de facto out of the box?

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This consideration must have been in the mind of the European travel agent, a woman, who wrote to warn us that she was bringing a busload of tourists to look at the scientists in their natural environment and attire. She expected we would provide at least twenty five of them.

This requirement caused some concern because we only had one PhD who wore his hair in braids and his clothes rumpled, to the point that anonymous hands (a secretary?, a colleague?) would periodically leave a large bar of soap on his desk.

We added some campus folklore with the arrival of the students who came to PARC from all over the world bringing a tsunami of immature, innovative projects for the season. Offshoots of prestigious dads (e.g. a girl named Minsky with the briefest of shorts) and pheromones flying were part of our summer with the wiz kids, who were ferociously competitive among themselves.

Our own Californian doctorals from Stanford or Cal Berkeley were busy inventing ways to compute with new hardware designs and the resources of Mesa, the fed's Ada, Lisp, Pascal, Smalltalk, and a whole armory of such languages and architectures. Even the ones destined for glory kept a low profile. Of Eric Schmidt, future CEO of Google, PARC people remember a mellow voice, the smile, a wide brimmed hat; he was already unflappable, no matter what.

4.3 ELITE

Of the senior computer scientists, several were gentled by years spent in an academic climate. They were known as the Greybeards, the Dignified Ones. Chuck Geshcke hid behind his prophet's beard and was viewed as exceedingly saintly, before he went to found Adobe.

The researchers across the discipline divide material and social scientists, mathematicians, engineers, prophets were chosen from the top of their profes-

sion. Says who? Yesterday, back from serious surgery at Stanford, I found on my desk the special issue of Scientific American on Technology: almost all the writers had worked at PARC, and the rest had visited frequently. The best article, according to Vint Cerf and Bill Gates, was from PARC.

4.4 THEATRE: THE BEAN BAG ROOM

I was still trying to focus on the PARC look and feel – a figment of the imagination of journalists and travel agents? – when the head of the Center came back from Japan and reported on his visit to Sony headquarters.

The top executives were all present, welcoming him and thanking him for accepting their invitation. John (also known as JSB for short) was wondering which one of PARC's innovations and ventures would impress his audience, for a start.

"First choice, gentlemen? What would you like to hear?"

"Sensei," came the answer, "we only want to hear about the BEAN BAG ROOM!"

4.5 DIVERSITY

Yesterday we denied access to a group of Japanese businessmen who wanted to come to PARC and hear the presentations I failed to give in Japan earlier this year (I was in the hospital at the time, having a redundant organ removed.) Indeed, my hosts seemed unduly incensed by my no show, but then I remembered conversations with Asian visitors who had suddenly appeared in the doorway of my office.

"Are you Giuliana? How old are you?"

They proceeded to enquire about my state of health, prospects, marriage, all sorts of personal matters. I finally realized I had been selected as a female specimen of mature years, familiar with advanced technologies, who could be safely

sponsored by friends abroad as a painless example of diversity in action.

4.6   A MYSTERY

Rightly or wrongly, who knows, we have to beat back crowds of would be admirers, who all want to partake of the PARC phenomenon – the "legend," the "national resource." People almost genuflect when I am in the audience at a meeting, and respectfully answer my questions.

"She is from PARC," murmur the well informed, their minds gasping for breath after being exposed to the torrential eloquence of our JSB as keynoter or provocateur. "His vision – so erudite" Yes, he has read everyhing, from St. Augustine to the Dalai Lama and Camille Paglia.

They stand in a semicircle around me. There is no escape.

"Would you, Giuliana, please tell us what he said?"
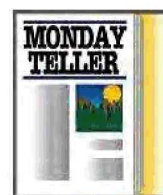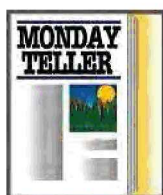
In apparent battle of wits with mentor VP Frank Squires, PARC's highly popular executive.

Chapter 5

Symbols and Legends

Is this the PARC circus? Another adventure of the mind, a gift from the Bean Bag Room? On the terrace overlooking the Bay I see several muscular young men juggling; they send objects like balls, oranges, and batons up in the air with various degrees of competence. Computer scientists, I guess.

I forsake my hamburger and fries and join a small group of spectators who stand enraptured. Somebody mentions program slicing.

Meaning?

"A form of complex programming," volunteers a bystander, coming to the rescue of a public of know-nothings – material scientists, accountants, lawyers and generics like myself. With a tinge of reverence in his voice, he offers a definition suitable for lay persons. Complex programs are like tapestries held together by threads or slices. Any programmer worth his salt can pick them out, and he makes his point gesturing with an invisible baton like a conductor on a podium. "This is like Old PARC," somebody murmurs.

Old PARC? Genius, professor, visionary, geek? I am looking for someone – there he is, one of the jugglers, I see. People say that he feels like Old PARC, but chronologically speaking is not.

5.1   THE INNER CIRCLE

The juggling practice is winding down. It is time to approach and speak up, in the direct PARC manner.

I ask, nonchalant, "Remember the time when that big shot came from corporate?"

"No, must have been before my time."

"You remind some people of Peter Deutsch." (of "Hackers" fame, prodigious programming, and a cappella music.) And don't you think you have much in common with Alan Kay?

Nah, he has never met Alan Kay, the legendary Smaltalk wiz kid, but to me the similarities are almost unbelievable; jazz musician (drums), self taught, cosmic range of interest leaning towards the visual arts, and extending to essential unorthodox skills such as juggling. What else?

Old PARC types talk about their work with passion. Rather than a mosaic of labs and at times conflicting personalities, they see PARC as one – a living, breathing organism.

5.2   ANOTHER CULTURE

Today I am thinking of a time when PARC was housed in two small rental buildings, on a hill populated by coyotes and rattlesnakes – now also horses at pasture in growing numbers. They are working partners for a research project concerning a contraceptive manufactured from the urine of pregnant mares (Premarin).

I avoid the fauna, enter the building with my new magnetic card, meet Jill, a Rochesterian who plays the qwerty keyboard like Paderewsky on the pianoforte. Rochester, in upstate New York, is considered a cow town by Old PARC. Some of its brightest citizens – PhDs, administrators and technicians – were strong-armed into accepting a dubious position in the terra incognita of California. It is now

common knowledge that "corporate" would never have released that particular bunch of primadonnas had it suspected what kind of personal and cumulative talent they possessed. "How young we were, how wild we were," sigh the Rochesterians, and relieve their nostalgia with drinks and readily available romance to be found at the Dutch Goose, a pub shunned by the locals. Old PARC and affiliates have taken over Rosati, a country greasy spoon they call 'Zot'.

5.3   SKIRMISHES

I have come to discuss with Jill the disposition of a Holy Writ, known to the initated as "The Pendery Papers," which collected the thoughts of some of the company's most creative minds – we called it "Inventing the Future." But our conversation proceeds amicably, boring. "How lost we are in California. We are all from Rochester, know nobody else, we must stick together," wails the majestic woman. She suffers from an addiction to pasta, which she refers to as "noodles," East Coast style.

To satisfy a vague curiosity I ask: "Who was shouting in the lobby yesterday? A veritable mother of a scene, that was."

Yes, someone had invited a group of junior secretaries to lunch, and Germaine was left behind, screaming "This is a cathouse!" I had to look it up in Webster Unabridged – I did not know what cathouse meant.

A LOUD KNOCKING FROM THE WINDOW – a slight young man precariously perched on the second floor ledge gestures to let him in. Jill slowly rises to her feet, opens the window, pushes the visitor down, he falls. I stand petrified, having just recognized Steve K, one of our most valuable software designers. "Must have lost his mag card again," Jill comments placidly.

There were no repercussions (would it have happened at IBM?), but Steve carried for hours the traces of his encounter with freshly mowed grass. His colleagues

were of the opinion that he was developing a fondness for taking naps al fresco, when a haystack was available.

I simply thought that, decorated with blades of grass, dandelions and wild oats, his countenance dreamlike, he made me think of a Silicon Valley Ophelia. Only the mustache did not fit.
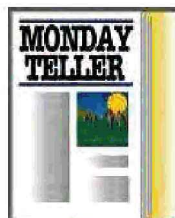
Chapter 6

End of Pax Electronica?

6.1 KIDNAPPED

I became a citizen of Rochester, N.Y. *honoris causa*, when my triple chocolate cake was voted "best at PARC".

So I was home after work, considering cakes with favorable political overtones. Pavlova? Queen of Sheba? Tiramisu? I concluded that our think tank's atmosphere is not domestic. I was ridiculed when I brought to work a sample of my *pat maison*. "She eats cold liver!" marveled the homeboys.

But all of a sudden, I was running to the telephone. I had turned on the radio, on a hunch, just when the announcer interrupted his broadcast. He said that the President of Adobe Systems, Chuck Geschke, had been kidnapped for ransom. They thought he had just been rescued by the FBI, but had no details.

I ran to the phone as pursued by demons, and called Chuck's home. The FBI man was cool. He told me he was "a friend" and who was I and why was I calling?

The scientist to whom, I believe, we owe much of computer graphics and printing, was kept prisoner for five days by two inexperienced banditos. In the opinion of historians and other qualified observers, that event marked the end of an era in Silicon Valley. Gone were the times when programmers, managers and venture capitalists would consume pepperoni pizza in the wee hours of the morning, sitting

amicably on the floor by the computers churning away. Bodyguards, mag cards, and tall wired fences became the accepted signs of the pax electronica.

Chuck's adventure was a popular feature in the media, where it remained almost unique, situated as it was, not in Sicily or Afghanistan, but in Los Altos, California, a tranquil bedroom for the upper middle class.

My mind gropes for parallels to the long, orderly innovation years we have enjoyed, and comes up with *"pax electronica*," a would-be parallel to the *Pax Romana*, and the *Pax Americana* of the recent past. But Rome and America were administrators of the peace, not its subjects, so the parallel doesn't really hold, warns a well known authority from Stanford University next door.

6.2   THE MIDAS TOUCH

People at PARC saw, in the abduction, a consequence of the sudden creation of conspicuous, personal wealth. I still hear in my memory's ears the joyful voice of a laser diode specialist, one of the best, calling in the PARC corridor:

"Giuliana, what is a business plan? They say I'm s'posed to have one. You've got to help me NOW!"

Baby faced, gentle Don proved quite adept at business plans: he gathered upwards of 40 millions (they say) in no time by producing his patents, all ready to go, no violence contemplated.

And why was Chuck Geshcke, the kidnap victim/hero, known as Golden Bear? His commanding presence, prophet's beard and communicator skills could often control on sight the Bean Bag Room's gyrations, relying on virtues alpha males seldom deploy.

"If this is not our Chuck all over!" said the people at PARC when they heard that he had forgiven his assailants and requested that clemency be shown to them. Genius Golden Bear style is notoriously unpredictable: I perfectly remember how

sternly he lectured me on appropriateness and decorum when I asked him to pick up a toothbrush at the drugstore in Leesburg, VA. We were there being trained in a management class.

6.3 NO RISK ALLOWED

When Chuck left PARC we shed tears, knee-deep in his papers that I was expected to release as if they were of no interest. He has no patents: innovations and inventions happen by the grace of God, I guess, not by scientists' endeavor.

I upheld my reputation as a risk taker and asked:

"Will you please take this bit of money, my savings, and invest in your new company?"

"We may lose everything – I doubt we will succeed. I will not gamble with your grocery money, Giuliana."

I would not stoop to revisionist history, especially when personal, but I'd like to remember that I put up a spirited defense, explaining why I should be welcomed by the partnership, grocery money in hand.

The ball was in my court.

I just didn't...

6.4 MORE WOE

My boss came to see me, crying, saying that she will leave PARC in four months; she was strongly advised to depart, and received a generous handshake. She was the champion of Empowerment, which she called "change strategy" and used it like a stiletto in her stocking. Her style of management, all skirmishes and shadow boxing and reconciliations, was straight out of one of the most liberal eastern universities. She was a dean there.

I did my best to comfort her. Told her that leaving is a wrench because PARC is like an uncomfortable womb, and people like myself cannot make their way out of it. Yet PARC veterans have often been sought for more gainful if less challenging positions in the Valley.

I explained to her how important it was to project a serene, collected image, but yesterday she went to an Exempt Female lunch, and publicly and loudly called our Head of Research "a bastard." (He is not one).

When I saw him next, JSB was waving a tiny laser diode, which came out of PARC research and has revolutionized the product line. The toner heads in Rochester must be in a state of shock, having to suppport the works we advocated and prototyped ten years ago.

We celebrated with a happy/despondent reunion at Moffett Field. The other Golden Bear, sunny Gary Starkweather, spoke of *his* laser printing as sort of a technology Cinderella.

So many of the old PARC boys were there that my ribs ached from all the hugging.
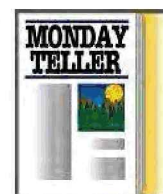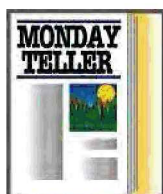
Christmas party at PARC. Celebrating with Shannon McElyea and VP of Research William Spencer.

Chapter 7

Turmoil on the Hill

7.1 ADVENTURES AND ENCOUNTERS

My friends insist that I HAVE to write the story of PARC's first 25 years, a daunting task in spite of the tapes I have accumulated and forgotten about (I found them under my bed, under a layer of scarves by Gucci and Prada). I was careful to use my own tape deck and tapes, and to give back to the company the time I spent, but I have interviews with the most prestigious scientists at PARC – when they left: Mitchell, Newman, Geshcke, Alan Kay, the works. The latest wizards have gone to Microsoft.

I am going to Los Angeles tomorrow for a Benchmarking Conference, staying at the Marriott again, and I will visit the gym. Last time I caused waves of consternation among the hotel staff, when I arrived early in the morning in my shorts and the T shirt I liked, with the picture of marijuana leaves I had not yet identified (anonymous gift from the Computer Lab). The hotel clerks tried to direct me towards a nice waffle breakfast or a ladies gym downtown.

The Marriott gym was better than adequate, but when I saw the only occupant my mind flashed "GROSS!" Mother-naked, an enormous individual was admiring his attributes, with the help of a pink mirror.

I took off like a bullet train and the waffles won.

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7.2   SOUL SEARCHING

Having a dialog with myself.

I am staring at my Mac, trying to recollect why and how PARC came about. There have been days recently when my whole world was busy debating how it happened.

Symbols and legends, indeed. The press has spotlighted, not imagined the myth of the Bean Bag Room, where ferocious battles of wits and resources have torn the PARC community apart. There were times when the research staff, sprawled on the oh so- soft carpet of the large airless room, could hear the sound of shuffling feet leaving the proud building.

Only a few months earlier management was casting about for new blood and ideas. "You see, Giuliana, PARC is very difficult to leave behind. It is a large, uncomfortable womb," they would say, as if to convince themselves of having made the right choice.

7.3   A FROG STORY

And I would think of Stig's frogs, from a Swedish management parable. Commonn green frogs from the countryside, when thrown into a kettle of boiling water, jump out immediately. If, however, they are bathed in water of a comfortable ambience and the heat is applied so gradually as to be almost imperceptible, the unfortunate frogs do not notice until too late. So much for management's mercy and exquisite torture being applied, remembers physicist David Biegelsen, one of first PARC employees (1970) and a noted wit. Those frogs remain in PARC's consciousness; they came with Stig Hagstrom, a cosmopolitan, authoritative manager and a member of a powerful group which year after year, manages to surprise us commoners with the list of Nobel Prize winners.

7.4 MILESTONES

In the contemporary language of *chic* fields like economics or sociology – to the sound of clapping hands, early PARC could be described as:

A COLLECTIVE INTELLIGENCE PHENOMENON EMERGED FROM A CREATIVE INTELLIGENCE COLLUSION

When the Center opened its doors, in the spring of 1970, it had been relatively easy for the Xerox corporate dreamers to staff it as planned. They had gathered under one roof the brainpower for the coming computer revolution, from the electronic engineers to the physicists and ...

Suddenly, voices from the BEAN BAG ROOM: "Gimme a break! The brightest students were going into computer science, not physics. In the outside world, computerist's salaries were higher than physicist's salaries. It's a fact."

Unfamiliar tense salary negotiations were introduced. PARC's very existence was threatened.

"When George Pake proposed to cut planned raises for the computer scientists so that the physicists could catch up, we threatened to quit and he backed off."

Dr.George Pake, future President of the American Physical Society, was recognized for outstanding leadership in a novel kind of labor impasse.

As far as we know, a fourth Martini never happened.
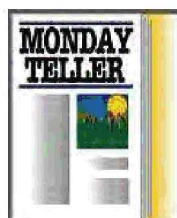
Chapter 8

Passages

8.1 GLOBAL IS COMING

I seem to be ubiquitous like crabgrass; I am going global. My son Larry, who works at Canon in Palo Alto, tells me their people in Japan have voiced a complaint: they no longer receive PARC's newsletter, the Monday Teller, which someone was transmitting to them. I started years ago writing off the cuff, PARC centric pieces about books, news and more for executives who do not have time to indulge. Some people at Microsoft read it.

Today even I (having used "Internet" since 1973) was impressed. I sent an e-mail to a scientist in Grenoble, where some of our most distinguished "brains" are cultivated in a modern rococo villa. He promptly called me on the phone:

"Sorry, Giuliana, I was very busy and forgot to prepare the abstract as promised." He knew that I would try to write the abstract myself (to his horror!) if he did not cooperate.

"Would a summary slide do?"

He faxed it. To and forth half the world, took exactly ten minutes.

I was invited to review the cost effectiveness of the DTIC (Defense Technical Information Center) which forces me to go to D.C. again – I was there last week. A funny thing happened when I was talking on the phone to a "user," a

physicist/engineer who complained loudly and insisted on being heard. DTIC, he said, has treasures of knowledge buried in the documents they have declassified, but not forwarded, to the rival NTIS (National Technical Information Center), at Commerce.

"You work at PARC?" he said, "then you will know what it means to have great ideas and discoveries and to waste them without even trying to put them into practice; you guys are expert at that." How true. But I gained a reputation as a miracle worker, having requested, from Defense, hushhush documents of interest to the PARC experimentalists. I imagined I had a smidgin of clout, in my role as Madam Inspector. My hosts were anxious to oblige, and I met people who had never heard of Silicon Valley or PARC. "What kind of an accent is that?" they would ask.

"California!" I answered with pride.

Today an old PARC hand came to dinner. Our Corporation, we fear, is on its knees, and Canon is focusing on IBM as its enemy/competitor. We wondered: will they take on Soviet Russia next?

Anyway, I mentioned that the latest hot topic is RPC, a networking data transmission technology where the acronym stands for Remote Procedure Calls.

"We called it INTERSCRIPT at PARC years ago, don't you remember? Butler Lampson thought of it, but Xerox was not interested." Gee, it really seems that, within a certain area, we really invented everything...

8.2   CENTAUR

Butler? The quintessential PARC scientist, an irascible genius with the face of a cherub and machine gun diction; Old PARC still measures speed of delivery in *lampsons*. He once pelted my assistant (she is a pain, I'll admit) with stale doughnuts found on the bench where the first personal computer, the Alto, was

being put together. I will never forget the night that Butler found me crying next to a brand new computer, at 2:00 a.m. We had only a handful of Altos we shared round the clock, and I was trying to produce my first electronic newsletter. There were no storage or retrieve commands available, then. I lost my text and made a fool of myself in front of some of the brightest people on the continent.

Butler motioned me away and sat at his machine like a centaur. Then his fingers were flying on the keyboard. Pages of apparently unrelated numbers – and my newsletter was back. Someone in the small crowd of admirers and Alto hopefuls explained that Butler enjoyed a photographic memory with total recall, like Renaissance character Pico della Mirandola.

8.3 MEGRIMS

It has been a long season, we may have lost some of our uniqueness. I talked to a friend, a frequent visitor to PARC; he was discouraged by our inaction, the politics, the decision makers in the East who have never approached a computer keyboard.

"Have you noticed, Giuliana, the senseless rehashing of never ending projects? PARC never looks outside, has "research" projects which compete with products already on the market!" Competitive intelligence, featured even in my resumé, is not welcome in these parts.

The Board Director, looking sheepish, came to town from Corporate, Stamford, CT; strong reactor types, myself included, were not encouraged to engage them in conversation. The scientists who acted as guides and presenters were carefully coached, and the others were told to smile and not say much, in case they encountered a board member in the men's room.

8.4 CHARACTER

How disappointing. Symbols and legends? Old PARC was not afraid to show emotion, and a sense of humor was part of the show. The staff of mercurial, anti-establishment Bob Taylor of Computer Science Lab, dozens of them, males and females, showed up on Halloween dressed in the sky blue T-shirt and blazer which are Bobs trademark. They were also holding in hand a can of Dr. Pepper, his favorite drink, and a symbol of his native South. No stronger sign of support from his people could have been offered.

Bob is a "preacher's kid" from Texas or thereabouts, with a touch of mysticism and cutting humor noir. Sometimes he plays the guitar to his soft baritone in the Bean Bag Room, with a circle of attending women at his feet. "And how are the women doing in this very techie harsh environment? The worried looking one, down there. From MIT, I think, a visiting academic wonders.

"She is all right," Taylor confirms. "She has sexy brains."
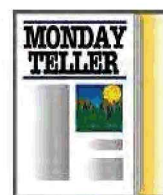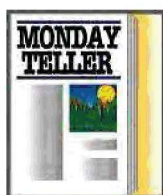
PARC's multinational presence: with Britishers Neville Connell, Bob and Mrs. Street.

Chapter 9

The New Labyrinth

9.1   FINDING THE WAY

It was a large, conspicuous ball of twine, with no ornamental pretensions but a rough arrow and one scribbled word: MINOTAUR.

This mythological welcome, by an anonymous contributor, greeted PARC dwellers when they were entering their own building at last. They had camped out for years in Stanford Industrial Park, wherever a suite of offices had opened up.

One could hope that the population of the new building, preppie and Ivy League predominating, had heard of the man/bull prisoner in Crete over three thousand years ago. The Minotaur's palace was a labyrinth, a deathly trap for visitors until Theseus made short work of the monster. The hero of the Greek legend then retraced his steps following the thread his girlfriend Ariadne had given him, just in case.

9.2   PARC'S FOUNDER AS NOVEL THESEUS

There was no Theseus for PARC, but tongue-in-cheek rumors started to circulate that the Center founder had entered the labyrinth at PARC three months before,

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never to be seen again.

Was he hiding, oblivious, in the "pods" devised by a Japanese expert to withstand earthquakes?

Was he avoiding confrontations with scientists who wanted to start a business?

Was he seeking respite from his valued but shrewish staff?

Was he suffering from a psychological problem, depression?

A close friend, member of the academic staff at Stanford, came to visit and found our top executive much changed. "What a surprise," she confided, "he is so remote, so different. And to think we used to bring students to him for morale building."

"You mean – like a coach?"

"Yes, he was so adept at counseling the kids in trouble, the pregnant coeds..."

9.3   THE FUMBLE

The reasons for our Chief's apparent disappearance were soon to become apparent. PARC's version of the Minoan horror story is based on the strained personal relations between George Pake and Xerox top Management, obdurate in refusing the gift from PARC's collective brainpower – or "collective intelligence," as the literati these days prefer to call it. We are still battling to refute the "fumble," which is PARCs shorthand for "Fumbling the Future: How Xerox Invented, Then Ignored the First Personal Computer."

That slender book, written a few years ago by two consultants who never spent a day at PARC, has cost senior management many sleepless nights.

It did not help poor George that he was given some resources to keep the PARC children-scientists happily playing in their sandbox. So frustrated was he on his trips back from Corporate, where his offerings were again spurned by the Powers That Be, that he (uncharacteristically) indulged in several drinks to soothe the

pain.

A parsimonious, traditional Midwesterner who married his high school sweet-heart, George explained that he was traveling first class because of frequent flyer upgrades, and was therefore entitled to compose at his leisure a "three Martini intemperate memo" on his trip back to PARC.

I saw the memos. They were quite a collection, witness to a frustration crescendo we all felt. Some Old PARC hands dug up from memory the notorious "strawberry joke" as applicable to he situation. (Strawberries and the Minotaur? Yes, strawberries!)

9.4   METAPHOR

About a guy whose life takes a turn for the worse: first he loses his job, then his car, his home and all his money. He sits crying on a bench near his ruined house, and a compassionate neighbor offers him a truckload of strawberries from his garden: "Come on, Bob, pull yourself together and sell these strawberries. This could be your start in the agribusiness."

Bob accepts the challenge, and rings the doorbell of a neat house in a middle class neighborhood. A woman invites him in, eyes the strawberries, and says she'll be right back. And does she come, in a black negligee, all perfume and smiles. Bob bursts out sobbing.

"What is this? Whats wrong?"

"I lost my job and home and the car and everything! And now ... now I will be fucked out of all my strawberries!"

Such, indeed, is management's lot.
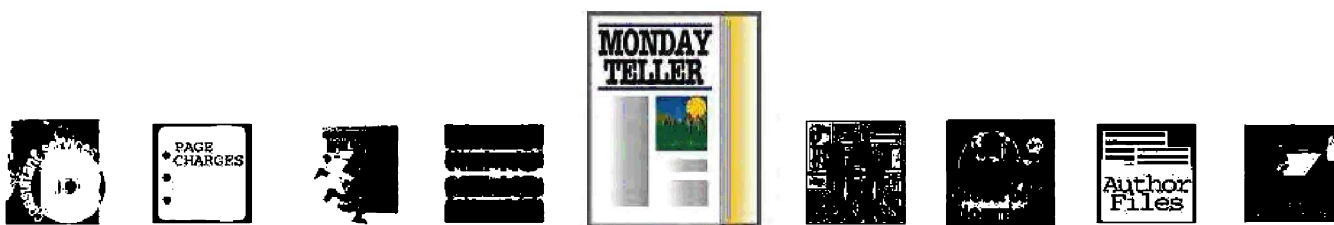
Chapter 10

Finale

10.1 A LITTLE BLACK NOTEBOOK

Alphabetical, under my name, the little black book he took from his executive briefcase read: "A risk taker." I shuddered. My friend was showing me how I rated in the confidential notebook the one that prudent VIP outsiders consult when tackling the unpredictable PARC dwellers.

I felt relieved as I read on, my presumably reckless nature kept in check by a bookish bent and communication skills I have somehow acquired. I can be trusted to describe the mood of a lab, the thrill of innovating, the miniquakes of the San Andreas. Yet risk is ever present for the brave, exposed to all kinds of social difficulties.

"Hi," from the doorway. There is a "suit" I have never met before waiting for me. "Is it true that Jack is divorcing his wife?" "Ill tell him you asked." The warning effectively removes the lone intruder.

10.2 DRESS CODE

People wonder about our dress code, which never existed, and comment about PARC management's habit of casual elegance – some executives today are wear-

ing sport shirts and colorful suspenders. These are "braces" in British parlance, while, for the English, "suspenders" refer to a feminine garment of intimate design. Today one visitor from England, himself a braces man, is incensed by this lexical inconsistency, and seems to assign some of the blame to me, as the representative of local communicators.

We are approaching mahogany row. "And what does Dr. Pake, our Commander in Chief, wear for casual/elegant?"

I see a traditional graybrown suit; his tie is non-descript at best. "For sure he is daltonic," the secretary comments, sullenly.

10.3   THE HOLY WRIT

I was looking for the PARC Holy Writ, the document that circulates among the cognoscenti, but few of us have experienced its impact to date.

The papers – a slim notebook – carry the name of Don Pendery, who was trained at IBM and then became Director of Corporate Planning at Xerox. He obviously was a risk taker who sought out the innovators, let them be free to invent the future, and enjoyed the results.

Seven papers came out of a meeting Pendery held at PARC in June 1971. Today, readers approach them with a sense of awe; some prophecies fall wide of the mark, like the demise of paper, which has not happened yet. They call the future mouse 'manipulator.' "Today's technologies are not quite extrapolatable," writes wunderkind Alan Kay.

Pendery's Papers present "a view of an office as a system of processors (human and otherwise) communicating knowledge to one another..." This is Jim Mitchell, a top PARC risk taker, writing in 1970.

10.4 PHONE CALL: MEMORABLE

Time for a staff meeting. "No phone calls, only my family, my boss, and the Pope!" I had organized my priorities, but the phone rang anyway. The voice of a former protg of mine, now at Microsoft:

"Will you do something for me, Giuliana, but right away? Some guys here were talking about what PARC is doing – office systems, pretty good stuff. You had some tapes, done with a hand camera, slides, other things. Call FedEx, tell them to ship them over, on the double, I beg you!"

Meantime, an unrelated strategy session was developing in our CEO's office at Corporate in Connecticut. My boss was there, sheltered from his adventurous California subordinates. It is to his credit that he stepped out when summoned, saying "What's up?" rather than "This better be a good one, Giuliana."

In its way, it was. Big Xerox just said no on the spot. No interest. Nothing significant had happened.

Old PARC kept on working round the clock. My former subordinate, the protagonist, so to speak, of the beguiling phone call, became an influential Vice President in Redmonds, Bill Gates's headquarters.

Then Steve Jobs came to visit.

10.5 TROJAN HORSE

It happened after someone at Corporate – one of the "suits" – remembered that Xerox already owned 3 percent of Apple. It had been acquired as an investment.

So Steve Jobs, the aggressive innovator head of Apple, was one of us! Why not invite him over and show him what good stuff PARC had? And we could have that cute young PhD, the redhead, do the presentation!

10.6   BUT WHY IS SHE CRYING?

Steve was delighted by the invitation to view the systems, the hardware and software we had been developing in Palo Alto. He came, conquered, hired.

You know the rest of the story – how he produced the experimental Lisa, then the user-friendly Macintosh, and created the spectacular vision of Apple, which became the main source of innovation in the personal computing world.

And how about the Innocent – me? Did I see my opportunity, grab at the chance? In-depth information, expert opinions, time windows for brainstorming – did I contribute any?

The little black notebook was lying. Risk avoidance was my choice, although I shudder now.

What if Bill Gates had come to visit instead of Steve Jobs? Would Silicon Valley be different today?

From the innermost pages of my memory:

THIS IS THE WAY IT WAS

Giuliana Avanzini Lavendel
Palo Alto, CA, USA

03/03/2011

Acknowledgments

I thank my husband and myh family for their support, and also the friends who brought such joy and significance to my life. They are too numerous to count, but I will mention Kathy Jarvis, who was splendid and ready to carry the torch when I left PARC, and Jeffrey (Jeff) Croke, MD, who has kept me alive and writing with his unique combination of wisdom and knowledge.

I also want to thank two people for the beautiful illustrations in the book.

Marzia Faggin (pr. fah-j'in) made the PARC Technical Information Center icons that you'll find throughout the book and on the back cover. Marzia is an intensively trained design professional, a native of Silicon Valley. She holds a Bachelor of Fine Arts from the Istituto Europeo di Disegno in Milano, Italy. After graduation, Marcia held various posts as a graphic and web designer in several US companies, including General Electric and Xerox PARC. Moving to Florence, Marzia became interested in subjects like paper preservation, but decided that her real calling was painting. She held her first solo exhibition in Italy, and it was a success; she is now preparing for another personal show, to be unveiled in Houston, TX, where Marzia now lives with her husband Manuel Terranova and three year old daughter Isabella.

Half way between engineering and art, and at home in both, Renaissance man Larry Lavendel has produced one of his stunning, eye-appealing designs for the *Innocent in Palo Alto* diarist, to whom he is closely related.

And for help in the preparation of *Innocent*, Kathy Jarvis collected the Monday Teller essays and wrote an introduction to them, Dan Bloomberg assembled

the book, and Xerox PARC kindly gave permission to publish the Monday Teller essays. Finally, I want to acknowledge the help of the Google Publisher Program. Google scanned the Monday Tellers, did the final composition, and published the book on a non-exclusive basis.

Appendix: Monday Teller, 1990 - 1999
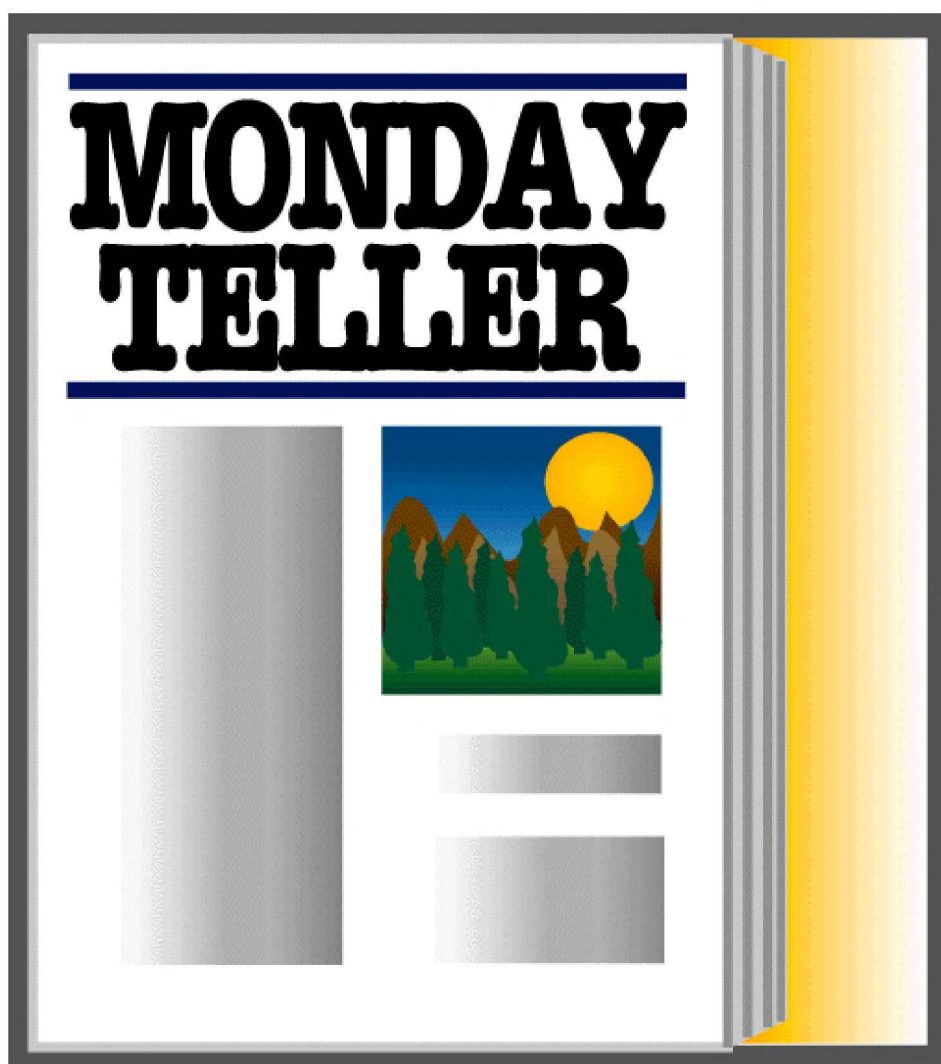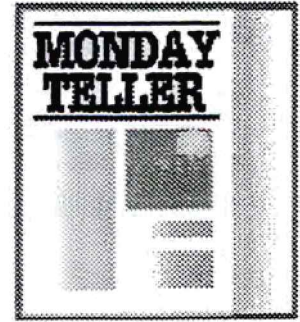
Monday Teller
1990-1999
Book Reviews from the PARC Information Center

By Giuliana Lavendel
and
guest contributors

August 1999

Foreword

The 1980s brought a flood of books about management for quality-seeking, leadership-oriented and reengineering-minded business executives. Some books were excellent and some were not; many featured a dense, academic writing style. Happily for managers at the Xerox Palo Alto Research Center, Giuliana Lavendel began writing précis of notable new books, capturing their important ideas and also reflecting the styles and vocabulary of the authors. That effort grew into Monday Teller, now a series of more than 100 book reviews with a Xerox-wide readership.

To glance over the Monday Teller titles is to scan a near decade of writing on management, competition, business strategy and forecasting. All the landmarks are here. In each Monday Teller, Giuliana Lavendel has put the explication of the book first. Detecting her opinion of these trend-setters is occasionally a matter of reading between the lines, absent a ringing endorsement of "good reads" such as *The Age of Unreason*, by Charles Handy.

Many of the reviews have also appeared, in revised form, in *Competitive Intelligence Review*, the journal of the Society of Competitive Intelligence Professionals.

This compilation includes, with thanks, contributions by Dan Bloomberg, Carl Hauser and Richard Kade, a dedicated reader who has also lent his technical support over the years. It is otherwise entirely the work of Giuliana Lavendel, now retired as Manager of Information Resources at PARC.

Kathy Jarvis
PARC Information Center
August 6, 1999

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Monday Teller 1990 - 1999

Monday Teller

We inaugurate a new service from the PARC Information Center with a brief review of the latest must-read for high tech managers. We plan to review a new and recommended book or report each Monday (with allowances for holidays). The topics will range from technical to business, reflecting recent arrivals at the Information Center. We are setting up a special DL for the Monday Teller; please reply to this message if you wish to join.

MONDAY TELLER no. 1: Competing Against Time

Competing against time: how time-based competition is reshaping global market, by George Stalk and and Thomas Hout. New York, Macmillan, 1990.

The Boston Consulting Group has spoken, and it is not only about cows and dogs. Compressing time is the new strategic weapon, which spurs higher productivity, allows for higher prices, increases market share. It even reduces risk: for instance, the cost of over -or under-forecasting customer demand becomes more burdensome with time.

The classic time-compressed firm is the large corporation which has "flattened hierarchies and adapted process management to satisfy rapidly changing market needs." The closed-loop-cell, a multifunctional, semi-independent sub-organization with its own schedules and objectives is the ultimate archetype, and also satisfies Boston's craving for hyphenated words and concepts. Canon, Matsushita, and a host of Japanese companies are time-based competitors; so are Federal Express and Sun Microsystems. There are charts galore, and case histories, some of which may not withstand the test of time: Citibank, the fastest and largest mortgage lender in the nation, is in trouble just because of that success-disaster.

A veritable cookbook on how to give the customer the most value for the least cost in the least elapsed time, "Competing" seems to have covered all possible scenarios, and lists Xerox Corporation among the budding time-compressors.

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC Information Center.

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Monday Teller

No. 2   January 2, 1991

PARC INFORMATION CENTER

"Structured Rapid Prototyping", by John Connell and Linda Bryce Shafer (1989, Prentice-Hall) is a cookbook which tells you how to prepare the soup, how to bring it to boil and so on, all in 13 chapters and almost 300 pages. The subject, however, is of current passionate interest, especially for readers who limit themselves to perusals of Chapters 1 (Introduction), 3 (Tools, Techniques and Methodology), 5 (Developing an Initial Rapid Prototype) and 13 (Making Prototyping Work in Your Environment), which sort of sums it up.

The authors define RP as "an easily modifiable and extensible working model of a proposed system, not necessarily representative of a complete system, which provides users of the applications with a physical representation of key parts of the system before implementation." (Editor, where are you?)

RP requires a full complement of specialized hardware and software, such as 4th generation language, relational DBMS, and platforms which are comfortable with open systems where PCs, minicomputers and mainframes communicate freely. Visually programmed modules are an asset. Preliminary specifications include DFDs (data flow diagrams),ERDs (entity-relationship diagrams), and CFGs (control flow graphs), which are a simplified version of structure charts. These are to be found in up to date CASE tools. The project plan, a statement of understanding, consists of 7 elements: approach justification, goals, scope of effort, development tools, user responsibilities, deliverables, preliminary schedule. Iterations at various checkpoints in the life cycle model are the norm. Users and developers, in small teams, collaborate to produce artifacts like the "context level dataflow diagram." Users will provide testbed and data, attend meetings and reviews, approve the final product; they will, in brief, walk through the whole thing--if

someone in the know will translate for them the authors' English.

* * * * *

"IDC White Paper: Information Systems--The Next 10 Years." This 10-page position paper, which is sponsored by Hitachi Data Systems, Ltd. (claiming to invest $11M in R&D daily) states that announcements of mainframe demise have been premature. Mainframes will shoulder the burden for distributed processing power and provide the data warehouse for the parent enterprise. Offering high volume transaction processing, security mechanisms, standard procedures, control over storage and peripherals auditing and OS integrity, mainframes will play the leading role in computing architectures.

The user-centered '90s will integrate workgroups on minis and micros with the mainframe environment of the global enterprise; by 1995, advanced diagnostic capabilities will eliminate outages. Expert systems, Unix, fiber optics, 4th generation languages are essential ingredients for this scenario.

by Giuliana A. Lavendel

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Monday Teller

No. 3   January 9, 1991

PARC INFORMATION CENTER

McKinsey has analyzed its proprietary database of 1989 corporate performance, spotting trends, issues and opportunities. Charts and graphs abound on market growth, industry structure and financial performance; the top 50 companies (including Xerox at #23 and Canon at #22) are ranked for revenue, shareholder return, etc.

Would that McKinsey could paint a more optimistic picture: rapid technological development is the upside; fundamental shifts in demand patterns and intense competitive pressures characterize the downside. McKinsey predicts success for those cos. which understand the structural forces at work and take up defensible positions.

Industry growth has slowed dramatically: down to 5% per year by 1989 from 20% earlier in the decade. McKinsey predicts continued slow growth with more volatile swings between segments and geographic markets; 20-30% annual growth in Europe and Japan will not be sustained. The world economy cannot absorb technology much faster than the 1989 revenue level of $284B. Furthermore, the shortage of applications software development skills, at both vendors and users, will slow the deployment of technology.

Most industries consolidate in the face of slower growth and lower profits but the computer industry has fragmented: the 1989 top 10 had combined market share of 48% in 1989 vs. 65% in 1975; IBM has seen worldwide revenue share drop to 20% from 37% over the same period.

But in the 1990s existing companies will consolidate: half of the current industry leaders will not exist in their present form in the next 5-10 years; the surviving powerful competitors will base their advantages on new concepts and models of success. There will still be new entrants in the marketplace, using technological advantage to take market share. The key will be "executional excellence" and most cos. will fill one of 6 fundamental roles: broad-based market leader (requiring continued high investment in R&D); leadership platform company; hot box or niche supplier; geographic marketer; application solution provider; integrated solution provider. Also in the 1990s demand for standardization will shift power to component suppliers and customers.

The return on sales of the top 70 worldwide computer cos. has dropped dramatically, from 9.2% in 1984 to 4.1% in 1989. The biggest challenges for companies in the 1990s: developing skill-based advantages appropriate for their roles (although overstaffed, many lack key skills to participate in high growth segments); managing with thinner margins (increasing SG&A headcount/spending to gain market share at DEC and IBM proved unsuccessful), strengthening organizational structures and management practices (e.g. more sophisticated pricing policies). (KSJ)

by Giuliana A. Lavendel

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Monday Teller

No. 4   January 15, 1991

PARC INFORMATION CENTER

"Control through communication: the rise of system in American management" by Joan Yates of M.I.T.'s Sloan School of Management (Baltimore, Johns Hopkins University Press, 1989, $29.50) is an exquisitely learned book which our Sr. Management has taken to its bosom, like Zuboff's "In the Age of the Smart Machine." This opus, however, is amply endowed with notes and illustrations of memorabilia, such as a picture of a squinting, perspiring customer handling an instrument of torture known as the letter press--the first mechanical copying machine.

Prof. Yates focuses on three case histories. One concerns the Illinois Central Railroad, the first of the land grant institutions of its kind, before 1887 (Communication for Safety, Consistency, and Honesty) and after that date (Communication for Compliance and Efficiency); the second is about Scovill, a fastener manufacturer which enthusiastically adopted a paradigm of internal formal communication in a period of growth (Gradual Systematization at Scovill). Finally, and more exhaustively, Yates studies the communications patterns at a large company which is still alive and well in its original persona; she examines Du Pont's First Century (Conservatism in Family and Firm) and Du Pont, 1902-1920 (Radical Change from a New Generation). After 1920, American management embraces the communication web, and control through communication becomes commonplace.

Yates documents the fundamental shifts from scientific to systematic management, from record keeping as descriptive medium to analytical tool. The workplace, after being de-personalized, gave rise to the corporate welfare movement, to which the corporate library, cafeteria, and fitness center owe their existence.

Technology is inadequate or misdirected. The typewriter was invented as a tool for court reporters, and the telephone failed to replace internal written communication, which emerged late in the 19th century--before then, all correspondence was external. Do you know why the pigeon hole desk failed? Retrieving folded items was inefficient, and filing, first flat, then vertical, became the "technology of choice."

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC Information Center.

Monday Teller

No. 5   January 21, 1991

PARC INFORMATION CENTER

"The IDM Primer: Managing Documents Intelligently" by New Science Associates.

This 73-page report reviews the image-based technologies and issues which the Intelligent Document Management Service sees as allied topics. Image storage and capture is only a small part of document management; sweeping changes in the way we process information are needed, including streamlining current work practices. For instance, "Groupware: Computer Support for Intelligent Group Work," is a field characterized as suffering from information overload, task overload, and poor communication. Following a review of products, listed by the context in which they are used, New Science concludes that "In an era when everything seems to be accelerating except for our ability to cope, Groupware may help relieve the burden by increasing our productivity." Similar coverage is dedicated to Imaging, Intelligent Text Retrieval, Work Flow Software, OCR, Hypertext, etc.
This primer may be useful for anyone facing decisions, looking for updated, graphic information for a talk, or simply needing an orientation on the complex interfaces of documents and images. While some portions of this report reflect New Science's editorial opinion, most of it is non-judgmental and cautious; in the OCR chapter, New Science observes that "In order to bring a complete imaging solution to market, these products (Datacopy's and Kurzweil's) will also have to be integrated with Xerox's own document processing systems." (G.A.L.)

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"Soviet Economy in Transition: Business Challenges and Opportunities for Foreign Business." by SRI International Business Intelligence Program.

The New York Times (1/20/91) says that Soviet investing is getting dicier, but this recent SRI report quotes an old Russian proverb: "You are better off having 100 friends than 100 rubles," because in the Soviet Union connections are more important than money (isn't it the same in Japan?).
The next five years are going to be difficult for Western companies operating in the Soviet Union. Multiple relationships will be of paramount importance, since we need to understand not only which Soviet organizations are involved in a project but also how these relate to one another. SRI attemptsto chart these complex relationships. Among sectors of opportunity, SRI identifies products and services for infrastructure modernization, including information and telecommunication systems. Opportunities will exist for hard currency sales to local governments, especially in highly industrialized areas such as Moscow or Minsk; cooperatives will also present increasing opportunities for foreign firms. Gosbank will be the central bank in a typical two-tiered banking system; the USSR Chamber of Commerce and Industry is emerging as a powerhouse, with ties to more than 5,000 Soviet enterprises.
Lack of "road maps," interference by Ministries and by an extensive bureaucracy of chinovniki, political unrest and a timid leadership are obstacles to be reckoned with, along with the current Societ macroeconomic imbalances. These are evident in the growing deficit (more than 10% of GNP) and an unsatisfactory ratio of wage growth to labor productivity. It also does not help that Russians prefer to barter rather than buy, and hold their rubles tightly.

by Giuliana A. Lavendel

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Monday Teller

"The Fifth Discipline," by Peter Senge. (Doubleday, 1990)

Work must become more "learningful;" most of us love to learn, and profound teamwork is an uplifting, unforgettable experience. This M.I.T. expert's storyline about the art and practice of the learning organization sparkles with quotes, from Archimedes to Bill Russell of the Boston Celtics. You are invited to dissect the parable of the rug merchant and the snake, and to test your skills with MBA teasers like the "beer game." There is even a mention of the Gaia hypothesis--Mother Earth as a living, breathing organism--in the final chapter. It is no wonder some managers are so absorbed by this book. (Could you put down a Tom Clancy thriller?)

Senge sees five component technologies converging in the learning organization. The book's eponymous Fifth Discipline is Systems Thinking, the integrator of all theory and practice, which makes dynamic complexity easier to handle; "dividing an elephant in two does not produce two small elephants." Since we are part of the lacework ourselves, we have problems identifying the pattern of change. We can only manage via a conceptual framework which combines new tools and an intuitive worldview. Its first building block is Personal Mastery, which is just a special level of proficiency in both the spiritual and the material realm; this is where personal and organizational learning come really close. Mental Models follow. They are, of course, our views of the world, which we sometimes guard jealously in the subconscious. To achieve the enlightened state of mind, the metanoia which is the leavening of the learning organization, the third and fourth disciplines come into play. They are Building a Shared Vision of the future and the capacity for Team Learning through dialog in the platonic, investigative sense. Without the latter, a team of committed

managers with individual IQs of over 120 could show a collective IQ of 63.

Business, in Senge's opinion, is the locus of innovation because it has both freedom for experimenting and a checkpoint at the bottom line, but few large corporations live half as long as the average human being. Senge illustrates his theories with a bewildering array of case histories in nuce, such as the influence of M.I.T.'s Forrester and his disciples on DEC, the giant they founded. Disasters are also part of the picture. Jimmy Carter was a victim of complexity, since his thirst for knowledge left him drowning in details, without a clue to the perspective. This is why the Fifth Discipline is so pivotal, since it allows us to step back and examine the whole (see chapter entitled "The Art of Seeing the Forest and the Trees").

The active force in an organization are its people, especially people willing to live under emotional tension. At PARC, says the author, the Dynabook failed, in a sense, because it never became a reality, but the vision reshaped the computer industry.

It remains to be seen whether this tour de force can affect the learner's thoughts and behavior over time. While unravelling the interface between Fifth Discipline and the four ancillary tools, Senge guides the reader through an entertaining maze of revelations which are, in effect, recognitions. For instance, about time, which the Japanese see as an ally and Americans as an enemy; in Japan, when people are sitting and thinking quietly, nobody will interrupt them, while in America is is assumed they are not doing anything important. About the strategic planning process, which seldom produces genuine vision, the author reminisces that the impetus for Canon's entry into the personal copier business came from an oversea sales subsidiary, not from Japan.

Physicist Heisenberg, after a lifetime of encounters with the likes of Pauli, Bohr and Einstein, concluded that "Science is rooted in conversation." Potentially, the IQ of the team can be much greater than the IQs of the individual participants. What better justification for the "envisioning laboratory," where researchers, implementers and customers create the continuously innovating company?

by Giuliana A. Lavendel

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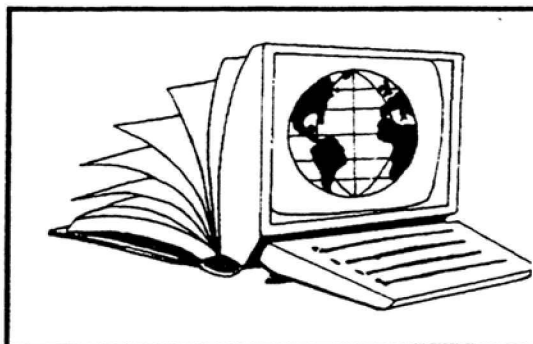
Monday Teller

Scientific and Technological Relations Between the United States and Japan: Issues and Recommendations by Dr. Frank Press. (Washington DC: Commission on US-Japan Relations, 1990)

Hot off the presses in D.C., this report was prepared for a group of benefactors which include the American Express, Ford, and Rockefeller Foundations, and SmithKline Beecham --"an American group" which "works for American interests" and is currently headed by the former chairman of Honeywell. Frank Press, President of the National Academy of Science, and formerly a vocal, issue-oriented Presidential Science Advisor, surveys in 14 succinct pages some of the hour's most pressing problems. He looks at the scientific and technological relations betweeen the US and Japan, and identifies six main issues we should worry about:
Japanese Investment in Small, High Technology Corporations;
Treatment of Multinational Companies;
Support for Basic Research;
Foreign Funding for US University Research;
Asymmetry in Training;
US-Japan Cooperation in Science and Technology.
It is comforting that Dr. Press has recommendations to solve all of the above-- with the help of time, good planning, and a modicum of luck. The text reads speedily, but it is quite informative.

●For instance, in the case of multinational companies, Press's recommendations are the following:
A formal policy should be issued allowing a foreign multinational operating in the US to participate in unclassified, government sponsored projects IF RECIPROCITY can be established with the country of origin.
A federal study should be commissioned about foreign companies operating in the US--

including tax breaks and other incentives offered by local governments.
The Japanese government should be invited to broaden the international dissemination of its sponsored research results. Other observations and suggestions:
● Japan is our second largest foreign investor (still behind Britain); small, high tech companies with large R&D expenditures are a particular target, since they need more patient investors than can be found at home in the US. This worries some experts, because these firms are launched by some of our most innovative "techies." If we see innovation's fruits removed from our shore, R&D support may dry up. However, there is no evidence that foreign investments are bad for the economy, and some believe the contrary; Press wants better data, more sensitivity by the acquiring Japanese firms to U.S. public concerns, as advocated also by a recent MITI report. "The impatience of American capital" could be cured with a better tax climate.
●The principle of reciprocal access to government-supported R&D has not been extensively tested, especially where collaborative projects a' la Sematech are concerned. In the US, collaborative research is university centered, but Japan is better at leveraging its modest public outlay in support of industrial research-- which was up to $73 billion in 1989. The US spends twice as much, equally divided between industry and government. MITI recently concluded that Japan's basic research allocations are inadequate, and recommended doubling government support for basic research, a now puny percentage of GNP if compared to those of other OECD nations. Since so much of Japanese R&D comes from the private sector, Japanese companies should make more information available and open doors for foreign researchers.
●We should create with Japanese university professors the links which are now "mediated"

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by Japanese firms. There were 24,000 Japanese students in US universities in 1989, the third largest foreign group behind China and Taiwan; American students in Japan were only one tenth of that number. Substantial support for Japanese students in America comes from US public funds and university endowments. Therefore, Japanese companies doing business in the US should establish a $300M fund, for use with matching US grants, to support research facilities in American universities.

●Some foreign scientists believe we search for partners post factum, only to share costs rather than intellectual challenge. We become unreliable when Congress or a new administration reverse prior commitments, after foreign partners have made large investments. A firm American commitment should be made to the Human Frontiers and the Intelligent Manufacturing System programs, both launched by Japan.

An attachment by the National Research Council's Office of Japan Affairs adds considerations and a wealth of statistics on "Asymmetries and Potential Similarities: Scientific and Technological Relation between the United States and Japan." American scientists publish five papers for each paper by a Japanese researcher. Such weaknesses can be traced to the Japanese university system and the "koza" which rewards seniority rather than brilliance, but foreign fellows are being invited to Japanese labs, and chairs have been created at Tokyo University for foreign professors. Japanese company-funded R&D has exceeded ours as a percentage of the GNP since 1970.

Japan's goal is to become a more open, knowledge-based society, but the barriers to trade remain: consumer goods sell overseas at prices 40% lower than at home. US R&D is weakened when manufacturing is shipped abroad, but are joint ventures with foreign competitors an advantage? Japanese money revitalized American steel firms, but, again, the small high tech companies are in danger. Establishing production and/or R&D joint facilities in Japan is a recommended strategy for large US companies (hooray for Xerox!). As globalization goes on, it will be difficult to distinguish American from foreign concerns, but we need to examine joint ventures to make sure that there is a clear benefit to the US side.

In the appendix, a laundry list of US strengths (worlds's strongest sci-tech base, etc.) and

weaknesses (technical illiteracy among the young, etc.) vs Japanese strengths (dedicated, skilled workforce) and weaknesses (inadequate scientific base) confirms that the opportunities are many for the country which works smart.

by Giuliana A. Lavendel

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Monday Teller

No. 8   February 12, 1991

PARC INFORMATION CENTER

"Overcoming Barriers to Open Systems Information Technology" by the User Alliance for Open Systems.

This IS grassroots; it is the first report of the User Alliance, which is in itself an interesting phenomenon. Only last year, in May, it used to be called The Atlanta 15, then it became The Houston 30, and now, after a meeting in Warren, Michigan, last September, it is almost 1000 members strong. It talks to users, developers, integrators of information systems (IS), and has just recently made the decision to ally itself with COSI (Corporation for Open Systems International), where Bechtel's O. Ray Pardo has succeded Bob Metcalfe as chairman. The original visionaries are from DuPont, Exxon, Chaparrral Steel, GM, NASA and such exalted places.

The Alliance believes that companies have experienced a degradation of technical expertise of 30%-50% over the last 10 years. Instead of embarking on innovative projects critical to productivity, users were forced into maintenance postures by proprietary systems. Users are defined by inference: "Open systems are those which allow unimpeded access to the information required to do one's job." The "techies," says the Alliance, have done their stint; it is now time to involve top executives, and to make them understand that, if they remain passive, their corporations may be struggling for survival within 5 years. Standards and specs also require the support of some Big Boys, since they cannot be considered serious candidates for open systems until a body like ANSI, CCITT or IEEE sponsors them.

The Alliance has concocted a problem-solving, productivity-enhancing wheel which looks familiar to LTQ practitioners. It has also identified 9 significant barriers to OS, and 10 global actions to overcome them. The barriers are vanilla:

--no process to identify requirement for OS;
--no vehicle for users to exert leverage on vendors;
--a legacy of investments in existing systems and applications;
--inadequate vendor-neutral OS based on industry standards;
--tactical (short-term) in lieu of strategic planning;
--no linkage to business objectives;
--fear of competition from proprietary systems;
--no North American plan;
--no shared vision for developing an OS process.

Barriers allow vendors to divide and conquer, confining users to proprietary architectures which increase costs for acquisition, development, maintenance, and porting. Education is paramount, targeting users and key executives, who must be corralled and persuaded. The vendor -- an unidentified presence -- is the quasi sinister power which "must be prevented from hindering the development of milestone standards."

The report somewhat tediously reviews each barrier, its rationale, impact, and possible countermeasures. The vendors' fondness for the installed base burdened with legacies (networks included) combines negatively with management's characteristic risk avoidance. Success stories in favor of OS should be circulated, since management still does not see value added in OS, and suspects that OS cannot handle the transaction volume like their trusted "home" tool. A culture change is needed, sponsored by a support group which could use, as a horrible example, the saga of an entrenched computer center refusing to adopt the PC revolution. Additional "global actions" now planned are: establish a body of research, create an education process and information repository. It will be interesting to see

whether the User Alliance/COSI marriage, which was celebrated last December in McLean, VA will fare happily until the next meeting, which is slated for March in Dallas.

Much repetition and irritation is evident in this report, but many observations ring true. If standards are not defined quicky and precisely in North America , globalization will shift market share to Europe or Japan. OS legislation should be promoted with the help of lobbyists. Globalization forces constant change, and adapting to this perpetual motion is more challenging than the technology itself. "Make a public statement against systems entrapment," exhorts the Alliance. This is what the report stands for.

by Giuliana A. Lavendel

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Monday Teller

No. 9   Feb. 18, 1991

PARC INFORMATION CENTER

"Computational Models of Scientific Discovery and Theory Formation," edited by Jeff Shrager and Pat Langley (Morgan Kaufmann, 1990).

"Until recently," says the preface, "the formal study of science has been the domain of philosophers and historians, and the processes of discovery have been surrounded in mystery." Now cognitive science can be applied to the intriguing area of discovery, by using computational paradigms. A new field is born, where different disciplines experience a convergence of goals and methods.

It was challenging to test whether this technical book, originated by a symposium held at Stanford University, could be read and appreciated by the mythical "well informed layman." The editors: Shrager is one of PARC's visionary researchers, functioning between computer science and cognitive psychology, while Langley is a NASA scientist with an academic background, specializing in machine learning and intelligent agents.

This book is an anthology of recent works on scientific discovery --a complex process which only recently computers have attempted to model. Basically, it is a historical work, culling examples from orthodox sciences like geology and physics. Its objectives and infrastructure are laid open for the reader in an introductory chapter entitled "Computational Approaches to Discovery," where the authors carefully deploy a specific vocabulary to describe the process of knowledge acquisition. Research on scientific discovery is divided into two periods: focusing on taxonomy and laws from the late '70s to mid '80s, and expanding in various dimensions in post 1984 years. The authors mention categories of intellectual activities, such as embedding and embodiment, which go beyond computer models since "..the scientists is an embodied agent embedded in a physical and social world." Laboratories, collaboration, and communication are important ingredients because modern science is too large and expensive to be encompassed by an individual researcher.

To present the computational modeling of scientific behavior in a new field, AI scientist Peter Cheeseman uses the discovery of continental drift and plate tectonics, first proposed by Wegner in 1915. Revolutionary conceptual changes are traced using computational models such as COAST, REVOLVER and ECHO, the author's favorite tool. Further on, historical chapters are interwoven with theories on how to create the most probable model -- i.e. a mathematical or logical description to fit the subject matter at hand. AI discovery systems and other simulation tools populate these chapters; editor Langley is very much at home with BACON. While BACON generates equations, GALILEO transform them so they can be applied to the physical processes under observation. The PHINEAS program is based on research by PARC's Danny Bobrow on qualitative physics, while KEKADA focuses on the detection of surprising phenomena, representing knowledge, suggesting experiments, and refining theories: this is applied to understanding the metabolism of amino acids. The discovery of gene regulation in bacteria is studied with the help of GENSYM and HYPGENE at Stanford; HYPGENE designs hypotheses, while GENSYM computes experimental outcomes. A final chapter discusses the baffling presence of "monster anomalies" which cannot be explained by Mendelian genetics.

Feigenbaum's 1979 slogan, "In the knowledge lies the power," which is quoted at one point, could be the inspiration for Shrager's and Langley's work. From such a perspective, this collection is well worth the mental exertion required from the lay reader seeking stimulation. Fascinating.

by Giuliana A. Lavendel

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Monday Teller

No. 10   Feb. 25, 1991

PARC INFORMATION CENTER

"CANON, INC.: Worldwide Copier Strategy," by the Harvard Business School, 1983.

In 1959 Canon entered the business machine field with micrographic equipment. The competitive wave started 3 years later, in1962, when Canon launched an R&D organization dedicated to plain paper copiers. The Harvard report looks at what happened following that strategic decision -- some of the keenest analyses of international business practices can be found in the case history series of the Harvard Business School, on which most MBAs learn their basics. Although published in 1983, this retrospective case on Canon's Wordwide Copier Strategy is still very educational reading for Xeroids. It is accompanied by a "Note on World Copier Industry in 1983" of some historical interest.

Canon, like Xerox, is essentially a technology-driven company; its first task was to develop a new technology, independent of the then formidable array of Xerox patents. This new technology was called NP, for New Process, and had become firmly entrenched by the late 1960s. Canon had done its homework: "Engineers working on the plain paper copying project thoroughly investigated the patents held by Xerox," recollects the Canon executive in charge of the project. It is interesting to note that Canon had entered the market with a coated paper copier based on technology licensed from RCA, later augmented by liquid toner technologies from Australia, in an effort to acquire interim market share, both in Japan and in the US. Another interesting observation is that Canon copiers were strategically positioned against a targeted Xerox machine, starting with our 720. Besides, Canon always had a global strategy in mind, as expressed in a famous, visionary talk by Ichiro Endo, Manager of R&D Headquarters in 1990: "...in accordance with the needs and the potential of a region, first R&D, then production and marketing should be pursued all over the world, and not the reverse (sales to production to R&D) as it is done now. This we believe to be the essence of the word globalization..."

Plants were soon established both in the US and in Europe. Marketing of NP products started first in Europe ('72), then in the US ('74), and sales were organized through dealers and subsidiaries, both of whom paid the same price for the product. A small direct sales effort was soon discontinued. ✗

When Canon announced the first laser copier in Japan in 1972, and one year later in the US, Xerox, Ricoh, U-Bix and Sharp already had laser copiers, but none with the combination of high speed, small footprint, high resolution, and TPD (Toner Projection Development) Canon had achieved. The Xerox 9200 was the selected target when Canon introduced the first high volume copier in 1978.

This Harvard case study was completed before many interesting developments happened, such as removable cartridges and the enormous success of Canon as the preferred OEM vendor of printer engines. (An NP color copier, however, was announced early, in 1973.) This report focuses on Canon's strategy of introducing a steady stream of products, all based on a fundamental technological development to which new features are added. In 1983, Canon was offering more than 10 copier models; as many as five different versions of each were manufactured, to accommodate foreign electrical standards. Consumables were also becoming a large revenue source for the firm. Canon Sales operated only in Japan, while overseas sales subsidiaries, like Canon U.S.A. and Canon Latin America enjoyed considerable autonomy, and took care of worldwide distribution.

From early days manufacturing was one of Canon's major strengths, with flexible manufacturing and robotics much in evidence; a detailed description of what happened on the factory floor is perhaps the most revealing part of this report. R&D is also well delineated in its three tiers-- the Product Group Development Centers, the Canon Research Center for long term projects, and the Advanced Technology Center devoted to the 21st century. The leitmotif of intense employee involvement runs through all these snapshots of corporate culture and strategy.

As for the years after 1983, Canon's slogan proposed to "Catch Xerox through technological differentiation." Canon considered Xerox its major global competitor, says the report. It is an expensive compliment.

by Giuliana A. Lavendel

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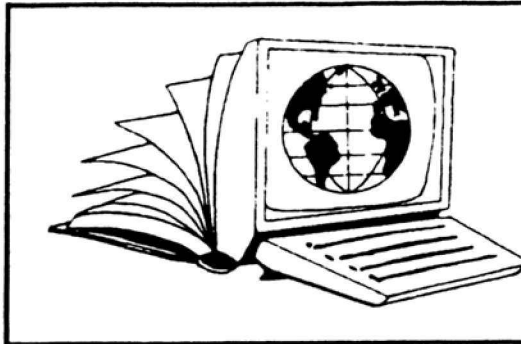
Monday Teller

"Management of Research and Development Organizations," by R.K. Jain and H.C. Triandis. New York, Wiley, 1990, and

"Workplace 2000: the Revolution Reshaping American Business," by H. Boyett and Henry P. Conn. New York, Dutton, 1991.

Taken in one gulp, these two new books may balance each other. The R&D management textbook is the product of earnest, orderly if unimaginative minds with academic affiliations: one of the authors combines research in the Army Corps of Engineers with appointments at MIT and the University of Illinois. Co-author Triandis, also at Illinois, is a psychologist specializing in organizational behavior, and shows a good command of the jargon of his profession. This work begins with an overview of definitions and debated questions -- can R& D be considered effective if it does not improve competitive position? -- and argues that R&D management's unique task is "the intricate coordination of people, ideas, funds, and cultures."

Several cookbook-type chapters follow, where R&D managers, having learned that they are called to "manage the unmanageable," are nevertheless taught how to be effective in creating and administering productive organizations; there is a lot of nontrivial information here on subjects such as technology transfer, conflict, performance appraisals. There are also charts, questionnaires and other field-tested tools, mostly originated by federal agencies like NASA and Argonne National Laboratory and often not applicable to the private sector. Techniques with fancy names like in-basket training, boundary spanning, the Least-Preferred-Co-Worker scale, and the Rahim Conflict Resolution Style Inventory are borrowed from McGregor, von Hippel, Nadler, and other pundits. There are also useful statistics; for instance, roughly 76% of all industrial research in America is development, while 20% is applied, and only 4% is honest-to-goodness, blueskying basic research.

While statements of the obvious abound, such as "Managing researchers is one of the most daunting tasks a manager can undertake," no help whatsoever is given to the manager who labors to face Problem Number One, that of measuring quantitatively R&D's productivity and effectiveness; according to the author you have to calculate "the return on R&D investment." How to do this is left to the reader, whose stress level may be heightened upon finding a contiguous section entitled "Odd Characteristics of Inventors and Innovators." (The authors recall that Kurt Goedel, the great logician, firmly believed that his food was being poisoned, and his doctors were trying to murder him. Goedel died of malnutrition.)

"Workplace 2000," on the other hand, is an excursion into the future (or the here and now?) of the inhabitants of the American corporation, done in a discursively flamboyant style which outPeters Tom Peters himself. Flexibility to handle multiple jobs and creativity to sustain a "pay for knowledge" system are going to be in, but individual performance will fade in favor of teamwork, the basis for creating value in the new organization. Large corporations have become 2,000 pound centipedes. In the future, they will be run like small firms, in a modular or mosaic pattern. Everything is going to be measured, although MBAs will not count for much anymore. The workforce will thrive on feedback and measurement, since what is measured is important, and therefore gets done. Workplace 2000 teams will slash non-value added costs, replacing the old cost accounting system.

Authors Boyett and Conn, consultants in Georgia for A.T. Kearney -- a firm specializing in manufacturing issues for large corporations -- paint a wide scenario where information sharing, facilitated by new technologies, will establish employee self control, in lieu of management control--and this is bad news for middle management. Empowerment will move down the ranks. Every employee will be part of a team adopting a family of five to ten measures to control, monitor and improve the people and the environment: foremost is QUALITY. Quality cultists will just love it, others will feel uncomfortable with the Orwellian scenario.

by Giuliana A. Lavendel

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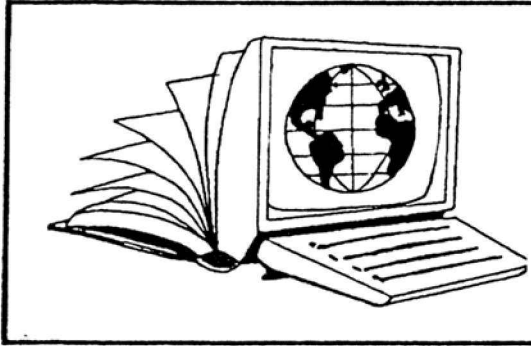
Monday Teller

No. 12   March 11, 1991

PARC INFORMATION CENTER

"The Future of High Technology in America," special issue of the *California Management Review*, Fall 1990.
"An Aging Dancer Fights to Keep Up"--*New York Times* 2/10/91, p. 3-1, 3-6.

Industry analysts report a crisis in confidence in Silicon Valley, which some doubt will continue as a center for technological innovation. The "dancer" in question is reportedly behind in the competition with Sony, Toshiba and Sharp to unleash computers from desks and free them from keyboards, reducing them to one-pound marvels that can transmit and receive data almost anywhere, as well as follow handwritten instructions. (One early attempt to make computers portable was the first prototype of a "Dynabook" built at Xerox PARC, a hefty, sewing machine-sized machine that cost about $50,000.)

As viewed by the pessimists, Silicon Valley is becoming a "techno-colony" dependent on innovation from Japan, increasingly reliant on the financial resources of Japan and other Asian countries, with its strong store of software expertise geared to support foreign products and priorities. As examples: Go Corp., which will license its operating system for stylus-based computers to Japanese and American palmtop makers, and Apple, which may work with a Japanese partner to develop a lighter portable Mac.

Optimists point to the dominant strength of the Silicon Valley culture, the hundreds of informal research networks that have sprouted and nurture innovation. The startups keep starting up (853 in 1989 alone); there is no herd instinct, no big-company mentality at work. Pessimists counter that, without the manufacturing expertise to capitalize on breakthrough technology, the Valley (and the U.S.) are doomed to second class status among technological powers. "The companies responsible for the previous generation of machines usually are not able to recast themselves to design the next one." This leaves an opening for the foreign giants like Fujitsu, Hitachi or Sony, who are expanding operations in the Valley and will profit from its innovations.

The reported crisis in Silicon Valley is covered by several authors in "The Future of High Technology in America," a recent special issue of the *California Management*

Review (from Berkeley's Haas School of Business). The *New York Times* picked up the gloomy outlook of "Silicon Valley and Route 128 Won't Save Us" by Richard Florida and Martin Kenney, excerpted from their recent book, *The Breakthrough Illusion: Corporate America's Failure to Move From Innovation to Mass Production*.

Professors Florida and Kenney hammer away at the notion that new firms are somehow better suited to high tech fields and that cooperative networks of small, specialized firms can be a more effective form of economic and technological innovation than large, integrated companies. The reality, they say, is a Hobbesian system where companies protect their own interests, take advantage of suppliers and undermine competitors for the sake of large, short term profits. A proliferation of me-too startups does not demonstrate real innovation. The horizontal and vertical fragmentation of high-technology capabilities makes it difficult to build stable companies and industries that can compete over the long haul in a global economy. The professors suggest no agenda for change, but their review of the problem is thorough, well-documented and replete with quotes from high tech superstars like Steve Jobs, Scott McNealy and Robert Noyce.

On the side of the optimists is AnnaLee Saxenian, author of "Regional Networks and the Resurgence of Silicon Valley." She focuses on the renewed vitality of Silicon Valley, which has substantially recovered from the mid-1980s crisis in the semiconductor industry. Saxenian enumerates the players in a new flexible model of production where small and medium sized specialist companies cooperate and collaborate on innovative and highly profitable products. She maintains that any analysis that focuses either on individual companies or national governments misses the point of recent successes in the Valley. Where some see industrial fragmentation Saxenian sees an underlying network, now being formalized by companies like Cypress, Weitek, Hewlett-Packard and Sun Microsystems. The challenge is to define a public forum in which to debate and set a regional industrial strategy.

"Agendas, Incubators and Marketing Organization" by Frank Cespedes of Harvard scrutinizes several decades of organizational change at IBM to demonstrate the "boundary-spanning" role of the marketing organization in a high technology firm. Cespedes

defines a dual role for marketing: setting an agenda to
pursue current goals and sources of revenue and
incubating new product capabilities. His analysis
suggests that IBM, with its history of overlapping and
competing product lines, may actually be the role model
of a continually innovating company.

Two articles round out CMR's look at the future of high
tech in America. Andrew Grove, CEO of Intel, reviews
changes in the structure of the computer industry and
predicts a new industry will take shape with more
players, smaller and more specialized than their
predecessors.

Tom Peters' article, "Get Innovative or Get Dead," offers
a series of strategies for companies which want to
become and stay innovative. Peters' harangue starts
from the premise that "AT&T problems are also the
problems of $10 million companies" and are amenable
to the same, sometimes drastic, solutions. To maintain
an innovative edge, companies can license their most
advanced technology, even to rivals; they can
"cannibalize" their most profitable products by
constantly trying to make them obsolete; they can spin
off new ideas into new companies or sell off old winners
to force dependence on a new line of business.
Companies can insure "fitness to compete" by insisting
that all parts of the firm sell a share of their products or
services on the outside market, and allowing them, in
turn, to purchase products and services from best
sources, including those outside the company.

Peters exhorts companies to subcontract anything and
everything to tap outside sources of innovation and to
create numerous joint ventures and alliances. He covers
the basics of time-based competition and ventures into a
popular area of organization research, "thinking in
wholes" about the individual manager's role as it relates
to other functions in the organization.

(by K.S. Jarvis/PARC Information Center)

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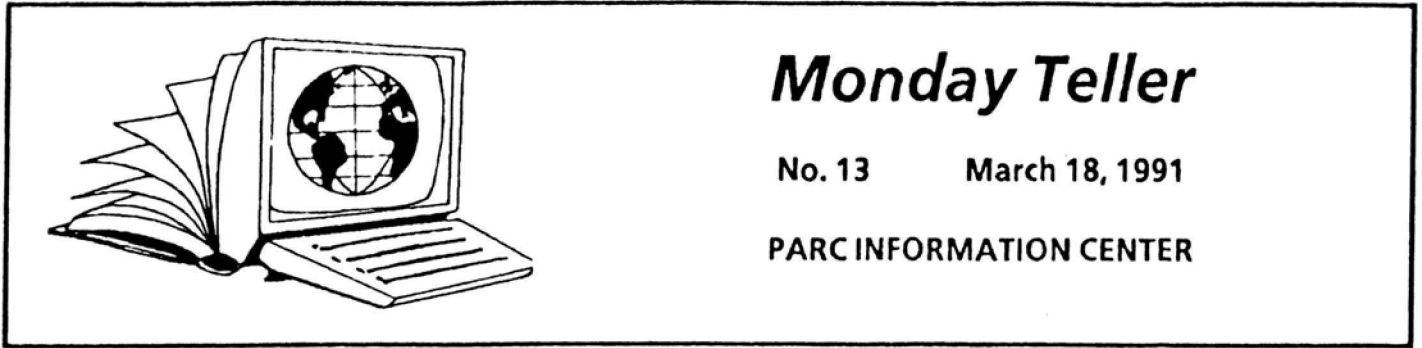
Monday Teller

Japan's Software Factories: a Challenge to U.S. Management, by Michael A. Cusumano. New York, Oxford University Press, 1991.

A remark by Jim Morris of Carnegie Mellon (formerly of PARC) defines this book appropriately: "While most observers of Japanese software development tend to eat the sushi and run, Michael Cusumano has dug into the reality of the software process in the U.S. and Japan." Thanks appear in the introduction to Xerox and Bill Spencer for support and suggestions, but the Corporation is mentioned only once in this 500-page volume, which concentrates on four Japanese leading computer manufacturers. Hitachi, Toshiba, NEC and Fujitsu all emphasize process improvement rather than product invention. Strategic management and integration of activities in software production are common factors, like economies of scope; cost reduction is obtained by developing a series of incremental products, rather than starting from scratch every time. Recurring elements in the factory approach are neatly listed as objectives and implementation steps. R&D organizations both monitor progress and introduce new technologies.

This is not a how-to book but a history of technology focusing on particular firms which have tried to evolve beyond craft mode. Prof. Cusumano, who holds the Mitsubishi chair at MIT and was the recipient of two Fullbright scholarships, spent several years at Tokyo Unisvsity. He has organized his material admirably to show why and how it was, possibly also how it will be. Part One -- entitled "The Software Challenge"-- talks about the essence of the problem, e.g. why large software systems have a longer and more stable lifespan than PC programs: Lotus 1-2-3 is a latter day Model T. Customization and standardization are antithetical, but markets are often segmented into custom on one side and commodity on the other; therefore, economies of scale and/or scope are possible. Of particular interest is a detailed scenario of the Japanese software industry, going back to the Sixties. Success was based on a teamwork approach with less reliance on a few superstars. Usage of tools and product engineering was also a strength.

Japanese programmers average 2,000 lines of code per month vs. 300 for American professionals, and have one tenth of the Americans' error rate, but we have to remember that options for managing product development are different in the two countries under observation, and so are the markets. For instance, in Japan, reliance on mainframe solutions is mandated by the difficulty of adapting that iconographic language on machines of limited processing capability and memory. Basically this is why the Japanese do not rely on "shrink-wrap" software, but they will undoubtedly refine their software skills, and compete even more effectively, over a wider range of products and markets.

A chapter follows on problems and solutions encountered in building large software programs: the spotlight is on Bellcore, AT&T, TRW, and the emergence of software engineering and prototyping. If an expensive, experienced AI engineer writes 2,000 lines in one month, and a lesser practitioner writes 1,500 lines in 1.2 months, the second alternative might be preferable, even if the better software runs faster; when the box is powerful, it is enough. Less skilled programmers, reusability, prototyping, all point to performance vs cost compromise. In this light, practices at IBM, ITT, DEC plus one of the accounting Big Eight are reviewed.

Part Two of the book starts with the SDC factory initiative, which was carried on by Japanese firms where SDC left off, abandoning its presence as a separate company in '81 (it is now part of Unisys). Profiles of the Japanese Big Four follow to complete the "factory appproach" section. Hitachi, first in establishing the factory, proceeded by trial and error and accumulated knowledge about product development and manpower requirements. Toshiba concentrated on its own store of products, emphasizing standardization, training and reusability across projects; thus the craft became less creative but moved closer to an engineering and manufacturing discipline. NEC, a descendant of Western Electric now in the Sumitomo keiretsu, implemented a multiproduct, multiprocess factory network, relying heavily on management committees and central R&D to formulate and implement strategy. (The central R&D at one point became an academic paper factory,

removed from the practical objectives of the NEC
divisions, but then revised its mission and tools in favor
of technology transfer.) By the late '80s, NEC sold more
software than its competitors in Japan. Latecomer
Fujitsu relied on updated tools like AI and CAD
integration, adopted mouse and multiwindow
environment ("both introduced by Xerox and then used
by Apple..."--sic, on p. 324). As the leading hardware
manufacturer, it is now superbly positioned for future
competition, especially in design.

A final chapter on standardization and cooperative R&D
traces every step from 1966 to date in the progression
from the Japanese Software Co. to PIPS, TRON, Sigma
and ICOT; company and government funds flow happily
together, MITI is a compelling presence. The Japanese
are closing in on MCC and the European projects, with
the government playing second fiddle to industry.
There are three appendixes, studded MIT-style with
tables and figures: on statistical methods and process
(e.g. varimax rotated factor matrix), market share,
customer satisfaction, mostly from a 1988 survey by
Nikkei Computer.

The future? NEC's Yukio Mizumo is quoted as saying
that the software factory is a concept, not a thing. "...At
least some software can be produced in a manner more
akin to engineering and manufacturing than craft and
cottage industry practices." It is an attempt to move
forward and, in its way, to affect the course of history.

by Giuliana A. Lavendel

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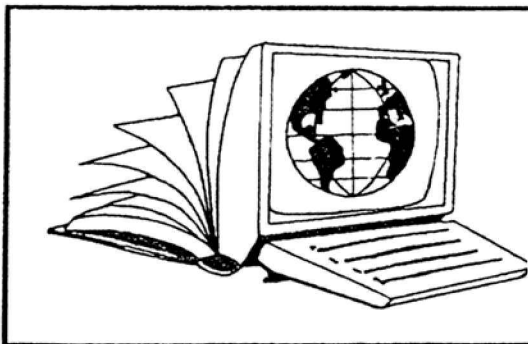
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Information Center.

TH E CORPORATION OF THE 1990s: INFORMATION TECHNOLOGY AND ORGANIZATIONAL TRANSFORMATION, by Michael Scott Morton, ed. New York, Oxford University Press, 1991.

"Automate the office is a popular phrase," writes in the introduction L.C. Thurow, an academic who has earned a place in our pop culture, "but to automate the office is to misuse the new information technologies." This is the final report from the Management in the 1990s Research Project at MIT, which in 1984 started investigating the impact of information technologies (IT) on organizations, and forecasting how it would all look in the next decade. The report was conceived as a joint venture: academics wrote it, but management types contributed thoughts and experiences from the corporate wars. Thirty research projects were undertaken by twenty-five faculty members. Professor Tom Malone, formerly of PARC, was among the project sponsors, contributing his analysis on how IT changes the way people work, and the competitive dynamics that follow. He also built for the project an expert filter for an E-mail system.

There are three sections -- historical background, strategic issues, management initiatives -- and nine chapters, all authored by MIT wizards and their guests from the halls of Stanford and Harvard. In conclusion, "there is significant good news to look forward to from IT," whose cost/performance ratio changes for the better at the rate of 20-30 per cent per year. Some common themes run through the mosaic of contributions. There are no software or hardware problems, only management problems. What we need is not a worldwide information system but a just-in-time information tool. People do not have to work harder or faster; it is the organization which has to change. Obviously the industrial sponsors agree with this consensus; they are a mixed if powerful bag, from AT&T to the U.S. Army, and then Kodak, British Petroleum, GM, DEC, Arthur Young, even the Internal Revenue Service. Some observations may be prophetic, like contributor Madnick's emergence of the "virtual corporation," which is born of the agreement of two or more companies or part of companies, to pool resources

and get to work together. In the case of the B-1 bomber, as many as 2,000 divisions and group from separate firms came together in a "virtual corporation."

Of particular interest, Joan Yates of Control Through Communication (reviewed in Monday Teller no. 4), writes on Past and Present as a Window to the Future. She looks at IT starting with the telegraph, like the Smithsonian's Information Age exhibition, and notes that transmitting one page of text from New York to Chicago took 252 hours in pre-railroad days (1840s) and only 7 seconds in 1988. IT is a vehicle of change, compressing time and space, expanding and transforming stored knowledge, promoting flexibility. IT must harmonize with the organizational context, like the system in place at Xerox headquarters to support the legal staff.

For contrast, we find a classic economist's view in "Interfirm competition and collaboration" by authors Rotenberg (MIT) and Saloner (Stanford). An example used is the first fax machine, the Magnafax, introduced jointly by Xerox and Magnavox in 1965, establishing a de facto standard. Various authors prescribe the use of IT for redesigning the organization, using schemata like Venkatraman's Five Levels of Transformation, which move from isolated exploration all the way to network redesign and business scope redefinition. The networked organization is already a reality, but coordination of functions, markets, products and corporate divisions is still to be achieved in the "turbulence of the 1990s" when managers will need to cope with unclear lines of authority and decision making. The relationship between IT and human resources management presents gripping dilemmas, as in the example of Toyota's NUMMI plant in California, where sweeping human resource management changes have been coupled with modest technology upgrades. NUMMI's productivity and quality results are considerably higher than those of Toyota plants in Japan.

As the final chapter on organizational change states, IT implementation is management of change affecting people, structure, process; organizational, technology

and strategy choices must be properly aligned for success. An enabling culture and an adaptive organization are the most helpful ingredients, and employee empowerment is perhaps the only panacea in which most authors in this collection profess to believe. The ultimate goal is to give employees a sense of this empowerment, since changes will cause a resdistribution of power and control. Other choices are mentioned, but they appear more doctrinaire and controversial.

In sum, a tour de force: deep, repetitious, stimulating, discontinuous, even fun, but definitely not to be read in one gulp.

by Giuliana A. Lavendel

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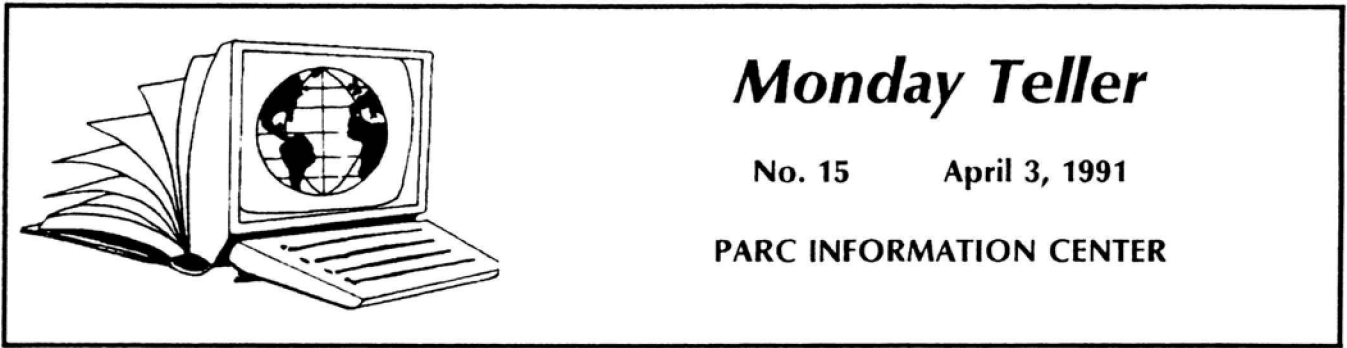
Monday Teller

"Xerox and Fuji Xerox," by Benjamin Gomez-Casseres and Krista McQuade. Harvard Business School, 1991.

"Many considered it [the arrangement between Xerox and Fuji Photo Film] the most successful joint venture in history between an American and a Japanese company." This case study from the Harvard Business School was just released a few weeks ago in a Harvard classroom, present Paul Allaire, Roger Levien, and Jeff Kennard, who since 1977 has managed the FX interface for STHQ.

The Harvard team narrates how FX evolved from a sales only organization to a fully integrated operation, contributing 22% (or $3.6 billion) of the total Xerox revenue in 1989. Much of this happened thanks to the autonomy enjoyed by the joint enterprise from its inception: "The degree to which Xerox let us run was very unusual," says FX CEO Tony (Yotaro) Kobayashi. As a consequence, FX's impact became more evident on the complex organization the authors call The Xerox Group. "It is a tough challenge we have to face together," comments Kobayashi, emphasizing that competitors like Canon or Ricoh have a single management in Japan, but the goals of Xerox and FX are only partly compatible. This dichotomy causes recurring but surmountable problems.

Starting in 1982, a Codestiny Task Force of senior managers from Xerox and FX has met to enhance the bilateral relationship. Codestiny I and II were milestones; Codestiny III (1989) looked at the 1990s, and in particular to 1993, when the Xerox-FX relationship must be renegotiated. Xerox entered into a joint venture with the Rank Organization of Britain in 1956. By 1958, Rank Xerox executives were looking at the Japanese market. Twenty-seven Japanese firms vied for the position of RX partner, and the selection favored Fuji Photo Film. Fuji was the only nonelectronics firm among the applicants but had a winner in Chairman Setsutaro Kobayashi (Tony's father) who had developed a friendship with his British counterpart at RX. So Fuji Xerox was established in 1962 as a 50/50 joint venture of Rank Xerox and Fuji Photo, but only to sell xerographic products manufactured by Fuji Photo.

Broader vistas opened up, however, after the Japanese government intervened to secure manufacturing rights for Fuji Xerox. When Xerox introduced the 914, Fuji camera technologists immediately started reverse-engineering to identify necessary equipment and supplies for production. The first machine produced in Japan was built in 1962 by Fuji Photo; FX did not really develop its manufacturing capability until 1971, when Fuji Photo transferred its copier plant to FX. Royalties of 5% from xerographic sales and 50% of FX profits were assigned to Rank; the relationship to Xerox proper remained remote--a sort of cousinship. FX, however, assimilated the Xerox organizational structure with a triad of R&D, design/engineering, sales and marketing. By then, Setsutaro Kobayashi had surrounded himself with a core of senior managers, all originally from Fuji Photo, who became known as "The Seven Samurai."

When Xerox in 1969 gained control of 51% of Rank Xerox--by purchasing an additional 1% share--the relationship between the US parent and the Japanese cousin became closer, but serious disagreements arose because the Japanese wanted to develop small copiers as a part of a worldwide strategy. Those were the years when Xerox did not look at the low end of the market. FX as a Lone Ranger launched its counteroffensive against Canon, Ricoh and Konica, then targeted Minolta, Copia, Mita, Sharp, and Toshiba. By 1975 there were 11 companies competing in the Japanese copier market, while Big Xerox slept. Fuji also launched its Total Quality Control campaign focusing on "dantotsu," or "the Absolute No. 1 Product," to be delivered to market in two years instead of the usual four. The FX 3500 appeared as a declaration of independence, two years later, just after Xerox had slain a whole family of low to mid-volume machines. (The FX 3500 was also axed by Xerox management, but Tony Kobayashi, who had succeeded his father in 1978, simply refused to give it up.)

Xerox management in the U.S. was preoccupied with IBM and Kodak, and did not see Canon

coming: "Our success was so overwhelming that we became complacent," reminisces David Kearns, but it is fair to mention that Xerox was also involved in a series of courtroom battles. The IBM lawsuit resulted in a cross-licensing agreement, but the Federal Trade Commission did more damage by insisting that Xerox, with 95% of the plain paper copier market, had violated the Sherman Anti-Trust Act, and should even divest itself of foreign subsidiaries RX and FX. Although this did not take place, the FCC action forced Xerox to license over 1700 past and future patents. Other onerous conditions were imposed, and the result was that Japanese firms, which had entered the market with problematic liquid-toner copiers, were free to switch to the winning Xerox dry-toner process.

Under such pressures at home, it became apparent to Xerox management that FX should be "unfettered." This was the time, David Kearns recalls, when "the Japanese were selling products in the United States for what it cost us to make them." Benchmarking and LTQ were borrowed from FX techniques, and the long painful recovery began with the 1075 and other models of the Marathon series; FX designed and produced the low end models of this series, helping Xerox regain market share. Then came the Baldridge, and health.

The Xerox-FX relationship in the 1990s is viewed in the Harvard case as presenting a triple challenge: from Canon, from FX itself, and for senior management. By 1989 Canon, no longer just a camera company, derived 40% of its revenue from copiers and 20% from printers. Dominating the low-end laser printer market, its agreement with Hewlett-Packard originates some $1 billion per year in revenues. Canon unveils twice as many products per year as the Xerox Group although it spends less than $600M annually for R&D, compared with Xerox's $800M and FX's $300M; recently, it has made its mark on the color copier market.

Fuji Xerox's strength--by 1987, 94% of low volume copiers sold by Xerox were FX's--led Xerox and FX to intensify their cooperation on research, product development and strategies. Cooperation was most successful in research, harder to implement in development and manufacturing. The NIH (Not Invented Here) factor was also an obstacle. Moving people around helped. By 1989 approximately 1000 FX residents had spent three years each at Xerox overseas, and some 150 Xeroids had resided with FX; 1000 shorter visits are also exchanged yearly. Feelings of challenge and admiration are common among Xerox managers, since FX continues to be the corporate agent for change--decisive, tough, and visionary.

The Codestiny III Task Force is charged with developing a framework for the two allied companies in this final decade of the millenium. Fuji wants to expand its markets in Asia; Rank Xerox is reluctant to let go of its markets and strategies which emphasize high margins and high-end machines, while FX focuses on market share and low end products, using joint ventures and local talent.

This spellbinding narrative continues with some useful appendices, which include a chart of patents granted to FX--the number has more than doubled since 1980--and relationship charts identified by the Codestiny III Task Force. Should Marketing, Research and D&M within Xerox and FX be independent, complementary, overlapping, joint or coordinated?
(We respectfully defer to Xerox and Fuji Xerox Senior Management for the sequel and answers.)

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

"Well Made in America: Lessons from Harley-Davidson on Being the Best," by Peter C. Reid (NY: McGraw, 1990).

This is "American Samurai" in a small company setting, with a workforce of at most 4,000 (before downsizing). Harley-Davidson began in 1903 building motorcycles which are considered an American classic; the husky, basso profundo roar their engines emit could not possibly be confused with a lawnmower or a sewing machine, according to their faithful admirers. This book is also a thank you card to Harley-Davidson employees, to the state of Wisconsin, Ronnie Reagan, suppliers who waited for months to have their invoices paid, and even customers who continued to buy the more expensive Harley motorcycles and "stuck with us despite problems that would have sent other buyers elsewhere," states CEO Richard Terlink in the foreword.

Harley has finally recaptured its market share from Honda, the major rival from Japan, which has since cut back its presence in the heavyweight motorcycle niche. H-Ds are now the only U.S.-made machines in a field which became dominated by Japan, but Harley-Davidson itself taught the Japanese how to create their motorcycle industry when, much earlier in this century, it quietly sold its blueprints, tools and dies for $30,000 to Sanyo, a Japanese pharmaceutical company. This is how the first "Rikuo" (King of the Road) came into being as a haunting reminder, a nemesis which visited the American company half a century later. The Japanese copied Harley's distinctive engine, which was introduced in 1909 and is known as the V-twin because its two cylinders are set at a 45 angle opposite each other -- they say that even the look conveys the image of power. The Virago, a big V-twin introduced by Yamaha in 1981, looked remarkably like a Harley, ran better than the real thing, and cost 25 to 50 per cent less. Honda, Yamaka, Kawasaki, and Suzuki were producing more bikes than they could sell in Japan; dumping accusations were filed by the Americans in 1978, but the charges were rejected by the International Trade Commission, which, however, reversed itself in 1983.

The "lessons on being the best" are in two parts: a reminiscent, longer section about how we did it at Harley, and a prescriptive one on how you can do it also. After the Japanese motorcycle invasion of the 1970s, Harley-Davidson's position declined dramatically, and its parent, conglomerate American Machine and Foundry (AM&F) put the company up for sale in 1981. Harley lived through the perils of a scantilyfunded $81.5 million LBO by its employees, and was actually only 7 days away from filing for Chapter 11 bankruptcy when Citicorp foreclosed. Since then Harley has increased its market share in the U.S. by 97%.

In 1982, after the leveraged buyout, Harley management took a tour of the Honda plant in Marysville, Ohio -- a facility which had no computer, and practically no overhead staff. It was a shocking experience. The Americans realized they had been sleeping on the job, forgetting all they had known and taught to others about manufacturing, even in simple tasks like "bleeding" the brakes. Besides, their market had almost vanished. How had Honda managed to become the benchmark? It had followed a strategic program which sounds ominously familiar:

1. Target, or rather "invade" a market segment which the American competitor considers insignificant, such as lightweight bikes (low-end copiers?). 2. Sacrifice profit to keep price low. 3. Increase volume by selling below market value. 4. Then expand product lines upward 5. Manufacture look-alikes with competitor's distinguishing features. 6. Consolidate market position by flooding with discounted inventory.

H-D's counterattack can be summed up in three acronyms: EI (Employee Involvement), which empowered the workforce and cut management's rule, JIT (Just In Time inventory control) which generated both quality and cash, and SOC (Statistical Operator Control), where employees concentrated on reducing variability rather than following specifications. Harley also fought for survival by going public to sustain its debt, and by introducing a new series of products called NOVA (Marathon?); it even fixed the oil leaks which were characteristic of the H-D engine and, somehow,

were considered a "macho" characteristic. (Apparently, realization came when the wife of one of H-D's top executives refused to accept her husband's motorbike and its oil puddle in the family garage.) Systems and procedures were no longer introduced top down, and the customer's preference became a paramount preoccupation; in Harley's case, the faithful expect a certain "raw" look which suggests a powerful machine not fully tamed. Obviously, Harley-Davidson's CEO did not have a clear picture of his market when he showed up for the annual Motorcycle Week in Daytona Beach in a black stretch limousine and wearing a three-piece suit. Vaughn Beals, one of the Harley executives responsible for the company's rebirth, theorizes that Japanese manufacturing methods owe something to Deming but also originated from the scarcity and high price of land in Japan. Economics made factories small, with machinery placed close together and no room for excess inventory; flow processes, setup reduction, statistical process control were the consequences. In adapting the Japanese techniques, Harley made subtle changes which caused them to become more acceptable within the company's culture; JIT became MAN (Materials As Needed) because other companies were just pushing back inventory to their suppliers rather than changing the way they worked. Employee democracy in action replaced "kicking ass," and assemblers were asked to visit vendors with production engineers for preliminary runs. Much emphasis is given to SOC (statistical operator control) which puts the power to change things in the operator's hands. Rides and races, clubby T-shirts, the newsletters Hog Tales (HOG stands for Harley Owner's Group) were used to reinforce relations with the customers, who were identified as typically about 35 years old, married, male, prevalently blue collar. The advertising budget was cut and relations reinforced with dealers, who had long complained that Harley did not have an entry level bike that would entice first-time buyers and tie their loyalties. Instead of developing a new product with capital it did not have, Harley successfully downsized its Sportster with a smaller engine and price. It is now the company's best selling model and a springboard for riders who later move up to larger Harley machines.

When a new issue appears on the New York Stock Exchange, the event is usually celebrated with a luncheon of "suits." Harley's big day came in the summer of 1987. A big motorcycle parade led by company executives rumbled down Wall Street, led by policemen also on Harleys; when they reached the Exchange, president John Phelan gave them the official welcome --for the first time on the sidewalk. A few months earlier Harley had announced that it no longer needed the special tariffs obtained in 1983, with President Reagan's help, to compete with the Japanese. (This was considered by professionals one of America's finets PR coups). Since then Harley has received government contracts for practice bomb casings,

reducing government procurement costs to the delight of incredulous bureaucrats; it has even won back its highly visible contract with the California Highway Patrol. Demand for its motorcycles outruns supply, at last. Insourcing in the U.S. has increased Harley's manufacturing base and created jobs, after productivity gains were achieved.

The lessons are both obvious and implicit. Management must be committed to a people-building philosophy; creativity can only thrive in a free, non-threatening atmosphere. Confidentiality is scrupulously observed. Employees must attack problems, not each other, so finger pointing is out when things go wrong. Cross functional moves are the rule, and are not management's unique privilege. Feedback confrontation is valued and practiced by management, but pushbacks -- saying no -- is also acceptable. Having fun is important. In the end, and foremost, all employees are trained in statistical methods, and supported with followups. Harley, in line with its employee involvement philosophy, does not use computerized charting because this would reduce the search for quality to a push-button operation. Operators make their own charts, which are immediately available and meaningful.

Harley identifies its uphill success story with six strategies, all of them outlined in the positive:
1. Define your niche and stick to it.
2. Listen to your customers, and give them what they want.
3. Differentiate your product.
4. Compete on value, not price.
5. Treat your dealers as full business partners.
6. Build on your name.
This to be added to the fundamental lesson of the Harley case , which CEO Terlink defines as follows: "Management's obligation is to communicate the problem. The employee will solve it, if management lets them."

by Giuliana A. Lavendel
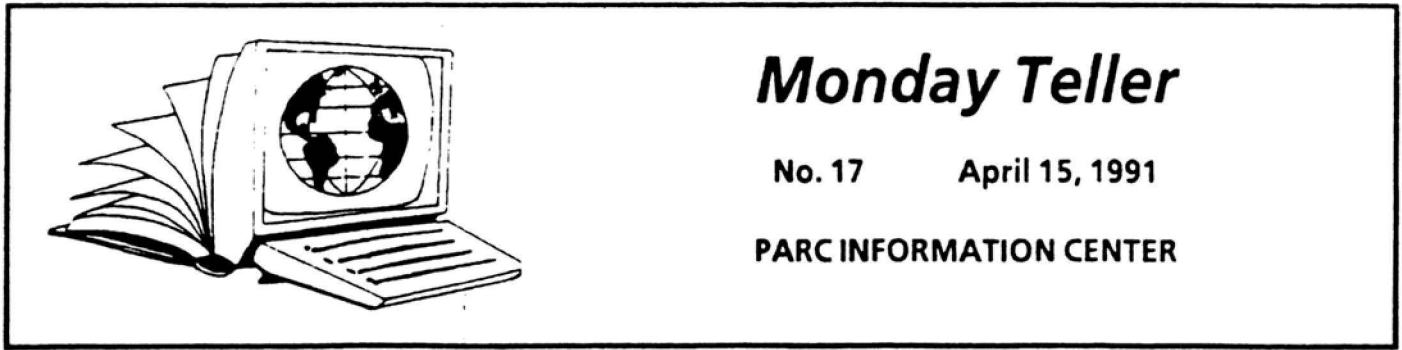
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Future Perfect, by Stanley M. Davis. Reading, MA, Addison Wesley, 1990.

The paperback edition of a 1987 original has rekindled interest in this veritable armada of ideas by one of the country's visionaries, former Research Professor at Boston University's Human Resource Policy Institute. Davis has been associated with Citicorp, the MAC consulting group, and organizational behaviorists the world over -- including some visitors at PARC. He throws so much at the reader, right from p. 1, that it may be advisable to read the book starting from the the wrap up section, "Beforemath," or even from the last sentence: "When management treats time, space, and no-matter as resources rather than as roadblocks, our methods of organization will no longer be lagging behind, at the end."

In brief, our industrial organization model consists of a decentralized operating system with centralized policy and financial controls; it was developed at GM in the 1920s, more than one and a half century after the industrial revolution had begun in England and, really, towards the twilight of the epoch. As a result, the context in which we manage doesn't suit the content of today's business, which should be managed in the future perfect tense. We are facing an any time, any place, no-matter economy.

Davis challenges our time mindset first: the 9-5 schedule comes from the industrial perspective of the producer, rather than the post-industrial perspective of the consumer, which ought to transform the corporation's sense of time. Products or services should be available in zero-based time, as at Toyota, which is now working on delivering a car within one day of receiving an order. A service company that operates in real time would attract customers who find it difficult to take a day off and wait around until the dishwasher repairman comes.

In Davis' no-lag world, ideas become acts; of course, this is Zen. The whole *Future Perfect* is a mind trip to create strategies which use time, space and matter -- or rather, the annihilation of these -- as a resource. Zero-based time allows you to see your organization in the future, interpolating back to the present and acting powerfully and fast. The "action before strategy" approach is characteristic of entrepreneurs, while classic managers see the flow in reverse, ignoring the fact that the present is the past of the future, and that organizations can be pushed rather than pulled to advantage. We are farther on this road than we think; people who take out insurance and mortgages are managing the consequences of events which have not happened yet, Davis' "beforemath."

Davis applies the same treatment to space and matter. Making products and services less fixed in space increases their competitive advantage. The producing organization moves into the competitive space of the consumer, as in electronic banking, Domino's pizza delivery, Polaroid photos, Coca-Cola bottlers and their "share of stomach" strategies (stomachs have just so much room, a portion of which gets taken up by liquids). In the new economy, value will come from intangibles or "no-matter", like Gillette's disposable razor and Fuji's throwaway camera; for a cogent example look at the contemporary hotel room key made of plastic, lighter and cheaper than its metal predecessor, and also more secure.

In the midst of these discourses, Davis unveils painful insights on which we often dwell only subliminally, e.g. "How low does the crime rate have to get before it is a threat to government agencies?" Problem solvers need problems, like the personnel officers in corporations who, alone, can point out that the King has no clothes, but never really win. Reward systems like the Hay points are designed with the "carrot and stick mentality,and what stands between the carrot and the stick is the jackass the system was designed for." Measures of body counts vs sales are antiquated and counterproductive, especially when the importance of a position is judged by the number of subordinates; in the new economy, managers should be rewarded for the number of people they manage to do without. Mature businesses diversify instead of returning more money to their shareholders, but could opt to shrink back and take less but more economically efficient space. The 80-20 rule, by which firms get 80% of their revenues from 20% of their customers suggest that resources are not used

productively. These, and other Davis assertions, whether original or derivative, are the stuff good brainstorming and debates are made of.

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Davis crystalballs with gusto. Staff positions, including "swollen data processing units," will give way to outside specialists on contract, who will in turn be supplanted by expert systems. By the year 2001, microcomputers will be as common as pencils, and profits for vendors will come farther down the value added chain, from distribution rather than manufacturing. Instant books will be produced overnight: when the US Olympic team beat the Russians on a Sunday night, Bantam had *Miracle on Ice* in bookstores on Thursday (for whom?).

There are no sacred cows within Davis' eyeview. He sees no dichotomy between industrial and service companies, since even at IBM only 6% of employees are in manufacturing. Therefore, IBM is misclassified as being part of the industrial sector of the economy. Karl Marx thought that ownership of material production was what counted, but services (no-matter) play the major role in the industrial sector today, and interpersonal skills are the no. 1 job requirement. Quoting Einstein, Davis emphasizes that new frameworks are like climbing a mountain where the larger view encompasses, rather than rejects the earlier, more restricted view. The post-industrial service/information economy embraces all that happened before because "agriculture, industry, and service are merely sectors coexisting within the same complex and interactive system." But we must stop using mechanistic, industrial models to run today's complex economy.

So much for prophet Davis, whose ideas the likes of Tom Peters and John Sculley enjoy immensely.

by Giuliana A. Lavendel

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PARC INFORMATION CENTER

"Business Document Image Systems: 1990 Market Update," Dataquest Perspective 4/15/91.
"Full Text Retrieval Systems Market Review and Forecast, 1989/90-1994" International Data Corporation (IDC) Special Report, 2/91)

These two just-issued overviews from big name consultants offer food for thought and some advice which should at least be considered.

Dataquest, for instance, says : if your line of business is document imaging, partner with the big guys and make your niche. The Dataquest document focuses on Image Management Systems, currently a hot topic. Although the computer industry had a slow year, the image sector had a relatively robust showing, perhaps because several key vendors introduced software for PCs. Of the five groups into which Dataquest likes to divide its market (single user, work group, department systems, Business Unit and corporate), the departmental systems sector of 11 to 50 users saw the most spectacular growth. Each segment has its winners. For instance, Canon's Canofile shipped 80 systems and earned third place in the single user group. Kodak shipped 92 KIMS for workgroups (2-10 users) and Filenet held its own in departmental sales. Financial services, government, insurance and manufacturing continued to perform as customers of choice.

Dataquest believes that imaging applications will drive sales of "enormous numbers of peripherals," i.e. scanners, printers, etc. As of now, with 2300 systems shipped and revenues under $3 billion (sic) the impact of imaging on the computer industry has scarcely been felt. Software will have to be developed to integrate imaging into the computer system environment. Only IBM and DEC, among the giants, have made their mark in document imaging, but H-P, Bull, Unisys and others are showing signs of life.

IDC scrutinizes full text retrieval by U.S, vendors, which at the moment is mainly the concern of the following sectors, in descending order: government (defense, and also state and local), law (litigation support), pharmaceutical companies, publishing, utilities, insurance, education, manufacturing, finance,

electronics, chemical and petrochemical firms. Seems, however, that interest in full text is trickling down, especially in the Fortune 1000. Small companies look to PCs, LANs and open platform like Unix for solutions. Standards are sought, as always happens when a technology catches on.

Here also IBM began it all 20 years ago, with Stairs. DEC also was among the early starters in the market which, however, still belongs to independent software vendors; Big Blue's SearchVision and other OfficeVision versions for MVS, VMS, etc. are late to market. Current emphasis is on single user and small group licenses; search engines are designed in read-only and run-time modes, married to the text base they accompany, as for CD-ROMs.

In spite of these limitations, IDC's optimism is explosive. Total worldwide shipments of text retrieval systems will (might?) experience a compound annual growth rate of 50%, with total shipments of 2.5 million units, mostly thanks to OEM agreements between regular vendors and independents. The lion's share of revenue will still go to Information Dimensions (Basis) with over 20% of the market, but shipments growth will be in micro solutions like the Folio PreViews/Novell NetWare combo.

Xerox offers an "interesting" product which combines Information Dimension's Basis Plus and Xerox ViewPoint. The resulting DSR is an integrated system with an intuitive user interface and minimal keystroking requirements, accessible through XNS/Ethernet; the Pentagon is a showcase account for DSR. (On the whole, IDC gives DSR a good review.) All vendors of some note are surveyed, including Verity, Gescan, Lotus, Information Access, even Thinking Machines. An especially interesting section evaluates online information filters, such as Western Union's Executive Briefing, Dow Jones' DowVision and the much talked about First! from Individual Inc., which is used to produce a 25-page news summary for President Bush every day.

Much of the growth in the full text market will be tied to the increasing acceptance of CD-ROMs. IDC,

however, rejoices that PC storage capacity has increased
as hard disk prices have come down, and anticipates an
average of 80 MB in 1994. Price per megabyte "is
expected to be between $4 and $5 by the end of 1994."
More like $20 and up, says an expert at Xerox, who does
not forecast such a price bonanza until the 16 meg chip
comes in big from Japan or maybe TI (IBM will grow its
own). Actually, not until the 64 meg appears on the
horizon will we see real price dynamics at the crucial low
end of the full text market. IDC acknowledges this
reality when it talks about "missionary work," with full
text really looking good, for now, only in "mission
critical" applications, a la DoD.

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC
Information Center.

The Critical Path to Corporate Renewal, by Michael Beer, Russell Eisenstat, and Bert Spector. Harvard Business School Press, 1990.

There are a couple of summary paragraphs in the introduction, but the overall "Critical Path" picture does not hit the reader until an elaborate bull's eye appears on page 219. Professors Beer and Eisenstadt from the Harvard Business School and Spector from Northwestern -- he is in Human Relations -- meander towards this chart since announcing on p. 1 "another powerful approach that is being used by an increasing number of American companies -- Ford Motor (sic), Scott Paper, Xerox..." As a matter of fact, this book is creating some stir at Xerox.

"Critical Path," the authors declare, is about American companies in search of the renewal shown at the center of the bull's eye, where three DESIRED BUSINESS OUTCOMES nestle: they are HIGH QUALITY, COST, PRODUCT INNOVATION. There are six concentric rings in the chart. The first, starting from the center, contains the three C's of COORDINATION,COMMITMENT, COMPETENCE, all Human Resource Attributes and, as such, mainly prerogative of the homonymous corporate function; Personnel, as we used to call it, is the fair haired designate in this book. TASK ALIGNMENT appears in the next ring, and is the prime mover of the transition from the old fashioned command-and-control firm to the renewed, flexible organization, which is task-driven. The task, not the hierarchy, is the basis for responsible roles, and the root of influence is (should be?) knowledge, not position on the org chart.

The title's CRITICAL PATH process fills the next ring, third from the center of the bull's eye; this process should allow management to obtain the benefits of both top-down and bottom-up change efforts, of hard and soft approaches, while minimizing their inevitable drawbacks. Critical Path works best at unit level and achieves Task Alignment only if and when six steps aimed at consensus and teamwork are followed in a prescribed sequence. The authors describe these steps in detail "to help explain and 'operationalize' the effective implementation of revitalization within business units."

These tactics go from "mobilizing energy for change" to "developing a task-aligned vision," fostering consensus for the same, spreading the good word without being too directive, introducing formal policies and "continually monitoring and strategizing."

The next three circles in this dantesque pattern represent "A CORPORATE CLIMATE THAT DEMANDS REVITALIZATION," then "PHILOSOPHY AND RESOURCES, i.e. CONDITIONS THAT ENABLE TOP MANAGEMENT TO REVITALIZE," and, finally, "CAPITAL MARKETS," the outermost ring, which affects mainly the top echelon of the corporation - -the last one to get the word, in this work which rings at times with almost populist tones. Capital markets symbolize the financial pressures which weigh heavily on top management, along with global competition and factors like deregulation; such pressures may inspire revitalization, but have both negative and positive outcomes. For instance, short term performance pressures may overwhelm human resource development strategies-- which are so important to the recommended bottom-up approach.

Four appendixes offer company profiles, quantitative analyses, questionnaires, definitions. The authors have used these tools to skim six case histories covering five manufacturing corporations and one international bank, all in the $1 to $4 billion sales range. They mention in passing that research shows how "the types of corporate dimensions" used to evaluate the six firms have a long-run positive relationship to financial performance. There is a careful distinction, in the sample, between Leaders and Laggards; detailed charts follow the targeted organizations' behavior and fortunes, based on primary source documents and hundreds of interviews. One such was with a much tried manager from Livingstone Electronics, who had hung this quote on the wall: "Every time we were beginning to form up into teams, we would be reorganized. I was to learn later in life that we tend to meet any new situation by reorganizing... Petronius Arbitor (sic), 210 BC."

The somewhat loose pattern of the proposed Critical Path process allows for excursions into many interesting management issues. A wedge entitled "leadership" and placed on the bull's eye chart indicates that considerable leadership is required at all stages of the game and at all levels of the firm. The top down organization, however, is married to an elaborate system of corporate oversight which increase frustrations for middle managers and production workers (unions are a BIG presence in "Critical Path;") Managers are forced to become more and more technically skilled, but do not acquire a broad business perspective. Even top down programs administered by Human Resources are unsuccessful in instituting programmatic change; there is a tinge of brainwashing which is personally threatening and constitutes a serious problem in transferring learning to the job. Programs like pay-for-performance with related pay distribution curves fail to achieve motivation and satisfaction among employees. Such programmatic changes, used in isolation as magic bullets, are "false starts." And top management may not be in total control of the cost reduction/human resource balance.

Commitment, instead, is achieved by working bottom up, sharing corporate strategies and showing people where they fit in. Task alignment develops human assets, changing how people work together around tasks without changing the organization chart: "multilevel, cross-functional teams would be organized around measurable, identifiable units of work." Change programs a' la Quality Circles, imposed from the top, offer off-the shelf standardized solutions "not customized to meet the individual needs of different subunits." It is important to develop and identify internal models which are also examples of business success.

The authors' dry style and mechanistic approach do not suggest a deep understanding of the relationships which should be created to achieve the teamwork and organizational ferment they espouse. "Critical Path" is at its prescriptive best when it emphasizes that beginning the process is the most important step, that business units and not corporate headquarters are the most fertile site for renewal, that knowledge replaces formal authority as the basis for influence in the task-driven organization, that the infrastructure has to be changed, in the end, to force behavior change. All these rest on the evidence of the six case histories -- which may not convince all readers. The same can be said for the asserted need for change-oriented human resource professionals, to be used as internal consultants and catalysts, with intensive support by external consultants.

Career progression and succession, as described and recommended, reveal some harsh aspects, which do not fit the authors' apparent preoccupation with employee well-being. Fifty per cent of the "successful" units

observed replaced key "resisters" who would not commit to the prescribed path of corporate renewal. Lots and lots of "interventions," as the professors call them.

by Giuliana A. Lavendel

★ ★ ★ ★ ★ ★ ★ ★★ ★ ★ ★ ★ ★ ★ ★ ★★ ★ ★ ★ ★ ★ ★ ★

MONDAY TELLER is a publication of the PARC Information Center.

"Third Generation R&D," by P. Roussel, Kamal Saad and Tamara Erickson. Harvard Business School, 1991.

Roussel, Saad, and Erickson are senior executives at A.D. Little. In the foreword, ADL's Chairman recalls that in 1899 Charles Duell, Director of the U.S. Patent office, resigned in discouragement because "Everything which can be invented had been invented." In spite of a notorious blooper -- when it advised IBM and others that Chester Carlson's invention would never fly --A.D. Little has always promoted the tie between science and product innovation, since the day in 1911 when Arthur Dehon Little was called to organize General Motors' first central laboratory. Incidentally, Xerox is not mentioned in the index, which sports the obligatory reference to Von Clausewitz.

This book is a tribute to R&D as a moving force for American industry in its search for global competitiveness. By coincidence, it was issued at the same time when a Harvard Business Review paper by John Seely Brown -- "Research That Reinvents the Corporation" -- is attracting a flow of comments by international experts. "R&D produces only one product, knowledge," the authors state. As an industrial force, R&D came into its own after WW II. Senior management, mostly recruited from business and finance, believed then that you could "buy science." But scientists and engineers were -- still are -- wary of "beancounters," for whom measurements of activity are often surrogates for productivity measures; other corporate functions resented R&D's resistance to being held accountable like the rest. Some people called it the Silicon Valley syndrome: "Put a few bright people in a dark room, pour in money, and hope." This "intuitive" framework describes First Generation R&D, also known as "strategy of hope" (A.D. Little is wonderful with words), whose frustrations gave rise to Second Generation, or systematic R&D. This project-management approach handled R&D on a project-to-project basis rather than a

"communion" of senior corporate, business and R&D Managers, balancing variables in a complex, often global environment. This is difficult, because the R&D world and the corporate world often have different cultures and outlooks. (In the trenches, we speak about "beards" and "suits.") Hence the need for Third Generation R&D whose principles, the authors avow, are simple in concept, if not always in practice.

R&D's contribution to corporate profitability is not even in question in this book: the problem is how to spend the money and the attention well, towards strategically significant goals selected by senior management. R&D's main tasks are defending and supporting the firm's current business, and promoting its expansion, while enhancing at the same time the company's technological capabilities. This mission is different at diverse stages of development -- i.e. when the industry cycle is embryonic, growth, mature, or aging. What, when, why and how much R&D is the concern of management, everywhere; a holistic view of interrelationships prevails. Targets, even for fundamental research, blossom in a business context, because a sense of business purpose seems to motivate researchers and does not inhibit creativity.

Senior management's deep involvement is of the essence, as the Japanese example shows -- Peter Drucker noted that Japan has not been a technology leader, but its ascendancy rests squarely on management leadership. Only senior executives can authorize capital, marketing, manufacturing, sales and other accoutrements necessary to transform R&D results into competitive successes.

Since the authors suspect that "to many CEOs, R&D is the slot machine of the corporation," a fictional set of top executives is provided: they become successfully educated in the second part of the book. An imaginary conglomerate, Intercontinental, is examining a research-intensive operation called Haber Foods. The CEO is new,

financial, non-technical, ignorant of R&D issues but educable. (He gets an education because the CTO, Chief Technical Officer, who is none of the above, succeeds in getting the CEO's attention.) Even in the world of vanillin, butter, and cocoa, we encounter the three types of research we know. The incremental variety (small r and big D), based on the clever exploitation of existing knowledge, promises low risk and moderate reward. Radical research (Large R and often large D), on the other hand, with higher risk and high reward, creates knowledge new to the firm (and possibly to the world), in the pursuit of a specific business objective. Knowledge which might well be new to the world is the fruit of fundamental (i.e. basic, pioneering) research (large R and no D); this is characterized by high risk and uncertain applicability to business needs.

In the fictitious dialogue between CEO and CTO, Apple is found to do little fundamental research, which is left to the likes of IBM, AT&T, Hoechst, and Du Pont. The CEO is put through his paces, learns the pros and cons of the three types of R&D. He goes home late, exhausted but reformed; he is ready to control uncertainty and face risk, a commodity which corporation executives should eat with their daily bread. A formula defines this variable: risk = f (uncertainty < or probability > and exposure), and there are tables -- another A.D. Little specialty -- to illustrate the relationship between risk and reward in the R&D environment. There are unwelcome truths here and there. For instance, a little money for a feasibility study is a dangerous thing; many CEOs do not consider investments until big money is at stake, and this is usually late in the project.

The CEO learns the importance of evaluating competitors' technologies, a step often omitted in R&D. Maintaining the creativity of an organization while denying resources for intellectually attractive if non-strategic ideas is hard; some R&D chiefs reap grief because they cannot say no to respected researchers. The concept of business and R&D portfolio is pushed, to allow planning for the optimum balance of risk and reward, stability and growth; this is complemented by a chart of "elements of project attractiveness." All these guidelines are incorporated in the fictional company's R&D reality check, where a combination of calculated risk, attractive technologies and market potential eliminates research on blueberry extract and boosts instead investigations on "crab and shrimp natural essence." Lobster is out.

There are four dimensions of structural choice: internal vs external R&D; centralized vs distributed resources; input orientation, structured around

technologies, vs output focusing on customer needs; balance of line and project management. A most insightful chapter is found towards the end, "Getting the Most out of Your People:"..."Despite the feeling and perception of specialness, R&D personnel in many companies suffer a sense of inferiority..." Third generation companies balance expertise against other attributes in assessing performance, and rotate personnel both in and out of R&D. They plan resources over a 5-10 year horizon, and know that freedom to influence purpose will be as motivating, or more so, than unbridled technical freedom.

The authors warn that the pronoun "he" is used in the classical sense of "he" as a person rather than "he" as male, elegantly disposing of some contemporary foibles. "How can I get my boss to read this book?" they suggest in the Afterword. No answer is forthcoming, but someone should make the effort. (He, the boss, may learn something.)

by Giuliana A. Lavendel

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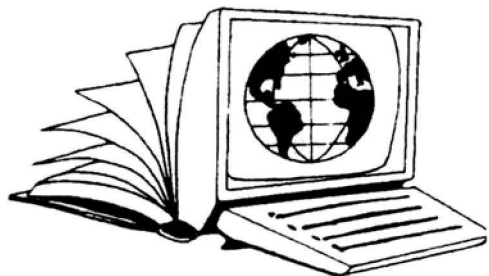
Monday Teller

No. 21   May 13, 1991

PARC INFORMATION CENTER

"Cracking the Japanese Market," by James C. and J. Jeffrey Morgan. New York, Free Press, 1990.

Another American Samurai? This one has a different twist: the present is the best, the greatest of times, if one but follows certain prescribed strategies for success, both in the Japanese and the global economy. Setting the stage, from an oceanside San Francisco restaurant, the authors sigh when a large Toyota ship full of Japanese cars⁻ for eager American customers passes the Golden Gate. The problem at hand, however, is not that Japanese companies have forged such a large presence in America, but that American companies do not have a corresponding presence in Japan. We simply fail to compete.

The authors are father and son, possibly a Silicon Valley dynasty in the making. Morgan the elder is chairman and CEO of Applied Materials, a $500M company which is the world's largest manufacturer of semiconductor equipment and sends to Japan 40% of its production; James Morgan also shares with Sony's Akio Morita the chairmanship of the Japan-Western U.S. Association. Jeff Morgan, the son, has worked in Japan for Mitsui -- Fuji Xerox has a special relationship with that trading conglomerate -- and in the U.S. for Sun Micro. He is now president of RAD Technologies, specializing in Unix software for the global market and the Far East in particular.

"Islands in the Mist," first part of three parts, is competently written but holds few surprises for the reader. Most of us have been exposed to a long term information blitz by the both admirers and bashers of the misty islands, although at times one hears something new and stimulating in this area. For instance, "Tony" Yotaro Kobayashi tossed a new issue on the table during the recent "Asia Forum" at Stanford University when he mentioned peaceful coexistence and cooperation with other Asian countries as a top Japanese problem and priority.

In our book, deja vu reigns, but it is a clever deja vu. The Japanese are the top recipients of U.S. patents; we are losing markets because we buy from Japan the basic electronic and mechanical components and production equipment to build complex systems. Yet, this Japanese ascendancy is fortunate, if the prod of another Sputnik is needed to set America in motion. Culturally, we are at the antipodes: the Japanese pride themselves on their pure race, we glory in the melting pot; they prize wa, harmony or rather conformity for survival, and we glorify our roaming cowboy heritage. (We have, at least in California, assimilated the practice of ofuro, soaking oneself in a tub of steaming water after a stressful day.)

Some observations are novel. For instance, that the Japanese have a utilitarian view of the world: they divide it into resource rich nations like Brazil and China, which can help Japan in its mineral poverty, and consumer countries like the U.S. and Western Europe, which can provide it with huge markets. Japan is a highly developed capitalistic animal because in that society everything is geared to support business first and foremost, and so much for American sensibilities and freedom of choice. "Matsushita is a place where we build people: we also build electric equipment," says a famous company slogan. The customer is God, and service is a religion. "Many Japanese die from overwork," the authors say, but it is arguable whether they work harder or only longer hours than their American counterparts. Kokusaika (globalization) and inobesion -- there is no native Japanese term for it -- are the new rallying cry for Japanese businessman, and these can be used in reverse for competitive advantage, as Applied Materials has done.

The following section, entitled "The Japan Success Quotient: American Companies in Japan" is very interesting for Xeroids, starting with a table on foreign affiliated companies in Japan where only IBM, at 20,000 employees, looms more formidable that FX's 12,000. "Fuji Xerox is probably the best

success story of any American partnership in Japan," write the Morgans, who also quote Minolta's Atseo Kasuda as saying, "It appeared that we could kill Xerox too. Now I don't think so..." Xerox learned a lesson since the time it sent the first 7000s to Japan, where the average secretary, much shorter than her American counterpart, had to stand on a box to press the button. As told by the Morgans, the story of how FX stopped IBM in its tracks in the Japanese copier market is invigorating; on the whole, we did much better than P&G with its Pampers. The chapter on "Applied Materials Japan: a Brief History," is an autobiographical view of AMJ, which was "born running" in 1979 and by 1983 accounted for 33% of the parent company's sales. 1983 was the year when AM began construction of the 65,000 square foot Narita echnology Center, with a loan from the Japan Development Bank. This well-respected R&D laboratory is now under construction to triple its size. The Japanese customers love it.

The first two sections of this book paint the landscape of the Japanese market, while Part 3 is cookbook. "Kick-Starting the Global Organization" packs a lot of mini-case histories, such as "For Sun Microsystems, bridging three-way partnerships with Fujitsu, Toshiba, and Fuji Xerox instantly gave it a powerful sales network across a number of industry groups and vertical markets..." Piggybacking on established companies is an antidote for Japan's byzantine distribution system, and persistence is indispensable to success, as shown in the case of a small shoe manufacturing firm from Wisconsin which found itself confronted by the powerful Dowa, Japan's large minority descended from the butchers and tanners of the feudal period. In the long run, Wisconsin won with a combination of creativity and doggedness. Incidentally, Morgan Senior is also from the Midwest.

A recommended "market map" is in reality a business plan, which the authors recommend as a starting point. Detailed sections on distribution, licensing, and joint venture agreements follow, with the customary caveats about negotiations. A no-frills model for global partnership is charted, suggesting ways to leverage the American partner's strength: technology, image, marketing, management knowhow. What the Japanese have taught us is that "the keys to manufacturing rest in the design process, and product design is the major cost driver of any business." Japan is a command economy, controlled by a loose cartel of business and government interests. In the private sector, competitors cooperate to carve up market opportunities. Everybody watches the competition with a passion.

Long term strategies and staying power are the foundation of the Japanese success story; many U.S. competitors abandoned their positions too soon, or employed too small an effort. Companies with 2,000 employees in the U.S. and only 20 in the Tokyo office, which is run by an American, will not prosper. This is a serious blunder, the Morgans say, because success in Japan leads to global excellence.

In other words, "Go there to do business, expect to play tough, and keep your eyes on the ball."

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

Two from SRI International: "Reducing Time to Market,"by Norman McEachron and Ruth Tara, and "Managing Competitive Analysis,"by Diane Weston.

●Time to market is becoming a national nightmare; the bureaucrats and politicians in Washington worry about our manufacturing capabilities, and academics in places like MIT and Cornell set up programs to mold manufacturing engineers. It seems appropriate, therefore, to take a look at "Reducing Time to Market," whose first author is one of SRI's most resourceful analyst. McEachron manages SRI's Quality and Productivity Program, and is generally quotable. Examples: "More than 85% of the defects in manufactured goods, computer software and services stem from problems in the definition and design of products...Engineers' choices of materials, components, and process technology during the design stage lock in some 70% to 90% of the product's final cost." Time is more important than cost, and is the prime target for leveraging. As a rule, a high tech product that comes to market on time but is 50% over budget will drop less than 5% in profitability. Had the same widget been on budget but six months late, its profitability would have dropped by one third.

SRI makes a distinction between tactics for speeding up time cycles and strategies for accelerated product development; strategies are complex, and imply a style choice. The technique of concurrent development, aka simultaneous engineering or, in Xerox's recent past, FFE (Future Engineering Environment) is just a management tool for implementing strategies which exist at a higher level of commitment and understanding. SRI's matrix (practically every productivity prophet has one) recognizes three types of strategies.

To start with, there is "Breakthrough." It emphasizes change, even when it is applied to well known or mature products whose time to market can be shortened by two thirds or more; examples are Honda's City Car and Sony's Walkman. The "Evolution" paradigm focuses on continuous improvement on top of a stable, well known process -- for instance, the addition of IC controllers to cars. This method can reduce time to market from 20% to 50%, over several years, and this is how Mitsubishi cornered the air conditioner market. "Preprogrammed strategies," which receive much attention in the SRI analysis, guide the development of mature products and can promote cycle time reduction of 99%, if the customer is targeted and cooperative. Compaq and Zenith have used preprogrammed strategies for their successful laptops. The tools are often the same -- multifunctional teams, for example, or overlapping project phases -- but each strategy family uses them a bit differently.

Following a breakthrough strategy, vendors of a critical database product reduced development time by 18 months by setting a quality target of three serious defects for the first year (they found only one). Within an evolution strategy Toyota Auto Body used Quality Function Development to limit the number of design changes, locking 90% of them in between 14 and 17 months before production began; pre-production costs were cut 61%. Preprogrammed strategies, by defining customer-approved options and combinations, eliminate late design changes. Of course, pre-programmed are the riskiest, most capital intensive, live-or-die course, since they depend so heavily on zeroing exactly on customer preferences: modeling is advisable, especially when manufacturing is involved. Evolution is safer because of lower technical and market risks: no big bang here. Breakthrough relies on speed and flexibility, and a degree of risk which can only be handled if the team communicates and coordinates well. Limited pilot projects are another must.

Technology transfer ("Learning and Reuse") is examined as it relates to the three paradigms. A substantial section on "Critical Implementation Issues" surveys organization and management of

the acceleration proces. The components are Personnel, Work Environment and, above all, Concurrent Development, which "lies at the heart of successful acceleration strategies." This invitation to a hands-on approach is hampered by the report's verbiage, which is quite doctrinaire ("Collapsing sequential processes into overlapping or parallel phases, continuously optimizing design across successive generations of products, etc.)

●What is competitive analysis? Author Weston sees it as an umbrella term for the process of monitoring the competitive environment, and finding out how well you are doing under the circumstances. Competitive intelligence processes upscale from raw data to information and, finally, intelligence, selected because it is relevant. For both analysis and intelligence, communicating to users and decision makers -- this special breed -- are key steps.

CA suffers from the customary maladies of the information operations, which are uncertain prestige, alignment, and budgets, coupled with the centralized/distributed tug of war. A questionnaire circulated by the Society for Competitor Intelligence elicited responses from approximately 60 large corporations which, on average, dedicate a small staff of 3 and a budget of half a million dollars to CA proper. Few companies, however, have a clear grasp of their CA expense and impact, since the small CA group draws resources from information centers, market research R&D, strategic planners. Existing corporate information systems are used, along with E-mail, networks, databases and software, all godsends paid for by other budget centers; this is called effective resource sharing, but makes it impossible to know how much CA costs.

A particularly rational approach was recently adopted by a subsidiary of Monsanto, a company which puts a high value on information. Centered in the business planning and development division, the program calls for participation from cross-disciplinary teams that include people from sales, R&D, marketing, planning and manufacturing, who receive support for their local budgets. Members of each CI team monitor an assigned competitor, and meet regularly to share and analyze what they have learned. Other companies, including Xerox, use similar approaches and a wide variety of sources for obtaining and filtering the information magma into a relevant and coherent message. Both the PARC Information Center and Fuji Xerox are mentioned among the creative benchmarks, and Japanese efforts in general are judged more impressive than those of their U.S. and European counterparts.

Corporations in Japan rely heavily on line managers, engineers, and widely traveled senior executives for competitive intelligence; their efforts are supplemented by well organized and funded programs supported by trading companies, government agencies, and industry groups. This is why joint ventures and alliances with foreign companies mutually benefit in facing up to global competitors. Xerox is again mentioned in a favorable light.

This svelte, easy to read report exhibits a global view, and has charts and mini case histories to supplement the author's findings. Perhaps the most important observation: communicating CI is different from disseminating it. Actionable competitive analysis depends on an essential loop where practitioners receive feedback on the usefulness of their work. This often brings them additional intelligence, and an insight into the needs and goals of that contemporary deity, the "customer."

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

"CEO: Building a $400 Million Company from the Ground Up," by Sandra Kurtzig. New York, Norton, 1991.

Light summer reading, "hitch your wagon to a star" and all that. In elementary school they said she had an average IQ, and Kurtzig determined to prove them wrong. She was making an okay living at GE, but her manager was a jerk, more concerned with paperwork than performance. So she took the $2,000 in commissions she had coming, and went into business for herself.

This is the story of ASK Computer Systems, incorporated in 1974, IPO'd in 1981; it is a chatty, self centered, personal memoir, rather than a management book. In spite of the girlish style, it is not really a feminist book, although Kurtzig often mentions her pink briefcase, and informs the reader, from the start, that her mother was a police reporter in one of the toughest precincts in Chicago. ("The men she worked with weren't ready to accept a woman as their equal, so they nicknamed her Steve.") If it really happened that way, then Sandra was the recipient of unbelievable, irrepressible luck. Her career went from programmer to owner of a service bureau, then creator of a universal manufacturing and administration software package, and back to service contracts when a proliferation of platforms had everyone else stumped; then came the big time, and Kurtzig became the first woman in the U.S. to take a high-tech startup public. Perhaps the most interesting parts of this book are the cameos with glimpses into the management style of Silicon Valley greats or former greats, like Hewlett-Packard's (and Convergent's and ASK's) Paul Ely, a man who shoots from the hip and takes risks. Lots of times he was off, but few in the Valley understand the computer business like "King Paul," who knew from the start that computers had to be more than fast iron.

Kurtzig encountered computers at UCLA, where she was a math major; there, "nerds" were talking assembly language as if they'd been born with 0 and 1 chromosomes, instead of Xs and Ys. She had a brief stint at Stanford, in the doctoral program for aeronautics, but emerged after only one year with an MS, which lead to a job with IBM -- however, she lasted only one day at Big Blue. She was luckier with GE, which offered her the Bell Labs account and later transferred her from Murray Hill to the Palo Alto Computer Time-Sharing Service, because Kurtzig and her then husband were homesick for California. On leaving GE, she took up computer services for several small concerns, and found that "constantly ceding territory and giving up running different areas of the company" was definitely the smart thing to do. She created a bare bones program for Tymshare, a precursor of Just-In-Time for manufacturing, with shortcuts for administrative functions. It was rudimentary, but, Kurtzig explains, "I didn't want to fall into the R&D trap of creating the perfect mousetrap... Too early is sometimes as bad as too late" -- the Xerox Star workstation was unfortunately well ahead of its time. The ASK software package at first was called MAMA, short for MAnufacturing MAnagement. Would an executive stand up and propose to run manufacturing with MAMA? The name was changed to MANMAN; you often need two men to do the work of one mama, says Kurtzig.

MANMAN, and its younger siblings FINMAN, GRAFMAN and ASKNET were a huge success at companies like Boeing, which could commission for $50,000 an ASK program which would have cost $1 million or more to develop in house. Kurtzig, in her anecdotal way, marvels at her own success on every page. At Hughes, upon meeting the MIS manager, a retired military man with a crew cut, "I figured him to be the last guy in the world to do business with a woman and a few hippies." Wrong; she got the contract, but it was really Hewlett-Packard and Paul Ely, then heading the computer division, who made ASK a large, successful company. ASK's early focus on H-P was a staunch defense when competitors tried to cut into the territory. Ramping up became too expensive

for bystanders; as H-P grew, and introduced new machines, ASK grew along with them. When she opted for H-P vs Data General because they were "the hometown team," Sandra made the soundest, if instinctive, decision as entrepreneur, buoyed by the reflection that H-P had a more solid engineering reputation and had gone out on a limb for the ASK startup. Sandra's father lent her $25,000 to help buy an HP 21MX for MANMAN, and when the time came, wanted his money back in cash, not in stock: "What shall I do with it, paper the bathroom?" The stock would have been worth $12.5 million in ASK's heyday, when turnkey manufacturing and accounting systems were kings. A former Xeroid representing Itel came offering to buy Kurtzig out. "I batted my eyelashes: Only one million?" Later on, she again rejected a "pass" from Xerox Computer Systems, which was looking to invigorate its timesharing line.

"Madame Chairwoman" did not leave the front office until January 1985 -- and temporarily, at that. After the stock had fallen from the mid-twenties to ten (with a brief trough at six and three quarters) Kurtzig came back, in her words, to reposition ASK as a key player in computing in the 1990s and beyond. Her entire professional life, she says, has been built around resurrecting success out of failures, conquering one niche market after another. Last fall she bought INGRES, a relational database and application tool developer, bringing ASK's annual sales to $400 million, although parts of ASK now belong to old pal Hewlett-Packard, and to General Motors.

It is interesting to note that, throughout this memoir, Kurtzig presents herself as a techie and salesperson, almost a stranger to corporate beancounters ("Eddie glared at me with his little MBA eyes...") but in the end she joined them. Realizing that she had no traditional management experience, she decided to acquire a Harvard education over three summers. Then came the IPO, a red Ferrari, a divorce, stockholder lawsuits, and a bout of what lesser mortals refer to as "burnout." Kurtzig even considered a Congressional seat, but the example of Jerry Brown, a close friend, was less than inspiring. Now Madame Chairwoman is back in the saddle, and the Valley is watching whether her luck -- plus her own instinct and the Harvard education -- still hold.

There are few lessons to be learned from this book, which is mostly episodic: some clever sales tactics perhaps, such as the caution never to mention competitors' names, which is equivalent to giving them a plug. Mentioning IBM is okay -- because IBM, of course, is everywhere, and everybody knows it. The Silicon Valley mythology is as

titillating as ever. For instance, the story of the mainframe that kept crashing, demoralizing the crack service team, while programmers brought sleeping bags to catch the computer's trouble free intervals at nighttime; finally, someone armed with a hair drier demonstrated that the crashes were due to a circuit surge caused by the copy machine in the hall. And H-P's market research suggesting that, as long as there were $40 slide rules, no one would pay for a $400 hand held calculator, and inveterate putterer Bill Hewlett rejoining: "I don't care if nobody else wants one, I want one."

by Giuliana A. Lavendel

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Monday Teller

No. 24   June 3, 1991

PARC INFORMATION CENTER

"The Age of Unreason," by Charles Handy. Harvard Business School Press, 1990.

British don Charles Handy -- London Business School, Warden at Windsor Castle and Chairman of the Royal Society of the Arts -- writes charmingly about change, but in reality his concern is about learning, learning how to adapt and live in a world where nothing is the same any more. What a pleasure it is to read this little black book, and try to fit your organization into the author's "shamrock" paradigm. The three main sections entitled "Changing," "Working," and "Living" force you to go through your life objectives and memories, but it is a comforting trip because you are in good company. For support through these perilous times, Prof. Handy offers the Shamrock, the Inverted Doughnut, Portfolio Marriages and the Horizontal Fast Track which are all familiar concepts, although we might not have noticed them before. Raised as a classical scholar, the author has a gift for the right albeit puzzling word.

"Age of Unreason" echoes Peter Drucker's "Age of Discontinuity", but Prof. Handy is serious. "Increasingly," he forecast at a conference studded with CEOs, "your organizations will come to resemble universities or colleges." "Then God help us all," voiced one of the group. Corporate executives in general prefer incremental change to the abrupt leaps of math's catastrophe theory; "catastrophe requires completely rethinking the way we learn things, and discontinuous change requires discontinuous upside-down thinking to deal with it."

Why unreason? G.B. Shaw once observed that all progress depends on the unreasonable man (or woman). Let us not assume continuity, like the unfortunate Peruvian Indians who, sighting the sails of their Spanish invaders, put it down as a weather phenomenon and continued going about their business. Rather than adapt ourselves to the world, like the frogs in the slowly heating pot of the apologue (a famous one at PARC), we must realize that the future is to be shaped by us and for us. "It is time for thinking the unlikely and doing the unreasonable." Let's ask questions, lots of them. Why are roads free and railways expensive (excepting Italy)? Why not three careers instead of one, as we progress in age from energy to wisdom? Why not reward people with time instead of money, at certain stages of life? Will the word retirement become obsolete as servant has? Can we distribute the normal 2,000 hours of work per year in chunks, rather than at 40 hours per week?

"Demography is a boring word for a mesmerizing subject," says Handy. The fully employed will be the new minority; the rest of the workforce will consist of the self employed and part timers or "temps," mostly by choice, in the shamrock-shaped organization of next century where every leaf will have to be managed with a different style. The clever organization will add a fourth leaf to the shamrock, putting even the customer to work as a subcontractor, a process already familiar to anyone who gets spending money from a bank's hole in the wall. A growing service sector offers opportunity for a more flexible organization, and will accommodate work and family obligations. The doughnut and the federal or global organization have a nothing center -- or a scanty staff at headquarters - while all the work is done by peripheral units; to support this point of view, Prof. Handy cites not Nucor's CEO but an encyclical by Pope Leo XIII, on the principle that it is evil for large central organizations to do the work which could be performed by smaller and lower bodies. This is one of several unexpected quotes in Prof. Handy's little black book -- we expected to see Soshana Zuboff mentioned.

By the year 2000, eighty per cent of jobs in the U.S. will require cerebral rather than manual skills. This is a complete reversal of the world of work fifty years earlier. Sixty per cent of the new jobs will be managerial or intensely professional, estimates consultant firm McKinsey. Competition for the highly educated will be fierce, and Prof. Handy

worries about British young people, whose educational patterns are still tied to the class system: relatively few go to school after 16. He worries about us also: "In America...the young stay in school, but whether they learn anything there is a question of growing concern." The information society uses a confusing array of inputs, to be fit together by the brain workers, especially if they are in their thirties and forties and on the core leaf in the shamrock. Intelligent, active people in the Third (Golden) Age will still contribute, but in the free patterns made possible by the demise of the labor-intensive manufacturing organization and by the birth of the knowledge-based society.

Handy has his own theory of learning, represented by a wheel in four parts: questions, testing, theories, and reflections, which originate new questions and another and yet another turn of the wheel. This wheel is difficult to turn and never gets started for some, but there are lubricants, such as the "negative capability" of living with one's mistakes and failures, and succeeding in spite of them. There are also roadblocks, and one of these is the "they" syndrome, which takes over when we delegate our future to some mysterious powers that be and forget Walt Kelly's "We have met the enemy, and he is us." Another roadblock is the missing forgiveness: "too many organizations use their appraisal system and their confidential files to record our errors and our small disasters," in the hope to frighten us to do better, while the opposite is true. Organizations used to be talked about in engineering terms like structures and systems, inputs and outputs, but now the talk is of cultures and networks, leadership rather than management. Organizations are getting smarter.

This whole stream of far reaching ideas and observations flows faultlessly in Handy's suave sentences which, like Horace's or Montaigne's, sound as if they were written just for thee.

This is a moving book, a personal journey with travel tips: "It is only one man's view," says the author who, self-effacingly, hopes to create in the reader an "Aha! Of course, I see it," recognition effect. Even including the few gimmicks he offers as training exercises, such as writing one's obituary, and formulas like I3=AV, or Intelligence, Information and Ideas equal Added Value, his concerns and insights hit the mark. Yes, intelligent people prefer to agree rather than obey, yes, education has become an essential investment, and to ration it is absurd. If we are indeed witnessing "the withering of the corporation" as we know it -- or rather the discontinuous changes in the ways organizational people perform -- we might as well recognize the inevitable and make it work for us.

This includes taking a look at the Portfolio Marriage pattern, with sixteen possible combinations, mandated by our changing ways to work; overall, we are moving towards a portfolio life which is a mixture of things, where work does not fit into five days of eight hours each, and money comes from many quarters and in different ways. An endearing characteristic of this book is that it is written in the belief that it is the little things in life which change things most and last the longest. Did you know that the chimney with its many flues making it possible to heat various rooms ended tribal cohesion? The modern equivalent of the chimney, of course, is the telephone, and the British have once again demonstrated that they have a genius for the game of Connections.

by Giuliana A. Lavendel

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Monday Teller

No. 25   June 10, 1991

PARC INFORMATION CENTER

"Euroquake," by Daniel Burstein. New York, Simon & Schuster, 1991.

"Euroquake" rests on the thesis that Europe has become the most important theater of contemporary world events: "this is the enormous force of history in the act of changing course." The issue is debatable. You may still believe that Europe catches pneumonia when the U.S. sneezes, or tend to beat your breast with our author, animadverting against "...self deception, the latest avoidance mechanism to keep Americans from addressing the country's loss of economic competitiveness and the near-total inability of its political system to provide leadership for change." The author examines why Europe's role has become so crucial, what might happen next, and what it means for all of us, especially if we look at the Old World from distant shores.

Burstein makes a point of discounting the Gulf War, which was imminent when the book was going to press; although it showed that military strength still counts for something, it actually gave advantages to Germany and Japan, which gingerly sidestepped the conflict. Economic power is the moving force of the contemporary world, and the U.S. suffers from a mistaken economic policy at home. Even our chief friends/enemies are shifting their allegiance: "Japanese infatuation with the American market is coming to an end." We do not tax gasoline adequately, as the Europeans and the Japanese do, we do not promote alternative energy sources, or encourage industry to become energy-efficient; we allow our indigenous oil production resources to be destroyed by free market forces. The American way of life is all wrong.

We are fighting the battle of the capitalisms -- there are three of them. There is, first of all, the Anglo-American way of capitalism, rooted in Adam Smith, and based on maximum personal and political freedom: free trade, free markets, high risk, high rewards. "One need look no further than

its enormous trade deficit to see that [the U.S.] remains the most open market in the world."

Japanese-East Asian capitalism goes back to Confucius. It emphasizes long term national planning and promoting the interests of the collective units, be they the nation or the corporation, "at the expense of individual liberty, consumer interests, and marketplace freedom."

The third capitalism is the German/European model, which occupies a middle ground between the American and the Japanese versions. Freedoms and macroeconomics are combined in a fortunate balance which "provides broad social insurance and insulation from risk to both individuals and companies." Author's pet.

Another interesting point, in Burstein's vision, is that "In the battle of capitalisms, corporations will function as the new armies. CEOs and managers will be more important, in some instances, than presidents and prime ministers." This may sound promising to American observers, who, however, labor under the ominous cloud of the traditional U.S. separation of business and government, which is at best nostalgic and at worst suicidal. Living in the Great Econo-Techno Multipolar Marketplace, Americans are the disadvantaged ones. If you could gather a cross-section of talented U.S. corporate managers, you'd find them more articulate, intelligent and resourceful than a similar group of Japanese or European executives. But in competition they would lose because Asian and European societies make the manager's job easier by providing low-cost capital, defending the home market, and making available a better-educated, more disciplined and loyal workforce.

There are three parts to Euroquake. The first is a historical overview of events which brought about "the dawn of a post-postwar world," from the "Eurosclerosis" of the early '80s to the Europhoria of today. Burstein's hero is Jacque Delors, President of the European Commission, facing a

European market comparable to a U.S. where each state had its own currency, language, business laws, and a strong protectionist attitude. This "decade of reversals and radical change" is summarized in a double chronology (a timeline would be more useful) from the US and from the USSR point of view. Since Reaganomics are the author's bete noire, Ronnie Reagan and Leonid Brezhnev are two peas in a pod, and 1985 is the turning point: for us, for Europe, for the Japanese. "The eradication of boundaries makes possible turning Europe into an enlarged Germany," quotes the author, from a German source. In sum, the post-war Pax Americana gives way to a tri-polar structure: Germany will dominate in Europe, Japan in Asia, and the U.S. in the Americas.

In Part II, "The Emerging European Suprastate," the author describes the world's largest market, the phantom currency ECU, and the cost-benefit analysis which was dubbed by the optimists "the cost of non-Europe," as per the much cited Cecchini report. According to a best-seller by French economist Allain Minc, however, a unified Europe is a grand illusion, which will flounder in chaos because the reality is not supranational unification but German power and dominance. Will there always be an England? Culturally yes, but not as an island any longer, after the "Chunnel" opens to traffic in 1993. More important, will Germany be able to deliver another miracle to East Germany? Will it be forced into the Soviet embrace? Should the world fear a new Germany? Although "there is a streak of authoritarianism in German culture," this is water over the dam now.

Similar motifs are reiterated in the third section, "Storming the Fortress: Americans and Japanese in Europe." Fortress Europe is dead, and protectionism with it. The U.S. is undercommitted to Europe and to globalism in general because of our uncoordinated trade policy. Washington's agenda is a twentieth century antique, in view of "the coming Japan-Europe alliance." "The Mitsubishi/Daimler Benz alliance will prove to be the deal of the century." The dollar is out as the leading global currency, but we have at least one great advantage: we speak English!

Mr. Burstein is no economist; he is a rambling rather than trenchant journalist, specializing in timely alarums (his first book is entitled: "YEN! Japan's New Financial Empire and Its Threat to America") who has put together, somewhat ponderously, his comprehensive vision of current upheavals. His knowledge base of people and events is enormous, but the trendline is often buried by the ephemera, and the result is closer to dorm discussion than analysis. The messianic tone does not help. Thoughtful readers may not be willing to accept that the Third World War is over already, and the Japanese and the Germans have won; for instance this would not please Madame Cresson, the new French Prime minister, who does not seem to favor the coming European-Japanese alliance -- at the expense of the U.S., that is. "On the heels of a modest recession in 1991, the United States will slide into a severe, prolonged recession that will last until 1997." Perish the messenger; to fulfill the title's promise, Mr. Burstein will have to take another hard look among his tea leaves.

by Giuliana A. Lavendel

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Monday Teller

No. 26   June 24, 1991

PARC INFORMATION CENTER

"Continuous Information Environments," by New Science Associates (Jerry Michalski). NSA, Southport, Conn., 1991.

A complex information wheel, resembling an antique quilt, outlines the author's vision in this brief analysis of the convergence of computing, telecommunications, and lifestyle, seen from the techie angle. Information should become available without limitations of space and time; it should also be transparent, and empower the user.

Call it ubiquitous computing ("ubicomp") in PARC parlance or CIE as New Science does, this scenario isn't yet about the here and now. Users find that being productive is difficult, in this contingency, and look forward to innovative technologies to deliver information when and where they need it. When this revolutionary approach matures, it will usher in a long term competitive change, a discontinuity similar to the advent of the printing press or the telephone. The devices featured on author Michalski's quilt-like chart -- from pen computer to personal communicator and cellular phone -- will deliver only if accompanied by three levels of integration: integration between these novel platforms and our current systems, integration with voice and within the group. Groupware features are deemed essential, in this analysis, for achieving the efficiencies our Fuji Xerox friends refer to as "new workways." Distinctive technology palettes will spell success for vendors, some of whom may still be unknown to us, hiding sub rosa or in a lab. "Information is where the action is," writes Michalski, but the infrastructure will not control it, the user will. CIE solutions will empower the customer to cope with the complexity and volume of information, while difficult and arcane tasks remain hidden from the users' view.

What applications, how soon, and from which vendors? Which companies will lead, or go under? Which strategies will spell an advantage? Ultraportable computing is evolving at amazing

speed; we went from 50 lb PC to the 1 lb, full function Poqet, voice and other features will follow. Two-way communication will change our way of life because the dynamics of how business and individual priorities mesh will change. People accustomed to desk-bound computers may feel apprehensive, anticipating what is in the works, but to date it has been difficult to prove that office automation pays its way. Yet, many present-day luddites exist, according to New Science, because available technology does not fit the kind of work they do.

The current information environment is extremely fragmented; you notice it when you are forced to switch from computer to telephone, go to a meeting without your notes, use disparate information channels to communicate, and when you are transitioning from voice mail to fax to real-time conversation, to E-mail on LAN, on corporate E-mail, on MCI. The status quo calls for a visionary integrated approach, which on the other hand may be not so visionary: portables, which used to be luggables, may make up half of all personal computer sales within three years. The pen in particular may change the way we interact with information, bringing computing power to those who shun keyboards and mice. (Perhaps people will have to develop legible handwriting, and will again bemoan "the tyranny of the machine.")

Go's PenPoint, using TOPS communication protocols from Sun's Sitka, already allows its machine to be plugged into a Mac or PC network. This is a living example of integration with existing systems, which author Michalski calls Type One.

The mobile office belongs to Type Two, which focuses on integration with other media -- for example, the telephone. Imagine -- oh bliss - not to be obliged to hunt in four different places for "all your stuff," that is E-mail and voice mail, fax, electronic documents et caetera, but having them all present and even sorted in the order you want Further ahead, integration with the workgroup, or

Type Three, will require, not a separate set of products, but assorted features to be called upon when the occasion demands it, from the safe harbor of ordinary everyday computing. It is fair to say that the list of these features contains few surprises for the sages of PARC and EuroPARC.

In sum, these are or will be C(ontinuous)I(nformation)E(nvironments). There will be no gap between text, image and sound, modes which will be handled by a single intelligent interface. We will witness wireless networking, intelligent buildings with built-in system infrastructures, the merger of data and voice, bridging information through the descendants of futuristic software packages like Channel Computing's Forest and Trees or Lotus' DataLens. Many steps could be taken even today towards this scenario, but today is indeed too early; better wait for the right moment when the technologies are ready to be harvested, like grapes on the vine.

No vendor can sell CIE today, although valiant efforts are evident, notably Microsoft's Pen Windows, which may have been inspired by the legendary video glimpse of the Apple Navigator. This whole scenario will become reality because people must be able to forget about the tools and get on with their work. The information revolution is really a massive opportunity which will trigger long term changes in our quality of life, in spite of technical difficulties. Michalski is hopeful but gives no magic recipe, except for stating that piecemeal solutions become rapidly obsolete band aids, which create waste and confusion when they must be replaced. An evolving understanding of information is crucial: "Companies are beginning to treat information as an asset to be collected, maintained, and improved, rather than as a cost of doing business." Amen.

by Giuliana A. Lavendel

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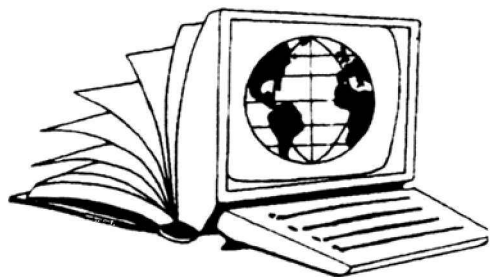
Monday Teller

No. 27   July 1, 1991

PARC INFORMATION CENTER

"World Class Manufacturing," by McKinsey and Co. New York, 1991.

McKinsey has spoken, and it is all about change although, according to one co-author, "the only kind of human being who really wants to change is a baby with a wet diaper." The three articles from McKinsey Quarterly, which are offered as a new look on manufacturing excellence, review both metrics and management approaches, as practiced around the globe; Americans, Japanese, Europeans, all are bundled together by this journal, which is issued in the U.K. There are some surprises. For instance, it is often revealing, in Europe, to find that all procurement sources are within a radius of 100 miles from the plant. Is this supply base carefully selected for just-in-time delivery? Alas, it is often the result of lethargy and national favoritism, coupled with an unwillingness to handle foreign currencies, in the enduring absence of the ECU. (Does this happen also in America?) Time on the job is also varied: counting holidays, vacations, sick leave, etc., Belgian manufacturing companies can count on a yearly average of 1,600 working hours, while Germans on the average toil 1,900 hours. In the U.S. 2,145 hours are expected, but in Japan 2,300 hours are usually spent on the job, including voluntary unpaid overtime.

While "Benchmarking World-Class Performance" and "Unleashing a Plant Revitalization" are homegrown products of the McKinsey think tank, "Heavyweight Product Managers" stems from a collaboration of two well known academics, Harvard Business School's Kim Clark and Tokyo University's Takahiro Fujimoto. Xerox is mentioned in this collection with the sort of reverence accorded an apt pupil. Of course, it is to be expected that Xerox would be the chosen example for companies where benchmarking "has become an all-pervasive element of their management culture," but there is more. Ten years ago Xerox focused solely on reverse engineering to explain Canon's fearsome advantage in the low-end

market. Now, Xerox plays smarter because serious investigation of Japanese practices in various industries "led to fundamental changes in how Xerox manages suppliers and develops products."

Benchmarking world class performers starts with competitive analysis, but goes much further. Often focusing only on one industry, competitive analysis fails to identify breakthroughs as they happen in other fields, and may stir up a blizzard of details causing "paralysis of analysis"; it is also concerned with the here and now, leading to gross mistakes like the chase for low-cost, offshore labor of the late '70s and early '80s, which made many U.S. industries vulnerable. Benchmarking is not the hit and miss, hands-in-pockets walk-through some people practice. It is serious business fraught with industry and company analyses, interviews with unsuspecting customers, fixed measurement formats, and a disciplined interpretation of the results, all of which make it very different from plant tours.

The same energizing motifs recur in the paper about plant revitalization, which follows a case history from a large multinational. Revitalization potential is most likely to be available where operations are "people-dependent," and here Xerox stars again. How to revitalize? Dislodge the status quo, set new directions using either a Pareto-style tops down approach with focus on critical areas or applying Japanese-style bottom-up employee involvement. In sum, unfreeze and commit to change, redirect, freeze again, reinforcing the new direction with rewards for performance and capital expenditures.

The Harvard/Tokyo University paper--undoubtedly the pick of the three- is about organizing for speedy and effective product development; this is the key problem in a growing number of industries around the world. After studying 29 major projects in 22 U.S., European, and Japanese car companies, the authors conclude that a "heavyweight" manager is needed to orchestrate all PMs or

product managers, who coordinate the working engineers directly or through liaisons, and are normally supported by several assistants.

Of four possible patterns, the "functional structure" is the most traditional, and has no heavyweight. Development neatly falls (or is supposed to fall) into functional disciplines, and engineers at the working level are relatively specialized. No one person has total responsibility for the product, but there are rules and specs and procedures and even "shared traditions" which keep the group together. In the "lightweight product manager" pattern the manager is a real person, but has limited power and status, no access to working level engineers; this is mainly a coordinator or facilitator role, working though liaison assistants, with the problem solving and goal achieving tasks less polished authors would refer to as "troubleshooting." The "heavyweight manager" has seniority and clout, and direct access to the working engineers. Definitely general manager types, heavyweights have responsibility not only for coordination but also for planning and concept development. They group, fittingly, around a strong product focus: body engineers group by size -- large cars, small cars, utility vehicles. Even more mission oriented is the "project execution team" structure, where the heavyweight manager is combined with heavyweight people throwing body and soul into the project. You could call it a religion, or, in Harvardspeak, a matter of integration.

Throughout the four patterns, manufacturing and marketing stay within the function, reporting to a supervisor who takes order from the project managers, whatever his/her weight may be. "Heavyweight" and "lightweight" may be indistinguishable on the org chart, but "the two are different species at the behavioral level." Heavyweights are multidisciplined and even multilingual -- not that they speak Japanese or French, but are fluent in the language of engineers, customers, marketers, and designers. They circulate among project people, clients, dealers, and function as both internal integrators and concept champions, incorporating customer expectations into the development details (this style used to be called "management by walking around.") Heavies shun paperwork and avoid the corporate scourge of too many meetings.

How discouraging it is to read, at the end of this learned paper, that most companies keep repeating the same mistakes. Only those which focus on continuous improvement have an edge, and this must be encouraging for Xeroids who, after the Quality focus, are entering the era of

"productive work communities," the communities of practice, of work, and learning designed for letting multifunctional, empowered people "build things." "High performance people redesign their jobs. Their career growth takes place through work enlargement," wrote Paul Strassmann in 1985, and it still fits.

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

The Art of War," by Sun Tzu, translated by Thomas Cleary. Boston, Shambhala, 1991.

It came from China, and even the Japanese are happy to admit it. At a recent gathering of the Competitor Intelligence Society, a representative of Japanese trading companies talked about the tactics of round-the-clock vigilance and surprise his colleagues practice; they are inspired by "The Art of War," written by a warrior philosopher who lived in China around 2,000 years ago -- over a thousand years before Machiavelli. (Of course, the seasoned chieftain's revelations to his American competitors flew in the face of one of Sun Tzu's most admired precepts: "Be extremely mysterious, even to the point of soundlessness. Thereby you can be the director of your opponent's fate.") Eagerly studied by modern politicians and industrialists in Asia, the fame of Sun Tzu's little book has spread to the United States, where it is mentioned in government circles and in the boardrooms of the Fortune 500. Not many people have actually read this disconcerting little tome which throws allegories and paradoxes to the reader in the best tradition of Taoism, a discipline which is at the same time humanitarian and, in Western terms, stoic. More than about military campaigns, it is about human conflict and resolution; its classic dictum is "To win without fighting is best. " In the view of many observers, this exactly describes how the Japanese took over markets and industries while the rest of the world looked on.

"Maintain discipline,"says Sun Tzu," and adapt to the enemy to determine the outcome of the war. Thus at first you are like a maiden, so the enemy opens his door; then you are like a rabbit on the loose, so the enemy cannot keep you out." Von Clausewitz, a Prussian general who fought against Napoleon and whose "On War" was popular among the managerial chic of the Eighties, would never have chosen a rabbit as a model of behavior. Self-effacement is an undercurrent in "The Art of War," in its essence a treatise against violence and aggressivity; yet it is paradoxical to look for

restraint from internal and external conflict in a book which begins with: "Military action is important to the nation -- it is the ground of death and life, the path of survival and destruction, so it is imperative to examine it." This is in the chapter dedicated to"Strategic Assessments", five in all; the foremost is the Way, the Tao: "The Way means inducing the people to have the same aim as the leadership..." This is a classic corporate statement, just like the one a few lines further: "Leadership is a matter of intelligence, trustworthiness, humaneness, courage, and sternness (discipline). "In"Planning a Siege" the role of the executive is described: "Generals are assistants of the nation. When their assistance is complete, the country is strong." Military operations are effective only if swift and decisive, and the reward system follows suit: "Therefore, in a chariot battle, reward the first to capture at least ten chariots." This is from "Doing Battle." We also learn that "The general rule for use of the military is that it is better to keep a nation intact than to destroy it...Therefore those who win every battle are not really skillful -- those who render others' armies helpless without fighting are the best of all." And, further on, under "Formation:" "So it is that good warriors take their stand on ground where they cannot lose, and do not overlook conditions that make an opponent prone to defeat. Therefore a victorious army first wins, and then seeks battle; a defeated army first battles and then seeks victory." It just fits the battle for market share, doesn't it?

Some corporate functions are already in tune with Sun Tzu's five "rules of the military," which are: measurement, assessment, calculation, comparison, and victory," although victory is oftentimes elusive. The eternal management question of whether smaller units are more productive and easier to administer than large organizations is handled by Sun Tzu in the "Force" chapter: "Governing a large number as though governing a small number is a matter of division into groups. Battling a large number as though battling a small number is a matter of forms and calls (i.e. formations and signals)." Another

forcible reminder of the Eighties is in the "Emptiness and Fullness" chapter: "..When opponents are at ease, it is possible to tire them. When they are well fed, it is possible to starve them. When they are at rest, it is possible to move them... Appear where they cannot go, head for where they least expect you..." (e.g. using the low end market as a springboard). Sun Tsu appears to have anticipated the advent of modern telecommunications: "So if you know the time and place of battle, you can join the fight from a thousand miles away." This fits the scenario of corporate wars, as does "In battle, confrontation is done directly, victory is gained by surprise." There is even a section bluntly entitled "On the Use of Spies," which seems to foreshadow competitor analysis and information services: "Foreknowledge cannot be gotten from ghosts and spirits... cannot be found out by calculation. It must be obtained from people, people who know the conditions of the enemy. So to fail to know the conditions of opponents because of reluctance to give rewards for intelligence is extremely inhumane, ...uncharacteristic of a victorious chief." Chapters like "Terrain," "Nine Grounds, " and "Fire Attack" deal with the nitty gritty of hand-to-hand combat, and this is a bit removed from the warfare of corporate halls, where shed blood is less visible: "When you will survive if you fight quickly, and perish if you do not, this is called dying ground," writes Sun Tzu somberly. But there are lessons to be learned, even in the thick of warfare: "Therefore if you do not compete for alliances anywhere, do not foster authority anywhere, but just extend your personal influence threatening opponents, this makes town and country vulnerable." And further: "Employ the entire armed forces like employing a single person. Employ them with actual tasks, do not (just?) talk to them." A successful operation should react like a swift snake that counters any attack on its body. "Can a military force made to be like this swift snake? The answer is that it can. Even people who dislike each other, if in the same boat, will help each other out in trouble." On the virtue of coherent leadership: "When directives are consistently carried out, there is mutual satisfaction between the leadership and the group."
Just put competitiveness in lieu of war, and Sun Tzu has it all. Competitiveness's "...essential factor is speed, taking advantage of others' failure to catch up, going by routes they do not expect, attacking where they are not on guard." So the rule is "...not to count on opponents not coming, but to rely on having ways of dealing with them, ...to rely on what cannot be attacked." How does one achieve invincibility? Sun Tzu spells it out "...a military force has no constant formation, water has no constant shape: the ability to gain victory by changing and adapting to the opponent is called genius."

by Giuliana A. Lavendel

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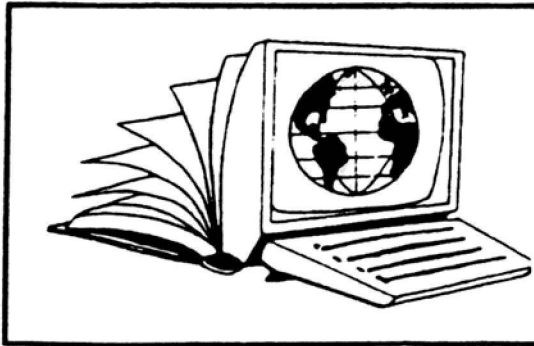
"The Machine that Changed the World," by James P. Womack, Daniel T. Jones, and Daniel Roos. New York, Rawson, 1990.

The New York Times recently revisited Volvo's Uddevalla factory, home of a Swedish experiment known as "the craftsmanship approach." It was to return dignity and productivity to the workers, but it failed. "MIT decides Japan is better," wrote the New York Times, alluding to "the landmark study of the world car industry" we are considering. One of a growing list of M.I.T. heavy hitters, Machine is "emphatically different" from other Japan books, although much of it is about Toyota and its production genius Taiichi Ohno -- but it is also about Henry Ford and Arthur Sloan and Louis Renault and Gianni Agnelli and other such creative tycoons, and what is happening to the industrial revolutions they set in motion. (No pun intended, although the authors are obviously motor car specialists, the same brain trust which published "The Future of the Automobile" a few years ago.)

Chief author Womack and friends decided not to seek consensus by writing an academic report in committee style; they produced a quick page turner whose significance hits beyond the automobile industry and its environment. The researchers spent five years at M.I.T's International Motor Vehicle Program (IMVP), exploring differences between mass production and lean production in the gigantic industry whose final product is composed of 10,000 parts. They came to one conclusion: the principles of lean production can be applied universally, and "will have a profound effect on human society." In other words, salvation will come by means of the automobile. Contrary to the Udevalla theorists, lean production is unlikely to to prove more oppressive than mass production; rather, it verges on humanistic just because it is fragile, having dispensed with "buffers and the safety nets" of extra inventory and workers, divided responsibilities and space to waste. With no slack,

the lean system requires that everybody work at one's best. At the Takaoka plant in Toyota City, any line worker can stop the whole system simply by pulling a cord overhead -- but this very rarely happens. At GM's Framingham, MA plant, now mercifully defunct, only senior managers could stop the system, except for safety reasons, and stoppages happened often -- although vast expanses of defective automobiles could be seen awaiting rework at the end. There is great variance between one Japanese manufacturer and another, and some American plants are now running pretty lean. Ford, which 75 years ago originated mass production, is now as devoted to lean production as the average Japanese transplant in North America, but the Europeans have a lot of catching up to do. Mass production still reigns in the average European factory, while in the high-quality, low-productivity plants of Audi, BMW, Ferrari, and Mercedes, white coated managers and workers "are convinced that they are craftsmen, and spend more time to fix the problems their assembly system has created than it takes the Japanese or American plant to make a nearly perfect car the first time." Are these craftsmen a quality pledge? On the contrary, the IMVP team found that they are actually performing like Henry Ford's fitters in 1905, adjusting off-standard parts, fine tuning, rectifying mistakes so that everything will work out in the end.   As for the Third World, its range of performance is astounding: tops is the Ford plant at Hermosillo, Mexico, which rivals the best Japanese plants and transplants, but many others are expendable. The special features of Japanese society, such as a homogeneous and highly literate population of workoholics open to "groupthink," do not even enter the equation, in the IMVP's team opinion. Lifetime employment and the rigid seniority system are not an intrinsic feature of Japanese society but became entrenched in the postwar period, when the Japanese government, under American prompting, strengthened the unions. Workers became a significant fixed cost, and it made sense

to empower them and benefit from their involvement.

Lean production is a new religion with no national boundaries; it borrows from both mass production and craftsmanship. Readers are invited to extract "universal principles" from the first Japanese application, remembering how other nations struggled to differentiate mass production from its American origin -- until, around mid-century it became global. The term "lean production" was coined at MIT by researcher John Krafcik. "Lean" because it uses less of everything than mass production does: half the effort, space, tools, engineering hours, development time to market. The inventory is JIT, defects are close to zero, and the variety of products is superior and growing. Blue collar workers find more challenges and also more stress, as "empowerment" pushes responsibilities down the organizational ladder. It is back to the past, when the skilled fitter in Henry Ford's plant of 1908 was responsible for the entire vehicle; in contrast, the assembler in Henry Ford's mass production line had only a couple of nuts and bolts to worry about, as Charlie Chaplin spoofed in "Modern Times."

The seed of lean production started when Eiji Toyoda spent three month in a pilgrimage to Ford's Rouge plant in Detroit. Back in Japan, Eji and his friend Taiichi Ohno developed simple die change techniques, and changed dies every two or three hour instead of two or three months. By late 1950, it took them three minutes for a die-change -- no specialist needed -- and it actually cost less to make small batches of stampings: first, because no huge inventories were needed, and, second, because stamping mistakes showed up right away. This, incidentally, is how the quality movement was born. The bad old habit of holding back knowledge and effort is characteristic of all mass-production systems; "faster is dearer" is also joining "quality costs more" on the junk heap of the Middle Ages of manufacturing.

Rather than originating spectacular innovation, the Japanese lean producers have scavenged brilliantly. The shusa, the team leader, has almost absolute authority, and brooks no interference from senior management; the team is long lived, and starts out robust, rather than growing from a puny start and collecting debris like an avalanche. For a lean supply chain, vendors are organized into functional tiers, with no large bureaucracy of procurement. Toyota spins off supply operations, retaining a percentage of equity in intimately connected but independent companies; key employees are loaned to them, and others migrate permanently, seeking career opportunities denied by the mainstream organization. In Japan, where most cars are manufactured to order, salesmen visit promising customers in their homes, like the physicians of yore, and showrooms are spartan. The distribution system at Toyota consists of three weeks' supply of finished units, most of which are already sold, but the company has invested in information technology, offering to the customer databases which retrieve automobile options and the customer's own demographics, derived from a dossier of past purchases.
Would this system would be viewed by the American customer as an invasion of privacy? What about a door-to-door salesman who deals in cars and knows all about your past? Perhaps the leanness style still has a Japanese flavor, and may cause problems even in the era the M.I.T. authors hopefully call "postnational."

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

"Cyberpunk," by Katie Hafner and John Markoff.
New York, Simon and Schuster, 1991

No wonder that the final section of Cyberpunk
mentions that "Hundreds of people agreed to be
interviewed for this book." A large portion of this
spiritless chronicle reads like a tape transcript
without redeeming significance; we expected
more from John Markoff -- if he really was there in
person, rather than as a sometimes supporting
presence. Markoff is the incisive, astute journalist
who is mainly responsible for reporting on the
computer industry for the New York Times where,
in 1988 he broke the Robert Morris story on the
front page. In Cyberpunk he and Hafner revisit the
case, rehash Cliff Stoll's Cuckoo's Egg as seen from
the spy ring side, and add a third story about
telephone phreaks where the main hacker is
straight out of a Schwarzenegger flick, complete
with monumental (6'2") blonde female
companion. Anyone who happens on this book
and does not have a taste for very minor Le Carré
should skip to the story of the recent Internet
worm case, where Markoff's hand shows through.
At 90 pages, it is the shortest section, and contains
some analysis and reflections which elevate it
beyond the pure chronicle of maleficence. "... The
case tapped America's ambivalent feelings about
the power and reach of computers...And the case
had family drama: the father and son who
belonged to a computer science elite were both
obsessed with exploring the subtle intricacies of
the complex computers that had come to control
much of society...The case also marked the sudden
awakening of a national recognition of the
fragility of tens of thousands of interconnected
computers..."

The Times reporter played a deus ex machina role
in the Internet incident. Markoff had been alerted
to the worm debacle by Cliff Stoll, who had been
up all night at the Harvard-Smithsonian Center for
Astrophysics battling the invasive program, which
had swamped fifty of the Center's machines. Later
Markoff learned from an anonymous informer that
the culprit was known by the initials RTM; a call to
Stoll, who invoked the Internet "white pages"
directory and the finger program, readily
identified Robert Tappan Morris, a graduate
student at Cornell. Markoff, who was calling
possible victims of the snafu at computer research
centers, rang up the chief scientist at the National
Computer Security Center, a component of the
National Security Agency. "In fact, the man from
the security agency appeared to know more about
the event and its perpetrator than the reporter
did...Finally Markoff said "I think that the program
was written by Robert Tappan Morris." "You're
right,"Morris answered...If the program had been
written by a Cornell graduate student, how was it
that the computer security expert at the National
Security Agency already knew that? What was
going on, anyway? Just as he was about to hang
up, he had a sudden thought. "Isn't that a funny
coincidence,"he said. "You both have the same
name." Without missing a beat, Morris replied,
"That's no coincidence. He's my son." The writer
makes no bones about his personal opinion:
"Robert had never pried his way into commercial
computer networks in search of power, money, or
state secrets. He was simply carrying on an
intellectual tradition he had learned from his
father."

Robert Tappan Morris worked for one summer at
the DEC laboratory in Palo Alto, and it is no
coincidence that DEC computers were involved in
all three Cyberpunk stories, although Digital
management appears to have softpedaled this
connection, and there was a minor Sun workstation
involvement in the Morris case. Lenny Di Cicco, one
of the major players in the phone phreaking case,
now drives to his programming job at a small
computer company in Orange County, CA, in a car
whose license reads "VMS WIZ." Kevin, the Dark
Side Hacker of the first story, broke into DEC's
development cluster in search of the VMS source
code: "The Palo Alto lab was composed of about
twenty-five people in a four-story streamlined brick
building that also served as Digital's western

headquarters in the downtown section of Palo Alto, an upper-middle-class community next door to Stanford University....Scientists at the Western Research Lab were experts in the UNIX operating system, though they held a grudging respect for VMS... The Digital gateway at Palo Alto, with links throughout the world, was extraordinary in its very existence. It could crank data in and out at 56,000 bits per second, which is the equivalent of transmitting all of Moby Dick in less than two minutes...Having good network connections mattered to a computer scientist in 1988 the way a properly equipped kitchen would matter to Julia Childs..."

Like this simile, the phone phreaks of the first section were socially maladroit. They were overweight and often drugged, with chosen names like Rick the Trip, Don Dual Phase and Captain Crunch -- the cereal's toy whistle matched the 2600 hertz tone which controlled AT&T's long distance switching system. In the Seventies, there was a whole spectrum of tools in support of phreaking, such as TAP, a bulletin culled from internal AT&T publication but distributed to hackers; TAP published obscure phone numbers, such as those of the White House and Buckingham Palace. LA Weekly, an alternative newspaper, blew the whistle on the phreaking or thrashing scene, which some contemporaries viewed as a form of social engineering. In the second section we meet Pengo, a youth rebel from West Berlin who became addicted to computers in his early teens and wandered from Datex-P to Tymnet to the CERN computers at Geneva, gathering acolytes dedicated to the "peace, disarmament, and intellectual freedom" of the notorious Chaos Club. The ubiquitous DEC's "user" password, which many new customers forgot to disable, served as an open sesame, reaching Navy installations in Virginia, NASA, the Air Force System Command, SLAC, Lawrence Lab, the major universities, and the whole world of confidential U.S. computing. Pengo and his gang sold the harvest of their wandering to the Soviets, and were finally exposed by traitors in their midst. Most of all, they were unmasked by the unlikely team of the CIA and Cliff Stoll, who first spotted a $.75 discrepancy in his computer records at Livermore and later concluded "Someone was in my computer looking for Star Wars information."

There are several interesting tidbits in the "Epilogue" of Cyberpunk. Pengo, the German whiz kid, was let go scot free, with no probation and no fine; he had to pay a small sum for damages to Emory Air Freight, whose network ID he had used liberally, and he also had to sign a document promising never again to break into DEC's

computers, whose source code he had in his possession. We learned with regret that Cliff Stoll is now divorced from Martha, his "sweetie" whose idea it was to set a trap to catch the computer spy who was selling information to the Soviets. One curiosity remains. During the deliberations in the Morris trial, the authors write, Mr.Morris senior "occupied himself with an old eighty-five-cent Penguin edition of Xenophon's History of Rome." Since Rome didn't amount to much in Xenophon's time, that renowned historian kept busy with matters exclusively Greek and Middle Eastern. Is the History of Rome punk history?

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

"Gaining New Ground: Technology Priorities for America's Future," by the Council on Competitiveness. Washington, D.C., COC, 1991.

"...This report represents the first time that America's corporate, academic and labor leaders have reached consensus on these questions...," reads the foreword. It is good news that that those gentlemen -- one or two women were also spotted on the list -- have reached consensus on anything. Founded in 1986, the Council is an organization of top executives working together to help America compete more effectively in world markets. The Council is star-studded: IBM's Akers, Bell Labs' Arno Penzias, Harvard's Michael Porter, the ubiquitous Admiral Inman, Hewlett-Packard's John Young, Albert Shanker of the American Federation of Teachers/AFL-CIO and other such luminaries sit on the executive Committee. The General Membership starts with Xerox's Paul Allaire, followed by muscle in all areas of the U.S. power structure, from Estee Lauder to the New York Stock Exchange. There is also a Technology Advisory Committee on which Sematech's Bill Spencer served in his former role as "VP, Science and Technology (sic), Xerox Corporation."

"The American people and its leaders have too readily assumed that preeminence in science automatically confers technological leadership and commercial success as well. It does not." Following this premise, the Council worked with government officials and R&D experts to analyze nine industries: aerospace, chemicals, computers, construction, pharmaceuticals, electronics, machine tools, automotive, and telecommunications. These sectors represent more than $1T in sales, and employ about 12M people in America, and the Council is looking for a competitive common ground on a global scale. If we do not get busy, intimates the Council's report, "Americans will feel the pinch in a thousand ways." Foreign governments are aggressively pursuing public-private collaboration, while we have lost market share in technology-intensive products like

memory chips and even entire industries such as consumer electronics. Other nations like Germany and Japan dedicate a much larger proportion of their GNP to non-defense R&D than the U.S. does. While in the the past there was a considerable flow of invention and development from defense into the commercial markets, in 1990 "only a relatively small fraction of the $67B federal R&D budget was directly relevant to the real technology needs of American industry." The technologies which will drive markets to the year 2,000 and beyond are already on the table; our problem remains how to convert them into marketable products and services.

The Council had published in 1988 a preliminary survey entitled *Picking Up the Pace*. This '91 follow up spells out an action plan with several recommendations for the public and private sectors. America does not exploit to the fullest the great resource represented by its "Research Universities." The universities themselves should take the initiative in developing closer ties to industry, communicating expeditiously important technological advances to potential users, strengthening engineering and management programs so that they are responsive to real needs, and -- last but not least -- enhancing research to address long-term issues that are relevant to industry. Corporations should cooperate with the Council in promoting technology networks, rising above their traditional sensitivity to the sharing of proprietary achievements. Sharing of information and establishing a new understanding of antitrust regulations are of the essence, as is benchmarking with foreign and domestic competitors which have shown enviable commercialization practices. Senior executives are encouraged "to give strategic factors equal weight with financial projections" (but how can they, under the pressure of SEC-mandated quarterly reports, ROA/ROE, shareholders, capital shortages, and the caterwauling from Wall Street analysts?)

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As for the Feds, the President is to proclaim technological leadership a national priority; a five-year implementation plan increasing R&D support for critical technologies ought to be part of the FY '93 budget. Key agencies, such as NIST, DARPA, and the new Critical Technologies Institute, must work closely with industry. Ensuring that national laboratories deliver competitive results "commensurate with the national investment in them ($20B)" is also on the agenda. Other recommendations show that the executives at the Council have not totally ignored economics in their zeal. There is talk of accelerating depreciation for manufacturing equipment, making the R&D tax credit permanent and more broad-based, and placing a permanent moratorium on the notorious Treasury regulations 1.861-8, which prevent multinationals from deducting for tax purposes a portion of their domestic R&D expenditures. This, of course, creates a disincentive for conducting research in the U.S.

The nation's technology infrastructure is critical. It embraces both material assets like equipment, facilities, and networks, and human capital -- the skill and motivation of our people. The feds need to assess if it is working because we need "to make sure that the United States has a world class technology infrastructure." The Council's wise men have fleshed out the infrastructure buzzword rather well, as shown in the body of the report focusing on the technologies critical for competitiveness. The U.S. status in each of these gets from an A to a D: strong, or competitive, or weak or losing badly or lost, like for optical information storage, display technology, and memory chips (hardcopy technology, both electrophotographic and electrostatic, is considered weak). So much for the Electronic Components table. Information Technologies, instead, present a rosy panorama of U.S. strength, with only a few subcategories defined as slightly weaker, or competitive. They are Hardware Integration, the whole Networks and Communications area, and portions of Portable Telecommunications.

Tables, data, clarity of exposition all testify to the resources which the Council had at its disposal; they must have been assembled by hosts of capable staff minions who, however, forgot to provide a helpful subject index. Open challenges to the status quo abound, such as the request that the Justice Dept forget some of the nonsense about antitrust laws "or the perception of them," and remove barriers to technological cooperation. Of particular interest is Chapter III on the International Comparison of Critical Technologies. In Japan, the spreading of pre-competitive

information, spurred by government programs, is often as beneficial as the creation of research breakthroughs. Germany has an extensive net of research institutes promoting manufacturing technology; they are funded by industry and located close to universities of renown. Appendix II contains a challenging comparison of critical technologies as viewed by the DOD, the U.S. Dept. of Commerce, MITI, and the European Communities. Commerce obviously has it; its list is the shortest, but contains all the good stuff, such as Digital Imaging Technology, High Density Data Storage, High Performance Computing, Optoelectronics, Flexible Computer Integrated Manufacturing (no acronyms allowed here). MITI lists Optical Elements, Large Area Circuit Elements, Amorphous Materials, and an array of mostly practical, device oriented goals to reach. Are we back where we started? Not on your life, say the Council's sages, who insist they are personally involved in the struggle, and pushing.

by Giuliana A. Lavendel

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Monday Teller

"Partnership for Profit: Structuring and Managing Strategic Alliances," by Jordan D. Lewis. New York, Macmillan, 1990.

This a verbose, diffuse cookbook. *Sub rosa* nuggets have to be uncovered from casual gatherings where little known or forgotten factoids emerge like, for instance, Xerox's brief romance with National Semiconductor. The frequent dropping of big names distinguished for their alliance propensities makes this book sound like a collection of course notes, where mini-case histories are served over and over again, to buttress the instructor's flights of theory. Yes, the author, now head of his own consulting firm in D.C., used to teach at the University of Pennsylvania's Wharton School, where he launched the "cooperation in business" motif which became his career milestone. He came to the conclusion that a large number of firms are involved in alliances, that the number of such phenomena is growing, that management considers such arrangements very important -- perhaps there is a parallel with the current thrust towards collaborative efforts in computing, often assembled under the groupware umbrella. Cooperation among business, universities, and government labs is a phenomenon to which the author draws attention, noting that international collaboration in research is growing faster than R&D budgets themselves.

While immersed in academic legwork, Mr. Lewis noticed that there were "no guidelines on how two or more firms -- with different objectives and cultures -- could work together to strengthen each [other], while remaining independent." So he decided to set those guidelines, which he has been mulling over since the Sixties. His book is built mainly around three dozen case studies, picked from a larger set developed at Wharton; since the selection criterion was productivity, in each case the alliance must have produced something, to be mentioned in this taxonomic effort. It could be said that Mr. Lewis pre-selected his references to show only success, since his belief in the alliance

modus operandi is almost limitless. Writing recently in the Wall Street Journal about *"IBM and Apple: Will They Break the Mold?"* he maintains that the commercial relationship bonds exemplified by the Japanese *keiretsu* promote efficiency and innovation, and as such have great strategic merit. Lower joint costs, "help in troubled times," the rapid dissemination of technical and marketing information, shared risk and common purpose" are listed in the plus column. Hostile relationships with suppliers cause many problems to the automotive and chip industries in the U.S, and even Sematech failed to stigmatize these adversarial relationships among members, who represent 80% of American chip industry. "Success will come," Lewis concludes, only if Apple and IBM place their need for this alliance above other priorities." Less likely alliances have succeeded, as shown in the case of Kubota, a Japanese manufacturer of agricultural machinery. In 1988 Kubota shipped its first, advanced superminicomputer from a new plant near Tokyo, thanks to the loyal support of Ardent Computers, MIPS, Synthesis Software, Exabyte and Akashic Memories, all from Silicon Valley and working as a team.

Enduring relationships with no backstabbing, divorces or solo flights are central to the nation's future welfare, and the author here targets approximately eighty alliances representing "high and low technology, global giants and local enterprises, manufacturing and services, consumer and industrial goods, domestic and international" enterprises. Research was enhanced by interviewing 100 executives from 40 large American, European, and Asian corporations; Xerox is covered, with Fuji X. and without, but does not achieve the visibility of the Ford-Mazda happy marriage, or the equally happy if less glamorous status of Dow Chemical and Personal Care cornering the disposable diaper market. Corning and Ford Motors, which "are widely regarded as exceptionally well-managed firms" are Mr. Lewis' cornerstones. Two equally prominent firms whose

experiences turned out poorly were also studied for contrast while remaining anonymous. A suspicion arises, however, that they could be identified as AT&T and Olivetti of the "well publicized arguments," whose alliance was misconceived because promised strengths were just not there. Telecommunications giant AT&T had not done well in the U.S computer market and could not mentor anyone; Olivetti had no experience in marketing to European telecommunication customers.

The three main sections: *A New Strategic Framework, Kinds of Alliances,* and *Implementation* are organized in 18 chapters and a mosaic of subsections, each of which contains one or more mini-case histories liberally repeated wherever they may apply. Because of the diffuse style and editor non-presence -- a common phenomenon now where spellchecking is substituted for copy editing -- the evidence is mostly anecdotal and aging, sometimes with embarrassing results; for instance, in *Working with Formal and Contractual Alliances* the supposed friendship between Bill Gates and Ashton Tate's Ed Esber fostered a business alliance based on "mutual trust" -- which was disproved by recent events (Borland bought Ashton-Tate, and this was not intended as a friendly gesture towards Microsoft). The concept of alliances as panacea is contradicted by assertions like "There is no way to know if an ally is out to disarm you. Alliances can lower market entry barriers, so any partner may become an opponent. With a good design, neither firm gains at the other's expense." But "a good design" remains an elusive target, even for readers of this book. *Partnerships for Profit* is a good investment for someone who needs to recognize business minefields and quickly acquire the terminology and background of the "arrangement" professions. Vertical integration is out, strategic networks are in -- just look at British candies and Italian textiles -- and Trojan horses come in different varieties, most of them speaking Japanese. "This is why RCA left the video cassette recorder market while Matsushita, a former partner, built a thriving business." The Japanese see alliances as the freedom to appropriate the partners' full spectrum of skills, as stated by a well known Asian executive: "Our Western partners approach us with the attitude of teachers. We are quite happy with this, because we have the attitude of students." Not only individual but also organizational learning is crucial, since "The winning advantage comes from an organization's ability to learn and apply new skills ahead of its opponents." At Corning, "the priority is to move the company ahead rather than advance

individuals to the company's detriment."

Much attention is dedicated to technical tools like interfunctional teams, well-placed project champions, minority and 2-way investments. (Among the examples chosen are vintners Chalone in California and Domaine Baron de Rothschild in France, each owning a 20% share of the other.) Is it better to have a lead partner? Is going 50-50 an invitation to trouble? How about transfer prices? How are board members supposed to behave in a multi-parent joint venture? Who conducts "opportunity scanning?" How about alliances with universities, since "the consultant professor is the most efficient means of technology transfer this nation has?"

In sum, the nitty gritty is diffusely covered in this specialty cookbook where recipes for different flavors of alliances can be found. The tone is a mixture of *ex cathedra* and chatty. Among the qualities recommended for key positions in alliance management, the author places curiosity defined as "an abiding interest in learning about others." He qualifies.

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

"Participatory Action Research," by William Foote Whyte, ed. Newbury Park, Sage, 1990.

A slow goer studded with social science jargon, but it forces one's attention because it talks about organizational learning, and one of the two main case histories is about Xerox (the other one is about the Mondragon farming cooperative in the Basque country of Spain). It is an interesting story.

Two leading concepts are weighed here. PAR (as in the title) focuses more heavily on social structure and processes, and is a source of "creative surprises." To practice PAR, people in the organization being studied become involved in the research process; they are the key informants who become active participants. Then there is AS, Action Science, more concerned with interpersonal relationships and the corporate games people play. In both cases, the key phenomenon is "participation in decision-making by low-ranking people in organization and communities." Sounds familiar?

It was assumed that "it is up to the behavioral scientist to discover the basic facts and relationships, and it is up to others to somehow make use of what social researchers discover." In PAR and AS, which are gaining status as powerful tools, a direct tie between social research and action is established; they both help establish, over a considerable period of time, a process of change which results in organizational learning. Back in the '70s, management called for worker participation by way of QWL (Quality of Work Life); hope was that QWL would help lower absenteeism, strengthen morale and indirectly increase efficiency. The emphasis on productivity did not appear until the '80s, when it became obvious that the Japanese were killing us. Quality of life then became secondary to the need to involve workers in problems of productivity and cost, and new directions were sought, because "understanding behavior at work depends on integration of social and technological factors."

Xerox's declining international competitiveness was of great concern to David Kearns when he became CEO. He contracted with consulting firm McKinsey for a study which could affect the corporation from the top down. The initiative was founded on the existing "mutual respect between management and union leaders," and thrived on the assistance of interested bystanders like Cornell University and New York State's School of Industrial and Labor Relations. A textbook case resulted which author/editor Whyte (Cornell, School of Industrial and Labor Relations) reviews with obvious pride. It was a freewheeling experiment. Workers and managers focused their attention on "the limited range of problems which can be solved on the shop floor." When they realized that direct labor costs amount to only 15 to 20% of the total, they calculated that a 20% improvement on shop floor productivity can only yield a 3% to 4% improvement on the bottom line. "With the organizational performance depending in large measure upon the effective integration of shop floor into the total production organization and the integration of the product organization with higher management, marketing, purchasing, research and development, and various staff services," the team decided to elevate the discussion and created a CST (cost study team). This body was at different times called "study-action team," "commodity study team," and possibly other permutations; top management was bowled over by the "intellectual contributions" workers could make.

The cost team and McKinsey originated "a considerable shrinking of the managerial and white-collar ranks," since "the Xerox bureaucracy had far outgrown the needs of the production organization. In 1979 Webster had 2.1 indirect employees to 1 direct production worker, but today that ratio has dropped to .4 to 1; this phenomenon is called by some "the reduction of M2P2, Men Marking Pieces of Paper." In this case, organizational learning occurred because leaders

of labor and management learned from each other and from the consultant/facilitator, who learned from both of them. Professor Whyte, however, regrets that the organizational learning process "did not spread to Xerox plants in other locations, where cost pressures were much less severe."

Whyte struggles with the school of thought which does not believe in a consistent relationship between participation and productivity; he concludes that at Xerox participation led to cost savings of 25% to 40% because the right independent variables were put in place. For instance, members of quality circles in other companies met occasionally, for a couple of hours a week or less, while the Xerox CST worked on problems full time for up to six months.

Two chapters follow, forming a sort of appendix to Prof. Whyte's theory discourse. The first one is written from the point of view of the Xerox participants, the internal consultants in the experiment: "Much of what we have learned," write co-authors Pace and Argona, "has been through trial and error, experimentation and refinement." PAR is mentioned briefly, but the preferred acronyms are QWL (as above) and TQC (Total Quality Control, obviously LTQ's granddad). Both are past history, although their sponsors, circa 1979, thought they would run for a good 10 to 15 years. The second article is signed by the "shop chairman," the chief union representative who knew a good deal when he saw one: "Although Xerox paid the bill for the consultants, management agreed that those consultants would be jointly responsible to both union and management." It is a thoughtful, at times tongue-in-cheek piece: "In Xerox, I do not believe that the key management people will deliberately violate agreements, but they are busy people under lots of pressures externally and internally (from procurement), so it can sometimes be necessary to remind them of a particular agreement."

Other chapters in the book contain case histories about organizations such as the International Potato Center and developments like the Maize Storage project in Togo; most of the book, however, is dedicated to the applications and results of PAR, AS, and their predecessors and variants. In particular, a chapter by Argyris and Schon entitled "Participatory Action Research and Action Science Compared" offers a commentary or rather a critique of the Xerox case presentations by Prof. Whyte, the internal consultants and the chief shop steward. How did organizational learning occur in the Xerox case? The authors introduce the notion of single loop and double loop learning: "In the former, the actions that produce errors are

identified and changed." Double loop learning, instead, would become mired in an endless series of questions like "Did the management sense that the cost allocations were arbitrary? If so, what led them to continue the practice?"... And so on and on, dissecting and fencing in the classic defensive routine.

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC Information Center.

Ackoff's Fables by Russell A. Ackoff. New York, Wiley, 1991.

This latest Ackoff discourse starts out feisty, like Aesop's fables, but in the end rambles sentimental and sententious like *All I Need to Know I Learned in Kindergarten.* The first three chapters concern bureaucracy - in industry, in government, in education: "A bureaucracy is an organization whose principal objective is to keep people busy doing nothing....The problem created by people who are busy doing nothing is that they frequently obstruct others who have real work to do." *Double Whammy* tells of a WWII systems expert sailing on a submarine in the Pacific who needed some rubber bands to organize data collected on pre-computer 3 x 5 cards; Navy clerkdom insisted that there was a war going on, and no rubber bands were available. During a West Coast stopover the frustrated operations researcher purchased at the five and dime several pairs of women's garters. His card files were thus organized and color-coded, but reimbursement for the cost of the garters took over a year, and had to be approved all the way up by an Undersecretary of the Navy. (Undeterred, the expert sold the garters at half price and filed a new form for returning to the Navy his garter gains.)

Ackoff/Aesop does not reveal the aftermath, but moves on to talk about the service economy. "No one hath greater love than a satisfied customer," he writes. Service derives from the Latin word for slave (*servus*); practice of the arts or crafts (or technologies) contrasts sharply with service because it is the work of free people, and results in tangible products. The amount of skill required to provide it transforms slavelike labor into "exalted service," but servers who are viewed as necessary evils - such as bureaucrats and airline agents, obviously Ackoff's bête noire --are regarded with hostility, which generates similar feelings in a vicious circle. The rebellious vein runs deep in *Fables*: "There is something diabolically satisfying in beating a system by adhering to its rules," and "employee adherence to rules is often more harmful to the employing organization than is a strike...most managers know that the easiest way to bring an organization to its knees is to interpret its budget literally. Most organizations survive only because their managers have learned to cheat with respect to their budgets."

Taking Off One's Pants May Skirt the Issue refers to a story in which two women in pantsuits, having been denied admission to a restaurant, quickly removed their pants in the ladies room, and were welcomed as fashionables in miniskirts. The author's view of the world owes much to C. West Churchman, famed wit and leading light among operations researchers, who was Ackoff's mentor and inspired considerations like "The assumption of infallibility is best left to God, and He ought to think twice before making it."

Not all fables are dedicated to trivial pursuits. Chapter Two, entitled *Rubbish Heaps Grow, but They Don't Develop,* focuses on the differences between growth and development. While growth indicates an increase in size or number, development involves an increase in ability. "It empowers, but only in a particular way: it increases *power-to,* not *power-over.*" Development, explains Ackoff, is "a matter of learning, not earning, and learning is a matter of education." Ergo, "education is the process by which development takes place." Self-development is the only kind of development possible, although teachers and schools can help along; Ackoff uses several examples from Mantua, one of Philadelphia's urban black ghettos, where he counseled the residents in their self-development efforts.

For a person who has spent his life in academic institutions --Wharton and Case Western -- the author is singularly acerbic in his evaluation of the education establishment. The goal of colleges, universities, and public schools in general is not the education of students, but "their principal objective is to maximize the quality of work life of

their faculty. Teaching is a price faculties must pay to get the quality of work life they want; as with all prices, they try to minimize it." Unfortunately, quality of education is often measured by the resources it has at its command, while "there is no necessary connection between the quality of education and the quantity of resources it consumes." How about productivity? In the period between 1957 and 1979 business sector productivity rose 65 percent, "even poor old steel industry managed to increase its output per worker-hour 36 percent," while U.S. public school productivity declined 46 percent -- measured by number of employees required to process a given number of students. Prof. Ackoff, needless to say, believes in vouchers, and then some: "Most educators believe that laymen cannot contribute to the improvement of institutionalized education. This is nonsense." Continuing education offers much hope; for one, because "educational institutions are not able to treat adults as badly as children" and also because private industry is much involved in it, offering more opportunity for experimentation and innovation. The reason for the present morass is that "the educational system focuses on teaching rather than learning." A chapter entitled *Never Let Your Schooling Interfere with Your Education* starts with a quote from Pablo Picasso: "Every child is an artist. The problem is how to remain an artist when he grows up."

Ackoff, however, is not latter-day Rousseau. He has a gift for identifying and crystallizing the elusive obvious, as in "Most of our schools, including colleges and universities, are industrialized disseminators of information. They are modeled after factories. Incoming students are treated like raw material...The processed material is inspected and tested periodically...The output of each educational production run is intended to be of uniform quality...The finished products is branded and given a model number (for example, Harvard '89)." Students should be supported in the natural progression from data to information, from information to knowledge, from knowledge to understanding: this can all be helped along by computers. Wisdom, however, cannot be generated by systems of "computer-obstructed instruction," but may well be "the characteristic which differentiates man from machines." Redesign, *debureaucratize*, demonopolize education, shouts Ackoff from the barricades, allow in other stakeholders, and all be well. Shooting from the lip, he has not found the key to our educational problems, but several of his observations hit home. Exams should be modeled on the real world, where people are expected to use effectively all the resources available to them; hence, open book, take-home, oral exams are al'

reality checks. Some subjects are better learned by teaching, and small groups of three to eight students could be organized into *learning cells* (but what happens with different levels of ability?). Many are motivated to learn in a real life situation, with teachers of obvious hands-on expertise; greater emphasis should be given to internships and apprenticeships, which are very effective ways of learning.

Three more chapters, on the cost of discrimination (*A Great Many People Think They Are Thinking When They Are Merely Rearranging Their Prejudices*), on people, practice, and professions (*Wisdom Is the Power to Put Our Time and Our Knowledge to Proper Use*) and culture, language and customs (*Ask for Anything You Like Except Time*) extend the author's broadside volleys to industry, the professional caste, and the global scene. The anecdotes are still delightful: a CEO, wounded by consultant Ackoff in his pride for a fledgling executive son, glares at the author in the presence of his Senior Staff: "F -- you, Doc." And Ackoff's secretary, while he was consulting for the University of Mexico, and exercising his laborious Spanish: "Please don't speak Spanish. It is hard enough to understand your English, Professor."

by Giuliana A. Lavendel

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The Making of Microsoft, by Daniel Ichbiah and Susan L. Knepper. Rocklin, CA, Prima, 1991.

The original title of this French book about an American company was *Les Nouveaux Magiciens* (*The New Magicians*), and its approach to the subject is admiration and wonder. "And to think that it all began with a young boy's fascination with software...," sighs the introduction. "Software is what gives life to the hardware, almost creating the illusion that the machine can think." Bill Gates is not the only magician in this scenario where talented creators at Apple, Compaq, Lotus, have changed the way we live and we work. Others, like "the researchers at Xerox Palo Alto Research Center who defined the user interface implemented today on Macintosh computers and in Microsoft Windows, have worked more behind the scenes but have also made a lasting impression on our society." (Charles Simonyi is one of the protagonists in this book).

That William Henry Gates III, son of a prominent Seattle attorney, was a wizard at school, scoring a perfect 800 in the math section of the SAT, should not surprise anyone. It goes without saying that Gates discovered the DEC PDP-10 when his school's Mothers' Club raised money for a Teletype terminal with shared time on the computer. The surprise is that Bill Gates become a "cyberpunk," adept at eluding passwords and penetrating the inner sanctum of large computers: he actually accessed Cybernet, a nationwide network operated by Control Data Corporation. When discovered, young Bill was repentant, and promised that he would never touch a computer again. This promise was kept all through his junior year in high school, when Bill and a school buddy started their first venture. Traf-o-Data monitored traffic in the streets of Seattle with a homemade machine based on one of the first Intel 8008 chips; the product lured big customers, like the State of Maryland and the province of British Columbia. The Midas touch followed Eagle Scout Bill Gates everywhere. During the 1972 presidential campaign, as a Congressional page in D.C., he hoarded 5,000 McGovern-Eagleton badges at 3 cents each, and then sold them to collectors at up to $20 apiece. "In the process," the authors observe," he refined his selling techniques and perfected his powers of persuasion." He also entered Harvard, bent on a legal career to please Gates Senior, but luckily it did not take.

In 1974 a small company called MITS (Micro Instrumentation and Telemetry Systems) put together in Albuquerque the first personal computer to go public, and had it featured on the cover of the January '75 issue of *Popular Electronics*. The Altair was a kit which, once assembled, looked like a metal box with no keyboard or monitor. It had only two boards inside, one with the 8080 chip processor, the other with 256 bytes of memory, and was first put to practical use when Bill Gates ran a simulation of the moon landing in Basic. To secure a business relationship with the Altair manufacturer, Gates (then 21) founded a business partnership called Micro-Soft in July 1975 and continued fighting off hackers who copied his software, especially members of the legendary Homebrew Club who circulated "free" copies of Microsoft Basic after a well-publicized incident at Rickey's Hyatt House in Palo Alto. Any loss of income was tragic to the young man who in his early teens planned to be a millionaire some day -- understating his achievement by an order of magnitude. By the end of 1976 Microsoft (the hyphen was dropped) was beginning to take shape, and Mr. and Mrs. Gates in Seattle learned that their ne'er-do-well son would never graduate from college. The Microsoft startup was a regulation late Seventies shop, where barefoot programmers came to the office at noon and worked late into the night, napping on the floor when the inspiration lagged.

The rest of the story has been told many times in newspaper and tabloids; here, author Ichbiah and translator/arranger Knepper use hero-worshipping lenses. "A lot of what you see is a reflection of Bill

himself," states an old Microsoft hand, and Charlie Simonyi explains: "Most people are good at something... Bill is distinguished by being good at more than one thing. It is a very rare combination...Bill is a 10 at enough scales that he's one in a billion." Under Gates guidance -- or spell -- Microsoft went with CP/M for their Fortran and Cobol, gave its Basic to large companies like Texas Instruments, developed one of the first portable micros which was produced by Kyocera and marketed in Japan by NEC, by Olivetti in Europe and Tandy in the U.S. Rejecting Silicon Valley as an option, the company moved from Albuquerque to Seattle, where Bill could water ski again ("Going Home.")

When Intel produced the 8086, Project Chess for the personal computer became a natural for IBM; management at Big Blue wanted to develop specs and software internally, but Bill Lowe thought otherwise, and called in Microsoft. For the clincher, Gates and his troops wore coat and tie, and the IBM spokesmen sported jeans and gym shoes -- each group trying to make the other feel at home. Through a series of *quid-pro-quos*, and a weeklong Caribbean cruise, the CEO at Digital Research lost his chance of selling his operating system to the IBM/Microsoft coalition, and CP/M-86 never flew. In February 1981 MS-DOS ran for the first time on the PC prototype -- slowly -- and IBM announced its first micro on August 12; it was available in stores two months later. Apple ran a full page ad in the *Wall Street Journal* with the headline "Welcome IBM. Seriously." Microsoft had created MS-DOS as the interface that made applications and languages independent of the hardware: it was a watershed.

There is a handy history line at the end of this chronicle which follows step by step the developments in the personal computer world for the last decade. We revisit Lotus 1-2-3 and Mitch Kapor, Dan Fylstra and the demise of his Visicalc, the Electronic Paper project and the hiring of Charles Simonyi: "Top-notch developers greatly respected Xerox's Palo Alto Research Center because some of the revolutionary concepts in computers were developed there." Menus appeared on monitors; the Electronic Paper spreadsheet, now called Multiplan, wooed users in Europe and bombed in the U.S., temporarily. By 1983, MS-DOS was available for over 60 computer systems, and could launch a challenge to Wordstar: Word 1.1, Word 2.0, and finally Word 3.0 for the Macintosh. Long-awaited Windows -- the development team was lead by another PARC veteran, Scott McGregor--monopolized 24 software engineers for over three years; Windows Excel, released one year earlier than 1-2-3

Windows, scored one over Lotus. Microsoft was by then reorganized into a big company, with finance, human resource departments and other accouterments (it had an excellent technical library almost from the beginning, started by another PARC veteran.) Throughout the book there is an obvious concern for accuracy, which covers also the brief section dedicated to "The Stars of Xerox PARC." People who have participated in the events described will find few inconsistencies, if any, but will encounter a few surprises: for instance, the notion that Charles Simonyi "has greatly contributed to honing Microsoft's recruitment efforts," helping to develop a system for testing candidates, and rating and promoting employees. His metamorphosis into organization man will have some old acquaintances shaking their heads.

There are no cracks in Bill Gates' armor, though, and consequently no real revelations. In sum, this is a competent exercise in reporting, written for the computer-naive reader in very simple language, with glossary, chronology, and even a decent index. Had it been originally written for an American public more aware of issues and history, it would probably have skipped much of the trite and obvious, and gone easier on the hagiography bits.

by Giuliana A. Lavendel

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High Tech Ventures: the Guide for Entrepreneurial Success, by C. Gordon Bell with John E. McNamara. Addison-Wesley, 1991.

He just knows too much: like Dante's *Inferno*, Gordon Bell's primer for the fledgling firm is populated with adversaries and friends. *High Tech Ventures* focuses on the balance between technological and financial health and differs considerably from the "anecdotes, testimonials, and confessions" on which many case studies and executive memoirs rest. If you ever heard Gordon Bell speak, charging into a meeting or a panel discussion, you will recognize his opinionated, brilliant, bitingly humorous self. He wields an agile stiletto: animadverting against the CEO with "low energy (slow clock), low intelligence (slow CPU) and low integrity," he adds that "an anarchic CEO or department head may fail to make timely decisions, believing instead in the Bo Peep school of management..." People in Silicon Valley and beyond will try to guess who are the *laissez-faire* Bo Peeps Bell is targeting. His "own biases" are clear.

Bell uses his diagnostic method, which takes into consideration all the critical dimensions of a new venture, and can assess its health at any point in time. He speaks to both the raw recruit and large company intrapreneurs, using the Bell-Mason Diagnostic in the form of questions or rules to set guidelines for success. There are over six hundred rules in this human-applied expert system, and it is a wonder that *High Tech Ventures* does not break under this burden. It remains a pleasure to read; the style, which is intensely personal, helps, and so do wicked observations like "I strongly recommend staying private and independent as long as possible and avoiding the inevitable urge to go public...Public investors, in short, are not truly investing in a company; they are merely renting one until a better opportunity comes along."

A quick overview of Bell's theories can be found in the introduction, where he presents a "simplified"

program for starting a high tech company; it is, of course, a gimmick. (Start a high information technology company/if frustration is greater than reward/and greed is greater than fear of failure...then/begin, etc.) This cookbook goes down the list of ingredients methodically, and tells you how to use them. People working together are the most important component, as per John Shoch: "Lack of team is the number one company killer." Fair play is observed in "Respect for Employees and Their Personal Time," which is counterbalanced by a section on "Respect for the Investors' Cash." The business plan is both a roadmap and a scorecard; formats, flaws, good examples are offered. Apollo's plan is presented in detail, courtesy of Bill Poduska, and there is an outline of Sun's, with permission from Vinod Khosla. The author is particularly critical of multiple agendas; Control Data, which tackled in one gulp its computer business, the Plato Computer Aided Instruction System, trade with Russia to fight the cold war, and hydroponic gardening, is a daunting example.

"Cash, Financeability, and Control" get a surprising share of attention in this primer by two seasoned technologists -- support author McNamara is a senior engineer at Stratus, with R&D experience at MIT and DEC. Company valuation is obtained by calculating the cost of having the startup reach its present position versus what it would take to finance a similar company to that point; the possibility of similar firms being funded -- low cost of entry -- drives valuation down. In the 1980s venture capital firms averaged a 22% annual return, but the contributions of the various companies in their portfolios varied widely. There are eighteen possible external funding sources, including university endowments and family and friends; employees can buy equipment, and lease it to the firm. Through this and following chapters relevant questions from the Bell-Mason model appear in boldface.

Founders should not have outside jobs because writing the business plan takes time. The investor-run company imposes too many demands on the

purse strings. Too much cash results in "financing-induced brain damage," entrepreneurs should purchase non-matching, used or auctioned office furniture. Quotes range from Einstein's "Everything should be as simple as possible but no simpler" to Al Shugart's bittersweet "Cash is more important than your mother," and John Shoch's second quote, "Inadequate cash for growth is the number two killer." Gordon Bell's contribution is "Profit is habit-forming. So are losses."

Bell is obviously in his element in the chapter on Technology -- the section on "The Role of Technology Progress in Forming Startups" is a gem (including a pointed remark that there are no Nobel prizes awarded for computer science). The chapters on manufacturing, product technology, marketing, sales are deep but exhibit a blissful absence of the jargon and baffling sentence structures which afflict many technical management books, including those from the groves of Academe. Even the Bell-Mason diagnostics are negotiated in very digestible form as "a rule-based tool that is applied manually to characterize and plot the status of a high-information-technology venture at each stage of its growth." Using this paradigm, the guide examines one startup case history for every step. There are eight in total, some failed, others, like Thinking Machines, very alive and well today.

Clearly, Gordon Bell's heart is with the history of the workstation, which rates a separate chapter, and there Xerox PARC is given its due. One table, over a full page, lists the descendants of the Alto, recounted by Butler Lampson. The story of the Titan, Ardent's graphics supercomputer with which Bell is closely identified, is told in detail, including a table on "assumptions" (product cost of $50K) and outcomes ("Was over $80K. Too far off plan.") In terse, businesslike but user friendly paragraphs, the stories of many great names in the computer world are told: how Sun was born, what happened at Trilogy, the Gateway-Cadence marriage, how Three Rivers showed that "being first is no guarantee of success." Bell spares no punches; the NIH syndrome is a form of "technological arrogance endemic among most engineers, especially in the U.S., the United Kingdom, and France"; "industry-compatible" is a euphemism for IBM compatible.

At the very end, in the chapter dedicated to the years to come, the aging *enfant terrible* of the U.S. computer industry puts his spiritual testament in one sentence: "American engineers, coupled with the American MBAs who manage most U.S. organizations, will ensure the continuing decline of the information-processing industry because this deadly duo focuses on the human organization (and especially its political structure), not on the technology and products." But he is still bent on teaching and persuading, and thus takes his leave of the reader: "Now that you've studied everything I know about products, technology, and startups...and decided to start a company; the easy part is over -- but the fun is just beginning."

Entrepreneurial (lone wolves) or intrapreneurial(company) types should assimilate at least some chapters. In *High Tech Ventures* flaws and virtues of the computing environment are dissected one by one; if the author has repeated himself, this reviewer has not caught him at it. Definitely one of the year's best.

by Giuliana A. Lavendel
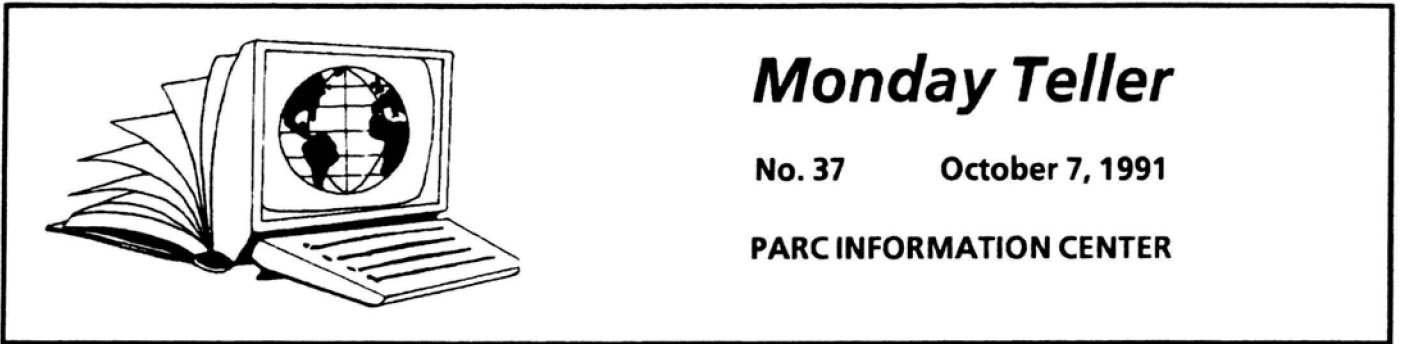
Monday Teller

"Communications, Computers, and Networks"
Scientific American special issue, September 1991.

The papers range from visionary to tutorial, but it is evident that the editor kept an eye on the information consumer/practitioner at all times. "We begin to reap the value of information when we have created an infrastructure that leverages our work," writes Michael Dertouzos. His contribution, under the generic title *Communications, Computers and Networks*, is almost an executive summary of this anthology, which focuses on new machines from a humanistic point of view. He says: after the plows and animals which fed the agricultural age, after the engines and fuels of the industrial revolution, the computer arrived and the information age was born. We are looking to the computer, with its complement of communications and networks, to enrich the way we live at home, at work, and in society at large "by unlocking new personal and social freedom." At the same time we are laying the bricks of the information age with computers "found nearly everywhere, doing nearly everything," and supported by the awesome power of networks. The infrastructure of the future will result from the marriage of these "two giants."

Thus Dertouzos, head of the Computer Laboratory at M.I.T strings together an elegant web of contributions from notables of the computer world (any PARC oldtimer would be acquainted with the majority of them, and this is indeed gratifying). The information infrastructure is geared to relieve humans from the burden of communicating and processing information. We need intelligent machines for this purpose, but "understanding the value of information is difficult, though, even for people." How valuable is a 300 page report on a company to someone who dabbles in the stockmarket? Doesn't a soap opera contribute valuable information for those who want to experience heartrending emotions? Dertouzos thinks that information has economic value only if it leads to the acquisition of some good or goods; it is less valuable in Third World countries, where goods are scarce and the lifestyle is wanting, although it could conceivably lead to an improved standard of living by teaching, for instance, better hygiene or better farming practices. "On balance, however," says Dertouzos, "information more naturally boosts the wealth of those who already have material goods." Thus rich nations must exert self discipline by guarding against the glamour of the information era and remembering that "information is, after all, secondary to people's principal needs -- food, shelter, health and human relationships." Roads, telephones, power are established infrastructures, but no real information infrastructure exists anywhere in the world to date, even when ISDN allows users to transmit at 150 megabits per second. Common service and standards are a must; Dertouzos recommends E-forms as a *lingua franca* to be instantly recognized by any computer on the U.S. gigabit network of the year 2000, and tapped at will via cellular and satellite systems.

In *Networks*, Internet guru Vinton Cerf of the Corporation for National Research Initiatives visualizes "a web of glass" spanning the globe; we are making progress in building the hardware for a flexible network. Cerf's article is a brilliant tutorial, at times quite basic, e.g. "Such manifold computer interactions are often referred to as distributed computing..;" same for circuit switching and packet switching, a more agile means which was deployed in the early '70s at Xerox PARC as Ethernet. A ubiquitous traveller, a Harlequin of a program that moves from machine to machine, possibly cloning itself, is known among the cognoscenti as "knowbot", short for "knowledge robot" (a registered trademark of his corporation, Cerf points out). Security remains a concern.

Apple's Larry Tesler, who introduced the concept of windows at PARC in the 70's, thinks that computers and people should be joined at the cognitive level: "The computer will come to play a much more active role by collaborating with the user, "he

writes in *Networked Computing in the 1990s.* This is a nitty gritty paper, technical in tone, precise and staccato in delivery, as in: "Experience at the Xerox Palo Alto Research Center and other CSCW research centers has shown that people judge ideas that appear on a screen more for their value than by the rank of the contributor." And further on: "The two most promising architectures wring more speed from less power in quite different ways." One of the architecures is RISC, data flow is the other. Tesler expects "the wireless pericomputer" in a not too distant day, when the computer will take on "a new persona."

Mark Weiser's *The Computer for the 21st Century* is the fulcrum of this issue, and it articulates a vision of hardware and software intimately connected and so ominipresent that no one will notice they are there. "The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it." Mark and his PARC colleagues think that personal computers are transitory, and so are laptops, dynabooks, - knowledge navigators and, most of all, the artificial universe of virtual reality which "attempts to make a world inside the computer" using props like goggles, gloves and bodysuits. Like the electric motor, the computer needs to disappear into the background, to become ubiquitous and participate in "embodied virtuality" which today can be found in electronic boards, pads, and tabs. Pads are an antidote to the windows invented by PARC and popularized by Apple; they are "scrap computers that can be grabbed and used anywhere by anybody." Mark avowedly looks at the next century, and the technological props needed for his vision ar not quite here yet: "cheap, low-power computers that include equally convenient displays, software for ubiquitous applications and a network that ties them all together." The Weiser paper is a bridge between the technically divulgative contributions of the first part of the issue and the sociologically inspired articles of the second, i.e. *Products and Services for Computer Networks* by M.I.T.'s Negroponte, *Computers, Networks, and Work* by Carnegie-Mellon's Lee Sproull and Sara Kiesler, *Computers, Networks and the Corporation* by Malone and Rockart, also at M.I.T., and Alan Kay's *Computers, Networks and Education* -- which is about how children learn.

There are many fascinating, disconcerting observations in this section. Negroponte remarks that postmodern man is potentially a nomad, and the *Scientific American* authors probably spend more than half of their time traveling: real teleconferencing would be bliss, and who needs Frequent Flier? Independence of space and time is essential, although the author does not mention teleportation but dwells on the universe of movies available on TV, holographic video, multimedia computing, personalized newspapers (for those who want them, but for most of us the jury is still out.) Electronic mail communities are something new and special, wreaking profound change in the character of the organization: in the Sproull/Keisler paper time and space are again emphasized as factors for change. Here case histories make their appearance -- the human resource engineers scattered around the globe by Hewlett-Packard, the 1.4 million people connected to USENET newsgroups according to DEC's Brian Reid, the retirees in a large utility firm using e-mail; these are examples of "dynamic group structures." Malone and Rockart talk hard hitting, MBA language, relating how computers impact organizations by "forging new kinds of markets"; Frito-Lay, GM, Baxter Healthcare and other Wall Street interests do the honors as case histories. Alan Kay dwells on themes familiar to his audience; the pervasively networked computer of the future (ubiquitous? pericomputer?) will shape and stimulate the adults of tomorrow.

In *Scientific American*'s well structured continuum, there is even an appendix on *Computers, Networks, and Public Policy* with contributions from three unusual bedfellows: Senator Al Gore on the *Infrastructure for the Global Village*, essentially about U.S. competitiveness; Harvard lawyer Anne Branscomb on *Common Law for the Electronic Frontier*, about the pitfalls of trying to be strictly lawful in *terra incognita*, and finally *Civil Liberties in Cyberspace* -- by Mitch Kapor, of course.
In sum, *Scientific American* has put together an arresting view of the high tech world by a bunch of stars; some contributions sparkle more than others. Experts from Bill Gates to Vinton Cerf have decreed that the Weiser paper on 21st century computing is an absolute must read -- and learn.

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC Information Center.

The Art of the Long View, by Peter Schwartz. New York, Doubleday, 1991.

Some corporations map out elaborate strategies based on a view of the world, others make a strategy out of not having one. Here is futurist Peter Schwartz suggesting that we think about potential futures, two or three or more at a time since, unlike market research and forecasting, they present alternative views of the world. "Scenario thinking is an art, not a science," he warns, but a useful exercise because people, even in free countries, feel constrained by the unpredictability of events. "This book, " he writes, "is about freedom." At times, this means freedom from self-imposed bonds, since scenarios are "memories of the future," realities to which we are blind because we are unprepared to see what the mind cannot accept. Scenarios are not predictions, but "vehicles for helping people learn." Ultimately, the decision maker's desk is still where the buck stops, but the level of preparedness is different: the awareness of risks and rewards distinguishes the business executive from the bureaucrat or the gambler.

The discipline's father, Herman Kahn, started building scenarios in the Sixties after his years with the Air Force. Pierre Wack, working at Royal Dutch/Shell in the Seventies, perfected the tools, and produced the scenario predicting the OPEC oil crisis, then worked at changing his managers' "view of reality." The rest is history, as documented in Wack's 1985 paper for the *Harvard Business Review*, self-effacingly entitled "The Gentle Art of Reperceiving." Our author was already a futurist, working at SRI International (then Stanford Research Institute) in Menlo Park, California, when Peter Wack came to visit in 1975. Schwartz joined the Shell group, and now heads a think tank called Global Business Network in the Berkeley hills. He is currently mulling over new findings about the human growth hormone as a fountain of youth; what would happen if the average life span in the US rose from 72 to 100, or to 150? What if the childbearing age for women rose dramatically? The hormone would probably be available first in wealthy countries which use more natural resources, and therefore accelerate environmental decay -- or increase pressure for environmental quality. Etcetera, etcetera. (The *New York Times* does not think that the hormone is such a big deal, but the same paper wrote an editorial criticizing efforts to build flying machines heavier than air. That was October 1903, barely ten months before Kitty Hawk.)

Case histories appear again and again, analyzed into minutiae. A favorite one is that of Smith-Hawken, mail-order gardeners to America, a firm which was built and prospered on the basis of the likeliest human needs in the 1980s and 1990s. Schwartz was one of the founders, and used -- or re-used-- some findings he had unearthed years earlier, when Weyerhauser was seeking to diversify from the lumber business. For the gardeners, Schwartz built three scenarios: one of world boom, one of depression, the third about a shift in values which would transform Western culture, spurred by the "inner directed" segment of the population for which quality of life rather than quantity of goods is the most important factor. The baby boomer generation might be key to the gardening company's success, along with "the Europeanization of the American consumer": as people in the U.S. become more affluent, their tastes grow more sophisticated and demanding. As often happens, reality was a combination of all three scenarios -- and the most important factor was the U.S. balance of payment, and the strength of the dollar.

There are various steps which are necessary to build effective scenarios. One is a mental dry run or preplanning, similar to the looking ahead a great quarterback like Joe Montana evidences when he "lofts

a spiraling pass and drops it into the receiver's arms." Which one of three receivers does Montana select? And, in a similar vein, what is going to happen to the Soviet Union? Should we invest in a new offshore platform? What could cause Americans to spend more money on books? This is the art of "what ifs," and most of us are not prepared to accept the whole picture. Schwartz believes that it was possible in the early 1980s to foresee the gradual fall of the Soviet regime, but the Pentagon planners who could foresee buildup, and even a nuclear war never asked themselves: "What if we won?" Furthermore, bringing thousands of newly unemployed soldiers back to the U.S. might create social problems; on the other hand, this influx of young and trained personnel might relieve a severe skilled labor shortage. Both scenarios are still possible.

Schwartz is a gifted storyteller for whom "scenarios are stories that give meaning to events." He quotes a joke about the man who asks a computer: "Do you ever compute that you will think like a human being?" And the computer blinks back: "That reminds me of a story." Myths are important to individuals and to nations. The American Dream, with its components of melting pot, Horatio Alger and the Constitution, individualism and materialism, makes us act a certain way, while the Japanese myth of resilience and self reliance -- of which MITI is an expression -- shapes Japanese behavior. Even corporations work according to myths, like AT&T which reaches out and touches everyone like a modern Johnny Appleseed.

Much of the author's philosophy verges on the demographic, since large issues influence everything; it is a mistake to develop scenarios for small, focused situations, only to discover that factors like population age overrule minor considerations. Skilled hunting and gathering of information, having one's radar out, are fundamental to the scenario process. Some subjects come up again and again. Schwartz loves virtual reality, and has outlined a future "international video cafe" for dating; also perception-shaping events like the oil spill at Valdez, "root" music like Elvis Presley and the Beatles, and a mixed category called "fringes," where innovation is born. "Fringes" include nanotechnology and even *The Competitive Advantage of Nations*, by Harvard's starchy prophet Michael Porter, who is "dangerously" outside the economists' mainstream. Even traditional institutions like NASA had "a group of weirdos who all went away into small computer companies." We also are thus honored: "Xerox had its

Palo Alto Research Center, from where the Macintosh was born." The Office of Naval Research sponsored interdisciplinary conferences on subjects like molecular engineering in spite of its traditional image. Remarkable people and environments stimulate the building of scenarios, as do "filters," which for the author are periodicals like *The Economist* and books like Seymour Papert's *Mindstorms*. "Networked sensibilities" simply means computer networking with people of similar interests.

An appendix with eight plus steps for developing scenarios never really takes off; the author tries to sketch a "how to" methodology, but cannot provide the systematic ordering of priorities to which we are accustomed in writings from academic institutions like MIT or Harvard. This book contains a large amount of stimulating information and observations on an international scale- realities that we subconsciously know. The European community never coalesces ("Did they really think that the Italians will work with the Spanish, or the Germans with the Dutch, or the British and French with anyone?") You may not have realized that Gorbie has trouble jump-starting the (Soviet?) economy because he will not have enough 20-year olds entering the workforce until well into the 1990s. On the other hand, you could rightfully be terrified by Schwartz's depiction of the "global teenagers," 2 billion of them in 2001, 500 times the number of American teenagers at the peak of the baby boom. Entrepreneurs or brownshirts? Will they want high-tech jobs or government posts? Will they like Coca-Cola, Walkmans, Benetton combos, computers (and multimedia documents?) Was Tianamen Square the first attempt to clamp down on the Global Teenager? The prospect of that youthful army is somewhat daunting, but exciting too.

A thoughtful excursion rather than a rigorous study, *The Art of the Long View* resembles the catalog of its cherished Smith Hawken offshoot: a random gathering of tools and flowers, to be enjoyed with the hope that the good seeds will sprout.

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC Information Center.

Selling the Dream, by Guy Kawasaki with John E. McNamara. New York, Harper Collins, 1991.

This book is about marketing as a religion, and has a surprise finale. It is unfortunate for author Kawasaki -- now a marketing consultant and columnist for *MacUser*, formerly director of software program management at Apple -- that evangelism seems to have acquired a tawdry reputation these days. "My role is that of the midwife of evangelism," states Kawasaki, identifying evangelism, in the Apple tradition, as a "useful technique for bringing about meaningful change." In truth, the messianic tone is reminiscent of some speeches by international corporation officials like Canon's Ryuzaburoh Kaku, gentlemen who can bring tooth and nail warfare to the automobile or laser printer markets and still feel like missionaries announcing a new dawn for the human race.

Besides Apple and the Mac, Kawasaki quotes other inspirational examples from an unusually catholic selection of success stories: The Body Shop, a chain of beauty products from natural ingredients, SeniorNet, which trains elderly people to use computers and network, and Windham Hilll records. This record company prospered when enraptured listeners became evangelists for Windham Hill's mood music. Guitarist William Ackerman assembled the first album, *In Search of the Turtle's Navel*, in his Silicon Valley home, but after a few years the company reached $30M annual sales. "Go to a record store and ask for the Windham Hill section," prescribes Kawasaki in one of the exercises which are designed to to flex the readers' marketing muscle, although, in many cases, they may have an irritant rather than an uplifting effect. (A similar piece of advice might please, though, where Kawasaki analyzes the success of Ben & Jerry's Homemade, the Vermont maker of politically correct ice cream.) The first exercise, for instance, invites readers to free associate

with some concepts and react accordingly; thus the term "motivation" evokes "make money" in the traditional mind, while the evangelist's response would be "make history." "Philosophy" would elicit "sell to" (traditional) and "convert" (apostolic), while "goal" is accompanied respectively by "quota" and "change the world." In Kawasaki's minor league Baldridge, Windham Hill and Body Shop are followed by the Miata, the dream car devised by Bob Hall, manager of product planning and research at Madza's North America R&D. "Many car designers thought of building Miata, but they couldn't get their behemoth employers to take a chance on a new design," comments Kawasaki, who also has a rule of thumb for the wary: " Never buy a car with more character than you."

In most chapters, the sections titled Exercise, Rule of Thumb, Interview, and the overabundance of paragraphs, bullets, indentations and other propensities characteristic of the enthusiastic Mac user give the text a choppy apearance; for instance, you go through Part 2 (*Becoming an Evangelist*), Chapter 5 (*Planning Your Evangelism*), Section (*Sample Evangelism Plan*), subsection (*A Company: the People Software Company*), and so on.

Much of Kawasaki's advice is Mom and Pop common sense, which the author breezily recommends to national figures like William Fulbright, father of the well-known scholar exchange program and former chairman of the Senate Foreign Relations Committee. Having been caught up in D.C. affairs, the Senator lost his Arkansas constituency, and was not reelected; Kawasaki's moral, "Remember your installed base," cannot quite match the apostolic intent of this book. There are few if any pithy thoughts even in the section dedicated to *Advanced Techniques of Evangelism*, although author Kawasaki sports a diploma from the Billy Graham School of Evangelism. *Buddies, alliances,*

and *multipliers* are the building blocks of success, where "multipliers are babyship organizations that hover around mothership causes." The final section, however, *Evangelizing the Opposite Sex* offers an interesting Rule of Thumb, that most men get the spouse they deserve while most women don't.

On the whole, why bother? Fact is, *Selling the Dream* has a gold nugget at the very end. It is the *PIP*, the Product Introduction Plan for the Macintosh; dated October 7, 1983, classified as extremely confidential, it is a *genre* masterpiece in 105 pages -- even discounting hindsight. In the Executive Summary the Macintosh is positioned as "an advanced personal productivity tool for knowledge workers," to be marketed "at an emotional level using television and at a rational level using print." Marketing strategy aims to "establish the Macintosh as the third industry standard product in the marketplace," i.e. following IBM PC and Apple II (e). IBM is expected to counteract with FUD, where "FUD stands for Fear, Uncertainty, and Doubt." As for product line strategy, the design goal is "to develop a low cost, powerful personal computer with Lisa technology" (From PARC?). With the customer in mind, the marketing communication objective is "to create distance between old product technology and the Macintosh..." The sales introduction plan relies on cooperation among Apple organizations, all involved in a timeline of the major milestones which spells out the "Own-A-Mac" program: 1. Get the Mac as soon as possible into the hands of those who will be selling it; 2. develop a knowledgeable salesforce on Mac features and applications.

Included is a Developer Seeding and Support Plan, followed by a Distribution/Service/Support Plan and by an International Plan intended to "create a product which is as country independent as possible and is easy to localize." A Sales Forecast and Allocation Plan is followed by a Risk and Open Issues finale which lists five open questions, all vanilla, and five remaining risks "which could seriously impact our goals." Product availability, third party developers, press acceptance of the Macintosh story -- the Lisa/Mac compatibility in particular -- are recognized as remaining unknowns, as is the cooperation of "many key people outside the Mac division. Without their continued strong contributions we will not have a successful introduction." The footnote to the last sentence is a Kawasaki classic: "That is, we knew that we were arrogant jerks who might

upset the rest of Apple."

In spite of the hype -- indeed, because of it -- excruciatingly lightweight, but *dulcis in fundo*. Prospective readers are strongly advised to start on p. 203, where the Macintosh PIP begins.

by Giuliana A. Lavendel

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Monday Teller

No. 40   December 1, 1991

PARC INFORMATION CENTER

The Power of Strategic Vision, by Ian Wilson. Menlo Park, CA, SRI International, 1991.

As the saying goes, there is a difference between being a visionary and having visions. In the white knuckle decade we are enduring, says the author, visionary skills are valuable if articulated, shared, realized through collective effort -- but ours, alas, is a time when micromanagement is endemic. We are overmanaged and underled.

Within every corporation which achieves sustained value for its shareholders there is a visionary hiding -- this is the tenet of this slim report, which provides a personal list of visionaries-in-chief on a global scale. We encounter strategic thinkers like Percy Barnevick of Brown Boveri, Akio Morita of Sony, and homegrown greats like Roy Vagelos of Merck, Hamish Maxwell of Philip Morris, Sam Walton of Wal-Mart, all picked from the Fortune's list of America's Most Admired Corporations which sums up the ballots of thousands of executives, outside directors, and analysts. The guiding light of General Electric, John F. Welch, is mentioned so frequently here that a sort of tribute to a revered mentor comes to mind. Yes, Wilson used to work at GE in his salad days, and graduated from that company's well canonized strategic planning corps. Perhaps because of this training, he is convinced that vision is not an innate characteristic like curly hair or a fine musical ear; neither is it impractical, a purview of the dreamer. Vision is partly rational, out of analysis, and partly emotional, tied to "imagination, hunches, and values," a combination we are schooled to expect from only a few thoroughbreds, in the Fortune 500 rarefied climate. By careful, patient planning, however, "companies can

lay out, learn, and practice a process for developing vision." CEOs should involve themselves in a considerable level of detail, as GE's Welch did when he restructured GE in the 1980s, reducing nine levels of management to four and performing other such portents. Several steps are outlined, but only two are really significant - the rest, such as "future focus" and "integrated diversity" can be dismissed as the kind of management babble we have often heard before.

First, a "restructured portfolio" means that the company should only be involved in those businesses where it has the potential to be number one or number two in the global market. Everything that does not fit should be divested, as Welch proceeded to do when he dropped the resource business of Utah International, in spite of its profit contribution to the corporate coffers. Then comes a "revitalized culture"; in GE-speak, this means chiefly "soft values for a hard decade," which translates into speed, simplicity, self confidence and, to top all these, empowerment for peak performance at all levels of the organization. (The author does not explain why, with all the empowerment currently going on, the troops' morale is generally declining, although -- or because? -- the ranks of middle management are shrinking, and decision making is being pushed down the ladder in the organization.)

Firms gain competitive edge through technology (GE), or service (Scandinavian Airlines), or distribution (McKesson), or convenience (7 Eleven), but vision (whatever it is) is the driving force. Does vision represent the CEO's thinking, or is it the result of group process? "A well-designed collective visioning process can work," but the CEO must be the driving force

behind it. There are an interesting couple of paragraphs on whether strategic vision is practicable at the SBU level, an almost autonomous business; the answer is yes, provided there is a favorable infrastructure present at headquarters. This means backing, beyond verbal support, to recognize and reward strategic performance, not only short-term results. As for developing strategic vision, which is the author's wishful accomplishment, the process must go well beyond guts or seat-of-the-pants wisdom. We are offered a couple of SRI's neat flowcharts, and eight progressive steps towards corporate strategic vision, starting with "Analyze the company's future environment" and ending with "Conduct sanity checks."

Three *bona fide* documents are to be developed in writing: a mission statement, a philosophy compendium of corporate values "which are the guiding principles of corporate action," and a vision statement. While mission and philosophy are timeless, vision is contingency-related. You could say that the triad represents past, present, and future; as a sop for inarticulate CEOs, the author concedes that the lack of an explicit vision statement does not *guarantee* failure. Like other management consultants, our author is a nimble categorizer of abstract success factors such as Coherence, Flexibility, Consistency, etc. He has better luck with Communication, when he quotes a Southern Bell spokesman: "The primary advantage of vision, -- and it has to be shared vision -- is communication." This means repeating the message until it is loud and clear, and practiced in every corporate statement. Scandinavian Airlines' Carlzon calls this practice "moments of truth."

Short-term problems must be solved first, if vision is to prosper. A case history on "inflexible vision" (an oxymoron?) brings a welcome reality check: how Richard J. Ferris of United Airlines brought failure to Allegis by ignoring poor financial performance. With earnings lower than 1% of revenue, the acquisition of Hertz, Westin, and Hilton was considered a reckless adventure by the stakeholders -- who, in the U.S., are not silent like their Japanese counterparts. Shareholders, management, pilots, and analysts pressured the Board to discard Ferris' inflexible vision ("They were so goddam arrogant it was not to be

believed," commented a senior analyst from the Street.) On the other hand, there are pitfalls also in achievement, when the CEO rests on his laurels and becomes a prisoner of success. SAS' Carlzon, who believes that "it is tougher to win the peace," turned the new threat of deregulation into opportunity by quickly adopting the hub and spoke ways of his U.S. competitors. The lesson is "always to renew, challenge, empower."

In sum, strategic vision pushes implementation forward by bringing the soft elements of vision together with the realities of sales, finance, production; it provides a "ready, aim, fire" for both strategic and operational decisions. Contrasting the company of the future with the present picture is more effective than the piecemeal approach of the beancounter. The author quotes historian Toynbee, who interpreted human history as a series of challenges and responses: strategic vision at its best provides both the challenge and the response. Vision(s), anyone?

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

Beware the Naked Man Who Offers You His Shirt, by Harvey Mackay. New York, Morrow, 1990.

Readers and critics disagree on whether *Naked Man* is as much fun as the previous *Swimming with the Sharks Without Being Eaten Alive*, but it is fair to say that Son of a Gun from Minnesota again delivers nostalgic, quotable reading. There are football stories and other fables in which millionaires marry former Miss Americas, while Norman Vincent Peale officiates at the ceremony; moneyed entrepreneurs are known as "The Big Cigars," which sounds closer to Damon Runyon than to Steve Jobs or Donald Trump.

We knew this stuff before but have half forgotten it; let's thank the author for the reminders, and wonder whether Mr. Mackay of Mackay Envelopes is as simple minded as he seems. He really hits the mark when at his most contemporary, e.g.: "Cutting payrolls has been Corporate America's most meaningful response to foreign competition." "Good managers are hard to find. Almost any other talent can be bought by the yard." Napoleon's advice applies to IBM competitors: "Let China sleep, for when she wakes the world will tremble," and "Our national motto used to be: This is America. Throw it away. It's been that way with our cars, our clothes, our spouses..."

There are eighty-five lessons to be learned from *Naked Man* and there might be something to remember in most of them, even Lesson 17 which is entitled *Garbage Collectors to Receive 30,000 per Year*. In this case it is the obvious economics of supply and demand, where premium pay rewards one of the most dangerous jobs around, riskier even than that of policeman or fire

fighter: garbage collectors have a high incidence of injury and sickness, and do not age gracefully. "Most people," writes Mackay judiciously, "do not want to be garbage collectors, undertakers, or bomb defusers in Beirut."

"Take this job and love it," advises Mackay, in the "rat eat rat" world of business where you can be RIFfed at any moment. Don't burn bridges, though, because "you may actually end up doing your old job for your old company -- but being employed by a new company at a distinctly lower salary." The single best way to stay employed is delivering more than you promise, but office politics is a bear, since "some people live just to dump on other people," as Mackay explained in a TV interview with Oprah Winfrey, with plenty of horror stories contributed by the audience (missed it!). Talk plenty around the water cooler, but not about your salary, net worth, medical record, and sex life: they are nobody's business but your own. Alas, life is like the Middle East, and there may be no permanent solution to long standing problems, especially this one: people are neatly divided into shark, shark bait, and shark-proof. Where do YOU fit in? You belong with shark bait if you hang your fortunes on a superstar: "Charismatic leaders tend to be classic Mr.Outsides. You do the work, they take the bows."

Mackay is nimble at the numbers game, and knows that by the year 2000 the average college graduate will make five significant career changes during a lifetime. One of the reasons is that more companies are farming out to niche companies jobs they used to do in house, such as accounting, payroll, benefit administration. This provides economies of scale, and in the long run will

benefit the U.S. economy because "How are the Japanese going to deal with that? Are they going to ship their Toyotas stuffed with clerks and bookkeepers?" At heart, Mackay is an entrepreneur who likes small business best, and has never met anyone who left a job, whether fired or voluntarily, started a business, and regretted it -- including people who went bust and had to rejoin the ranks of the walking wounded on somebody else's payroll. Successful people always have a carrot in front of them, but the carrot must be slightly out of reach; courage and a penchant for risk must accompany them at all times, since "there is no off switch on a tiger."

The eighty-five lessons are divided into six Short Courses: *On Getting Started, Working Your Way Up, Running the Show, Long-Term Sales Careers, Keeping Out of Trouble,* and -- from the heart -- *On People.* Lesson 51, *You Will Never Know Unless You Ask,* offers the complete text of Mackay's own questionnaire measuring the satisfaction level of his envelope customers. Fifteen quickies, in the manner of *The One-Minute Manager,* serve as an appendix, where Will Rogers is quoted in *It's a Great Country But You Can't Live In It For Nothing.* In this one-pager, we are informed that in 1986 the National Park Service purchased a small parcel of land near Fort McNair Park in Washington, D.C., only to learn three years later that it had been Government property since 1914.

There are jewels aplenty here, among the sales patter. For instance, that "You only get one chance to make a good first impression, and yours is in the hands of your receptionist;" dead end jobs are tough, and it is even tougher to figure out how to motivate the people in those jobs. *But Will You Love Me In the Morning?* talks about customer loyalty, the most valuable asset a corporation has, and the toughest to earn and keep. Silicon Valley entrepreneurs are to be reminded that *The First Hire After You Hire Yourself is Your Bean Counter,* for the good reason that *They Still Keep Score in Dollars,* while entrepreneurs' dreams tend to run ahead of their numbers. Asian women are submissive homebodies; ah, so? *Ms Butterfly* tells you that Nippon Life has 69,000 salespeople, and 90% of these are women: "Talent is talent, Asian, Caucasian, or any other color of the rainbow, male or female." And in lesson number 85, or

There are no Seventy-Year Old Burnouts, Mackay rides against "one of this age's most pervasive forms of discrimination: ageism." Really older workers tends to be the best on the floor because "so many of them are working when they don't have to. And when you do something you don't have to, it means you want to, and when you want to, it means you're good at it."

Naked Man is a piece of Americana. Midway between a rambling memoir and a monumental pep talk, it will turn you into a couch potato for a few hours, chuckling along and reminiscing with the Son of a Gun from Minnesota. Good as an antidote against the doomsday soothsayers...

(Giuliana A. Lavendel from PARC, with many wishes of happy holidays, a prosperous new year, and thanks to our readers wherever they are.)

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Monday Teller

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PARC INFORMATION CENTER

"The 1991 Report on the Computer Industry" by McKinsey & Co. Electronics Practice, 1991.

"Financial controls do not effectively stop creeping elegance," writes the McKinsey team, elegantly suggesting that complexity, which particularly plagues large American corporations, must be stopped at the source. This 1991 postmortem is only the second statement on the computer industry which McKinsey & Co. has seen fit to distribute in many years of data gathering and playing prophet. There is a brief "State of the Industry" survey, a longer "Trends" spotting section, and the digits and graphs we have grown accustomed to expect from one of the princes among US consultants. McKinsey is a firm which tells CEOs with incomes in the eight digit range what to do. We have, perhaps, become overexposed to statistics by the computer's pervasive presence, and the numbers presented here taste a bit stale to our 1992 palates, since no data more recent than 1990 appears in the report. Hindsight has some surprises for the reader who, scanning the Trends chapter, finds on p. 2-33 that Hewlett-Packard is scolded for having failed to return its WACC (weighted average cost of capital), while Compaq was able to create substantial shareholder value. We know that H-P had a stellar 1991; Compaq didn't.

This McKinsey commentary is to be read for the surprises, non sequiturs, paradoxes, facts and factoids which enliven its pages and contribute a hint of shock value, which the authors would probably call a reality check. To quote, "on a number of dimensions, the trends beneath the trends refute conventional wisdom." To witness: the lean and mean times are here, and older, established firms must adapt or wither. The computer industry is undergoing basic structural changes. In spite of the recession, some firms are recording spectacular performances; half of the top performers are in hardware, although software and services are the fastest growing segments of the industry.

Industry is establishing new paradigms for success, first and foremost that "the best companies focus only on what they do best." This also means that vertical integration is out, and so are account control and the concept of proprietary technology. In spite of the general perception that a slump has prevailed since 1989, and the evidence that the fearsome triad of growth, profitability and sustainability (keeping sustainable positions) is shaky, some firms have done very well. Why and how? McKinsey looks primarily at computer companies with over $500M in DP revenues, and neatly divides them into leaders, average and laggards. Xerox, not on this list, is in limbo and in good company.

Alliances are popular because of the need to leverage beyond the company's own resources. Rapid product development, targeting customer demands, and sales force effectiveness are trite remedies, but the comparison between Old Rules (Control the account!) and New Rules (Be the Best in Class!), viewed side by side offer some food for thought. You can be best in class by "doing only those things where you excel," and exploiting the field's infrastructure for your weak areas; also being first to market with leading-edge products AND services, and using indirect channels whenever appropriate. The customers themselves, fortified with standards and new technologies, "are reshaping the vendor environment."

The emerging strategic options are six: there are leadership platform companies (Sun), broad based market leaders (IBM), integrators (EDS), hot-box niche producers (Silicon Graphics), geographical market-focus companies (ICL). Established companies, which have to fight their own momentum, must put in place barriers against former habits now turned into vices, like the deprecated "creeping elegance" and cost structures which do not allow for "aggressive multiyear goals." Cost accounting remains a problem, especially when comparing existing and new customer accounts. "Displacing competitors and winning greenfield sites is a better measure of competitiveness than simply selling more applications to the installed base." But the installed base has its charm, since cost of sales is low. In an idealized static operation where cost of goods is 55%, R&D 10%, and operating margin 15% like Xerox's elusive ROA, SAG represents only 20% of total cost; we are talking about existing customers, of course (responsible for 80% of sales, as per Pareto). Put the same equations in place for new customer accounts (20% of sales), and SAG rises to 45% of costs, eating away at any operating margin. But no matter what the financials say, if new sites are not buying, then it is not worth bothering with it (the product). Another nitty-gritty preoccupation is identifying the customer who ultimately decides what to buy. If the MIS department's voice is fainter, there are new procurement hierarchies led by techies and purchasing agents. (Who ever bothered with them in the golden age of MIS?)

"Executional" excellence can be either developed or bought, but the core skills that link strategy and execution must reside at the core of the firm; there is no "build or buy dilemma" for a systems company interested in services, when it comes to applications expertise. Since financial controls have been proven ineffective in stopping "creeping elegance" --obviously a favorite McKinsey term -- R&D efforts must be explicitly evaluated against other factors, such as new features and products capable of creating a competitive edge by themselves. (It is indeed remarkable how management clichés roll off the McKinsey tongue.)

In the "Trends" chapter we find nifty numbers and graphs of presentation quality: worldwide revenues of hardware, software and services and related growth patterns, processor revenue by type, where desktops now represent 49% of global income. There are some arcane calculations only a marketer could love, such as a table on whether actual revenues exceeded corporate expectations. McKinsey took the largest U.S. vendors in '85, and calculated what they would have earned in 1990 if they had grown, with their products, apace with the market. This table is made more complex by marriages and mergers, like Hewlett-Packard/Apollo and Seagate/Imprimis. Placed by revenues midway through the list, Xerox reached $1.4 billion in '85, $2.5 billion in 1990, just short $100 million of "corporate expectations," like Hewlett-Packard. IBM and others did not weather the storms so well. Growth, as you know, is in software and services, but software is beginning to slow down: in three years or less, the services business (processing and professional) will run ahead of shrink-wrap.

McKinsey's database follows eighty "worldwide companies with computer industry focus." The companies ranked 31 to 80 grew the fastest, more than doubling their share of revenues and profits in the period 1985-1990. All companies are betting on the future, since the increase in R&D allocations remains constant for all.

Productivity is rising because, while the giants shed employees, the little guys are expanding personnel at a slower rate than revenues. Revenue per employee is also going up. 1990 average was $157,000 per employee in hardware companies, $110,000 among the software brotherhood.

Although the total number of mergers and acquisitions is on the decrease, this smaller number "belies their growing importance, as companies seek to acquire new skills and product lines." As for the success of this latest gyration--AT&T and NCR, Siemens and Nixdorf, DEC and Mannesman, Fujitsu and ICL-- McKinsey is not yet prepared to tell what McKinsey is thinking.

by Giuliana A. Lavendel

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Monday Teller

No. 43   February 10, 1992

PARC INFORMATION CENTER

Short Term America, by Michael T. Jacobs. Boston, Harvard, 1991.

He calls it business myopia, and puts it on trial, along with a string of root causes, such as an inhibiting U.S. banking system, corporate diversification and a depersonalized stock market. "Fortunately," he adds, "Americans are not chronic handwringers." We have challenged trade practice and industrial policy, and we are revitalizing manufacturing technology. Still, we are ignoring the darkest failure of our competitive stance: short term business thinking. Why did we let go of the fax machine and the digital wristwatch? Why did we lose the VCR? It was a classic: Ampex spent time and money to develop videocassette recording, but when management learned how much capital would be needed to make it into a commercial product, the technology was licensed to the Japanese.

Why did we throw in the towel on robotics? Cincinnati Milacron, the last American competitor to abandon the field in 1990 -- after GE, Westinghouse, United Technologies -- had only one chance to avoid a run against its stock: bring the product to market in four years. Milacron's foreign competitor could take up to 20 years to commercialize the technology. Obviously, Mr. Jacobs is an original, swimming against the tide of the time-to-market mainstream; he even attacks, on macroeconomic principles, the assumption that a dearth of savings is killing the American capital market -- a statement which could only be sustained, he insists, if the American economy, already integrated into the global market, existed in a vacuum.

This book probes the emerging issue of short term thinking, which many believe to be endemic to American culture. Mergers and leveraged buyouts were raging a few years ago when author Michael Jacobs was appointed Treasury's Director of Corporate Finance with the specific mission of zeroing in on the barriers to U.S. competitiveness.

Zero in he did; he distilled "the best research and the best experience in both business and government," and identified a major reason, perhaps *the* reason for failure in short term behavior. "If I have failed to offend anyone in the process," quips Jacobs, then "I apologize, because we all contribute to the problem and must recognize the fact." As for "short termism" being endemic to American culture, who built the Panama canal, who set foot first on the moon, built IBM computers, launched Desert Storm?

Business myopia is based on the discontinuity between capital providers (stockholders and lenders) and the corporate management which supposedly must make capital blossom. Boards of directors handpicked by top management for defensive purposes offer no oversight. In both Germany and Japan, banks and shareholders are intimately involved in the companies in which they invest. "Patience comes with participation," sighs the author. Between stockholder expectations of constantly high returns and the fancyfree paychecks of America's executives, circumstances foster short termism, which translates into a higher cost of capital here the U.S. The Council on Competitiveness (see Monday Teller no. 31), where many of the selfsame executives sit, found that we do not compete well in areas where extensive capital needs and technology investments over time are required. We are addicted to the immediate payoff.

Powerful institutional investors, with their baggage of program trading and arbitrage, increasingly influence the markets, which are not irrational in spite of their vagaries: they are simply uninformed. "America's shareholders have simply abdicated their role as owners."

The 1970s and 1980s saw the end of relationship banking, but the seeds of this demise are to be found in the depression era, which produced "the most fragmented and regulated financial industry on earth." U.S. banks are unable to offer a broad

range of services and a cozy environment where differences are negotiated instead of being resolved in court. American corporations have *disintermediated* their banks and draw capital directly from the ultimate source.

Creditors of American companies are scavengers who know that their customers are often worth more dead and dismembered than alive. (Again, German and Japanese banks, who own their customers' stock, are not interested in liquidations.) And as for the overpaid executives who cannot navigate through this melee, they'd better follow the example of Mazda's Chairman Yamamoto and his court, who took a 10 per cent pay cut when just 3500 of their automobiles were recalled after a safety check. Among the many tidbits the author offers on a platter is the fact that the average CEO of a Fortune 500 owns about one fourth of one percent of his company's stock. If he spends $100,000 on a corporate yacht, observes Mr. Jacobs, in theory the company's book value has fallen by $100,000, but the out of pocket expense to the CEO is his prorated share of the company, e.g. $250.

This is elegant albeit farfetched. Mr. Jacobs is a Great Inquisitor, a muckraker with a twist, who will disturb quite a few people because throughout the book he compares U.S. practices against those followed in other countries where stockholders are patient and involved, executive salaries are modest, and horizons are longer. Should we establish observation posts in our prosperous neighbors, as the Japanese do? Nah, "what America needs is a uniquely American solution," where blame for short termism is distributed all the way around, and a healthy financial system promotes long-term economic health.

Looking at the press of problems our Great White Father, whether Republican or Democrat, faces every day, one may be tempted to say that capitalism does not work any more and, paraphrasing Winston Churchill, to say that capitalism is the worst possible system for running a country's economy -- except for all other systems ever devised by mankind. "The problem," writes Jacobs, "is that the United States no longer practices capitalism, which is founded on the belief that markets work. It handcuffed banks so that they cannot talk to their corporate customers; mutual or pension fund managers, who should be the classic long term investors, cannot own a "meaningful stake in any company, or try to influence its behavior." Why does a simple loan agreement which takes two pages in Japan require hundreds of pages in the U.S.? What we practice is Big Government, and the author gets progressively

hotter under the collar in his progression towards a cure for myopia. Some of his remedies should be exceedingly popular, in the present climate. For instance, Mr. Jacobs recommends that the SEC establish a tradition of allocating certain commissioner posts to non-lawyers. (At this moment, all five of them are.)

by Giuliana A. Lavendel

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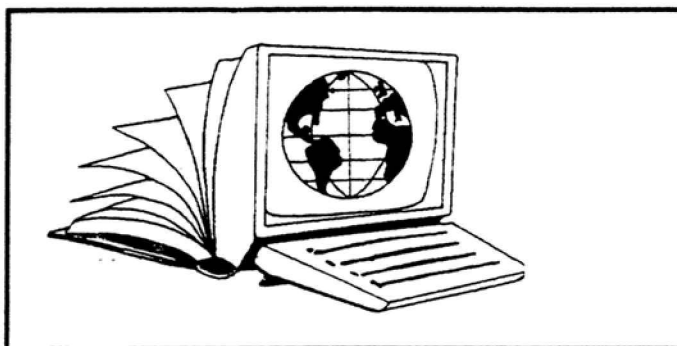
Monday Teller

No. 44   March 2, 1992

PARC INFORMATION CENTER

Unbounding the Future, by K. Eric Drexler and Chris Peterson. New York, Morrow, 1991.

"Mechanical engineers don't design molecules. Molecular scientists seldom design machines. Yet a new field will grow -- is growing today -- in the gap between." This is what *Unbounding the Future* is about: here we have a minimalist cosmology of the world, written with the intent of having the hoi polloi oh and ah at every page. If Drexler's previous book, *Engines of Creation,* was a technological bombshell, this popularization is a step towards a taxonomy of the applications nanotechnology will bring. This discipline is now recognized as a serious research direction, but its survival may appear fragile in a society like ours, which cares about the coming election, next quarter's profits, "and the future be damned." "Futuristic" is a disparaging term, in our bottom-line ruled environment, and it reminds people of funny Fifties-style fantasies like moon walks and robots, video telephones and ray guns (authors' hints).

Chief author Drexler, a scholarly young man with MIT credentials and a futurist's gleam in his eye, is currently Visiting Scholar at Stanford University and a director of the Foresight Institute; large corporations tap his vision for their long range strategic plans through the Global Business Network. Drexler is also a frequent visitor at Xerox PARC, where he can be spotted engaged in lunchtime conversations with researchers and sympathizers. He believes that the serious researcher has a duty to keep a broad audience informed, although this *pro bono* responsibility has been much de-emphasized in this century, to the point that "if you can write in plain English, this is taken as evidence that you can't do math, and vice versa." In other words, scientists who stumble upon something important usually run for cover, there to hide under a cloud of jargon.

In *Unbounding,* facts and data can be distinguished at a glance from scenarios the authors have crafted: scenarios are indented, and consequently much of the text, as a matter of fact, in the book's thirteen chapters. A reader emerges from the introductory *Looking Forward* with the hopeful notion that nanotechnology and its miracles are now at the exploratory engineering stage -- not really blueskying, because exploratory engineering is o.k.; it just covers technologies which can be understood but not manufactured at the present time. Some tools are familiar, such as scientific visualization and, of course, virtual reality, which can help bring the molecular world closer to our consciousness, lest we surrender to the temptation of making things work without understanding how. Chapter Two on *The Molecular World* talks about modeling, simulating to understand how perfect nanomachines work --as the proteins in human cells do.

In *Bottom-Up Technology* we are made to realize that molecular manufacturing will work much like an ordinary factory, with the caveat that a single dust molecule could damage the whole works, like a brick heaved into a machine tool. Autodesk's John Walker has observed, "All of our technologies today are bulk technologies," and in fact we are stone-age crude, hacking away rough shapes from intrinsically weak materials. Doing chemistry today is like "trying to assemble a model car by putting the pieces in a box and shaking." Molecular machines will make matter smarter, just as muscle is smarter than rubber, since it contains molecular machines which tell it when to contract. But we humans are huge creatures.

Biologists have an advantage because biomolecular science is already patterning molecular machines, including assemblers. In *Paths, Pioneers, and Progress* we are told that molecular engineering is already a part of our arsenal, thanks to developments like the STM (Scanning Tunneling Microscope) which came out of IBM's Zurich Research Lab at the end of the Seventies. Co-inventor Gerd Binning is now a Nobel laureate, for whom IBM maintains a small

Exploratory Physics lab in Munich. Researchers there are involved in biophysics experiments for imaging live cells, as recently reported by some visitors from PARC. STM's successor is the ATM, the Atomic Force Microscope invented in the mid-Eighties by a joint IBM Almaden/Stanford University team of atom jugglers, among whom is PARC's Cal Quate. (At temperatures close to absolute zero, the advanced microscope's "proximal probe" can line up 35 Xenon atoms to produce the world's smallest logo: IBM.) Protein design is particularly successful, and pursued in academic laboratories. Once again taking the long view, the Japanese have embraced nanotechnology in several research consortia, and are funding a dedicated institution, the Protein Engineering Research Institute in Osaka. Innovation will emerge from a combination of existing technologies in physics, biochemistry and traditional chemistry, leading to high quality manufacturing at low cost with little environmental impact.

From Chapter Six on, the authors step into a spiral of capabilities, with dazzling scenarios interspersed with reality touches. "Modern medicine often means an expensive way of prolonging misery " leads to an entrancing Chapter Ten on *Nanomedicine*. Inside cells, the body operates by way of molecular machines; it is actually a workyard, a construction site, a battlefield. When surgical control will be extended to the molecular level through the immune system, we will eliminate invaders like cancer cells and and promote healing by "healthy cell herding."

This is hot everyday stuff, not science fiction, but at times the sheer redundance of detail makes this popularization hard to assimilate, giving it a dreamlike quality. More MIT and less futurist would have helped, as a presentation style. But all corners are covered; this diffuse, amazing collection of facts and hopes weaves a chapter on the benefits of technology for the Third World -- equal at last -- and ends with a cursory look at the downside and possible abuses of nanotechnology. What if a replicator gets loose? Will bacteria and molecules run amok? Who will call in the Terminator? It comes as a relief that a well known nanotechnology godfather, PARC's Ralph Merkle, does not worry about the threat of the self-replicating molecular machine. Such things only happen in B-movies. Runaway nanotechnology does not fit the factory concept, whether molecular or man-size, and makes about as much sense, says Drexler, as the notion of an automobile going feral and refueling itself from tree sap.

by Giuliana A. Lavendel

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Monday Teller

No. 45   March 23, 1992

PARC INFORMATION CENTER

Rising Sun, by Michael Crichton. New York, Knopf, 1992.

This is dedicated, with apologies, to our friends who are too busy or high-minded to read a work of pop fiction. Fiction, though? Perhaps not. Was *Uncle Tom's Cabin* just a novel? Did *Gentleman's Agreement* influence our view of the world? Was Homer's story of the Trojan horse just a folk tale? Harvard medico and novelist Crichton has delivered himself of a political tract, or a tsunami: everybody within the D.C. Beltway has read or is reading *Rising Sun*, which may well have a hand in the Buy American movement. The *New York Times Book Review*, which has dedicated to *Rising Sun* two front page features -- one by Harvard economist Robert Reich -- calls the book "a shocking and ominous polemic." A bravura performance, it is the story behind the story of a tawdry intrigue involving the murder of a call girl in a Los Angeles office building. Claiming to analyze rather than bash, the novelist focuses on the presence of Japanese big industry and big power, and explicitly denies trying to push current tensions into an area of "unreasonableness" -- even though he cannot expect detachment from all his readers. Crichton is very well read in the area of economics problems; some of the basic texts on the subject of U.S.-Japanese economics are listed in a 3-page bibliography, another touch which distinguishes this chronicle from other bedside thrillers. Massive research went into its fabric, case history after case history; relevant technologies, like media manipulation, are described with accuracy worthy of an EE classroom.

The characters in *Rising Sun* include a passel of Japanese executives and two U.S. Senators. One of them, a now-you-see-it, now-you-don't blackmail victim, still agonizes about selling to Toshiba the critical technology that allowed Soviet submarines sitting off the U.S. coast to silence their propellers. (Hewlett-Packard and Compaq get the rap for Toshiba's reprieve.) Detective Graham, nominally in charge of the investigation, is an honest slob

harboring "a mixture of prejudices and media fantasies." Special liaison officer Peter Smith -- or everyman -- is on a discovery pilgrimage, while his mentor Connor-san, a retired, loner policeman who has lived in Japan and speaks the language -- the dialog is peppered with romaji sentences -- is the author's mouthpiece for his America Wake Up call. This *sempai*, master teacher to Peter Smith's *kohai*, apprentice is a Japanophile Vergil and Shane who often speaks about the Japanese in knowing admiration. Connor-san gives *Rising Sun* most of its fighting weight; his insights on the incompatibilities between two great nations have seldom been equaled in the works of economists and pols.

What do the Japanese say about us? Americans are too eager to make theories. Since they don't spend enough time observing the world, they don't know how things actually are. ("..In the seventies..they were sending 150,000 students a year to America, to learn about our country, and we were sending 200 students a year to Japan.") A black security guard, a survivor of the GM plant in Van Nuys remembers MBAs out of Detroit, "little weenies didn't know how the line worked. They didn't know a tool from a die,...ordering foremen around... and nothing ever worked right. Problems get fixed here (at Nakamoto)...these people pay attention." Connors: "Now that he (a Japanese manager) is beside the mayor, he sees himself in another context, with another set of obligations and requirements for his behavior...He is sensitive to context...You consider him immoral. He considers you naive. Because for a Japanese consistent behavior is not possible. A Japanese is a different person around people of different rank. He becomes a different person when he moves through different rooms of his own house." And further: "The Chief (L.A.P.D.) just hung you out to dry. He takes no responsibility -- it's all your problem.... In American organizations it is all about who --ed up. Whose head will roll... The Japanese have a saying: fix the problem, not the blame. In Japanese organizations it's about what's --ed up,

and how to fix it. Nobody gets blamed. Their way is better."

We are two culturally distinct societies. Americans do not rely on unspoken communication, but the Japanese can communicate without words. "To a Japanese, silences have meaning." The Japanese believe that you should give a gift early in the relationship because then it is not a bribe, and does not put pressure on a budding relationship. But while you cannot gather information from Japanese executives, who are hired for life and feel they are part of a family they'd never betray, they often try to bribe people like security officers from rival firms. "All is fair in love and war, and the Japanese see business as war...In the old days, if a Japanese bought an American car, he got audited by the government.... Their market is open: they can't help it if nobody wants an American car." In the States, however, "everyone's building walls and hiring guards. But in Japan, you can walk into a park at midnight and sit on a bench and nothing will happen to you...You don't need walls or bodyguards. Your safety is the safety of the whole society. You are free."

"Everybody knows the best way to transfer technology is inside somebody's head," observes the press secretary at the Jet Propulsion Lab. Researchers want to do research, but in the U.S. the R&D budgets are shrinking, and the Japanese not only pay well but they genuinely respect research -- they do not believe in the mad scientist legend. When American corporations went multinational in Europe in the fifties and sixties, they encountered difficulties, "so it is not remarkable that Japanese corporations also have some period of adjustment," states the American director of a Japanese research lab in California. "The Japanese are perfectly ready to accept Americans and other foreigners in their companies... And you will be accepted so long as you remember your place."

A professor at USC, who does not suffer investment bankers gladly, comments: Americans have four percent of the world population, and eighteen percent of the world economy, but also fifty percent of the lawyers, thirty-five thousand pouring out of schools every year. "This is where our productivity is directed." On the other hand, the Japanese patent like crazy, and practice "patent flooding," meaning they have covered all possible uses. Having devised some algorithms for image enhancement, the professor found that Sony and Hitachi had already patented the use of his invention, although the algorithms remained nominally his. Americans are always looking for the quantum leap, the home run, and then sit back,

but the Japanese just hit singles all the day long. They are successful, but not daring. And they think that everybody who is not Japanese is a barbarian, but "they are polite about it," says *sempai* Connors, "because they know you can't help the misfortune of not being born Japanese." The *Wall Street Journal* review of *Rising Sun* comments that"...the reality of Japanese-American relations, at least anecdotally, is sometimes even stranger..." Recently a 576 lb American won his third Emperor's Cup for sumo wrestling in Tokyo, but it is doubtful that he will be called *yozuna*, Japan's grand champion. Just what happened to H. Ross Perot: *domo arigato gozaimasu.*

Some of the quotes have been selectively expurgated here, since Crichton reproduces the colorful language of the L.A.P.D., which runs truer on TV than on a computer network. Writing with his usual terse style, the author of *The Andromeda Strain, The Great Train Robbery*, and *Jurassic Park* gets readers exactly where he wants them, without forcing reality too much. The press and TV are listening: "UC-Irvine's Hitachi lab rightly raises eyebrows," writes a *Los Angeles Times* columnist about a current biotech research deal between the University and Hitachi Chemicals. (Should the University of California inaugurate an "affirmative action plan" to benefit also American chemical companies?) In the opinion of *sempai* Connor alias Crichton, Japanese management scored again.

by Giuliana A. Lavendel

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Monday Teller

"Managing for the Future; the 1990s and Beyond," by Peter F. Drucker. New York, Truman Talley/Dutton, 1992.

What do a Catholic Mother Superior and a Japanese executive have in common? A fundamental trait very desirable in a CEO: they have their eye on the mission, rather than on their own reward. Glimpses like this one are found in the new collection of essays by the Great Peter, culled from the pages of *Harvard Business Review*, *The Wall Street Journal* and other pulpits. It embraces a very wide envelope, as witnessed by an executive summary of notes on the "post-business society," where what we have assumed as axiomatically valid no longer fits our reality. The most significant development of the late twentieth century is the emergence of the job as a property right, which is "largely a reaction to today's great wave of entrepreneurialism." Since the appropriate kind of education is a new form of security, "the center of gravity has shifted towards the knowledge worker," but unfortunately today's schools do not prepare the individual to be successful in the "knowledge society," where information is both bread and butter. Knowledge matters because, Marx notwithstanding, the source of wealth is now knowledge, not labor. The educated person is the new archetype of the post-business society.

In fact, the raw material economy has become marginal, with manufacturing increasingly uncoupled from labor: only two-fifths of blue-collar hours were needed in 1988 to produce the same volume of goods as in 1937. "Management has become the decisive factor of production." We are witnessing the cohabitation of four economies, interdependent but not controlled by one another. There is the waning economy of the nation-state, whose power is rapidly shifting to the regional economy (e.g. North America or the EEC); there is a semi-autonomous world economy of money, credit, investments, and finally there is the economy of the transnational enterprise, a' la British Petroleum, Xerox or Matsushita. Transnational strategy is incompatible with diversification, and even GE is divesting. While in the old style corporation short-term profit enhancement

was the goal, the *bona fide* transnational seeks mainly maximization of market share.

These sobering *Notes* are followed by four sections, each one fitting a particular facet of the author's protean expertise. From Part I, *Economics*, we learn that American goods have a share of the Japanese market which is twice as large, per capita, as the share enjoyed by Japanese goods in the U.S. Most U.S. brand goods sold in Japan are manufactured there by subsidiaries, either wholly owned or joint ventures, but wars against U.S. brands made in Japan, be they IBM computers, Mars bars, or Merck antibiotics don't make sense; preservation of our farm exports does, because of the fierce competition from European farmers. International economic integration will be based on reciprocity, alliances, and basic restructuring of the enterprise, which will move work where the people are rather than shifting people where the work is. The corporation will unbundle all activities which do not lead to significant advancement, so that activities like clerical work, maintenance, medical labs will be farmed out. Large firms may also "go private," in the sense that they will be under the control of a small number of private holders, typically the mutual and pension funds which now own 53 percent of all U.S. stock. (Xerox's largest stockholders is Fidelity, the largest mutual fund family in the U.S.)

The breakup of the Soviet Empire and China's "weakness and fragility" are bringing new ingredients to the international stew pot. Economists have lost their crystal ball, if they ever had one, and are incapable of predicting phenomena like money turnover, whose velocity is "about as mercurial as teenage fashions and even less predictable." The U.S. is not doing so badly; just look at the export boom, fueled by our healthy competition at home. Exporting and manufacturing abroad -- which in the end creates jobs for Americans -- complement each other. Besides, if wages fall below 15 percent of production cost, a 50 percent wage differential must be present to justify the cost of manufacturing at great distance. As for the Japanese, they "do not lead from strength but from political

weakness" because of their antiquated institutions, although "nobody in the world is as good at making decisions as the Japanese." (Japanese-American trade negotiations are just Punch and Judy shows.) The U.S. needs to watch the European Community and Latin America, and what Latin America needs from the U.S, is trade, not aid; *viva* the *maquiladoras!*

Many of these motifs are expanded in the following sections of the book, dedicated to *People, Management,* and *The Organization,* with tantalizing insights scattered through 360 odd pages. No mogul today has the power of a John D. Rockefeller or an Alfred Krupp, but the universities, "a mere ornament of society 80 years ago," now hold the power to grant or deny access to a decent livelihood and career. "End Work Rules and Job Descriptions!" exhorts Peter, who blames both unions and management for the chains imposed on productivity by work contract. As for managers themselves, their task is "to make the strengths of people effective and their weaknesses irrelevant," which also means managing one's boss and making him/her look good. As for culture, both the company and national variety, "use it, don't lose it." Japan has handled this issue successfully, but India and China felt they had to change their countries' cultures, and the result is mayhem.

Most nonprofit organizations and their "Outreach Revolution" are models of how to manage the volunteer - read "knowledge worker" -- for productivity. This requires a clear mission, careful placement, continuous learning, accountability and other such positives. Large U.S. corporations have not done particularly well on professional management's watch ("Boards Should Meddle!"), and executives should keep in mind an old English schoolboys' rhyme -- "The higher monkey goes, the more of his behind he shows." In *Four Marketing Lessons for the Future* four spectacular failures are reviewed: the Hyundai Excel, the discounts and bonuses offered by the Big Three U.S. auto makers, the decline of the big city department store. Most painful is the case of the fax machine, American by invention, technology, design and development, which is not being manufactured at home because market research said there was no demand for it (*deja vu?*). As for the R&D lab, traditionally immersed in its own technology and focused on quality rather than quantity, it benefits from "an awareness of, and concern with, science and technology outside of one's lab, outside of one's own field, outside of one's own industry." Amen... Improvement, managed evolution, and innovation are research's different but complementary tasks. Xerox gets honorable mentions for adopting SQC (Statistical Quality Control) and for "a machine that is a copier, high-speed printer, word processor and fair-sized computer all in one." Amen again?

Drucker never goes ballistic in his evaluation of people and trends, but serenely chews up several 20th century sacred cows, including the theories of John Maynard Keynes (probably the most obfuscating writer in the history of the English language, so who really knows what he meant?) *Managing for the Future* is a delightful, at times irreverent, collection of essays which gains much by being read in sequence rather than assimilated drop by drop whenever the enlightened business press feels like regaling its readers. Peter's *coup d'oeil* is powerful as ever. As he told this writer over a memorable lunch, Mr. Drucker has never actually managed anything, and this might well be the secret of the surgical detachment which allows him so see -- oh, so clearly -- "the futures around us."

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC Information Center.

The Overworked American, by Juliet B. Schor. New York, Harper Collins,1991.

Where has leisure gone? In 1954 a *Harvard Business Review* article contributed that "boredom, which used to bother only aristocrats, has become a common curse." In those blissful years, Institutes for the Study of Leisure were cropping up in academic departments all over the country, but later on "the leisure scare died out as the abyss of free time failed to appear," writes Ms Schor, who likes a well turned metaphor.

Schor lives in Boston, which she considers the fastest talking/walking city in the country, outpacing New York also in watch-wearing and heart disease statistics. We should relax and work less, as the author's Indian husband recommends -- obviously in vain, since writing a 300 -page book on top of duties as Professor of Economics and Head Tutor of Women's Studies at Harvard can hardly be considered "unwinding." The *Wall Street Journal* reports that in Milan, another fast walking/talking, crowded and polluted city, a specialized agency caters to clients who are fed up with the rat race and aspire to a more leisurely life, maybe even a job, in places like Antananarivo, Madagascar. The problem, according to both Ms Schor and the Milanese agency spokesman, is that capitalism set in motion a chicken-and-egg cycle to produce, consume, produce, consume, *ad nauseam.*

After job and housework, Americans today have only sixteen and a half leisure hours per week, and even those hours are shrinking. This process reverses a century's worth of progress in reducing labor, and the decline, dating from the early Forties, has decoupled the U.S. from Western Europe, where people work less than before. The level of productivity for U.S. workers has more than doubled since then, but we have not used this achievement to reduce

work hours. Schor: we could have chosen to work the four hour day, or the six month working year, or even take off every other year, with pay, *bien entendu*. Instead, men, women, blue collar workers and professionals all work longer hours, because employers, i.e. the job sellers, "do not offer the chance to trade off income gains for a shorter work day or the occasional sabbatical." Granted, we enjoy leisure denied to our harassed forebears in eighteenth and nineteenth century Europe and America, which witnessed the most toiling schedules ever to afflict humankind. However, the author is mindful of the six weeks of vacation which are a French workers' birthright; she pines for the ancient Athenians fifty to sixty annual holidays although, in fairness, Pericles and contemporaries had no knowledge of weekends.

In "precapitalist" society, the calendar was filled with holidays; religion had a role, but low calorie intake also forced the issue: "we can infer that work had to have been a low-calorie affair." The comparison is not brought up to the present day: do Americans work more because they consume more calories than Pakistanis or Spaniards? Schor comments only that capitalism eroded medieval society's leisure because, in contrast to ancient manor economies, it strives for maximum profit.

At the bottom of it all, "Key incentive structures of capitalist economies contain biases toward long working;" consumerism and the work-spend cycles are the culprits. Employers demand long hours, the resulting higher wages promote consumption, and luxuries become necessities of life. We are paying a price of toil -- how biblical -- for our prosperity, and for a global economy which forces many people to continent-hop and work around the clock. Parents feel that they cannot both support their families well and spend time with them: it is an either/or

proposition. Schor regrets that "half the population now says they have too little time for their families," although one wonders what quality time could average parents dedicate to their young in the Middle Ages, when toddlers worked in the fields and everyone was one pace ahead of starvation and plague. The author depicts the plight of working women, who after the office or factory workday face a "second shift" of housewifery and mothering; this makes for an average of sixty-five hours a week, even longer than that for professional women, mothers of young children, and those who are forced by necessity to moonlight on two jobs.

Since 1969, the average worker is on the job an additional 163 hours, with a gender gap where men account for one hundred more hours per year, and women for 300. Instead of hiring new workers, companies have elected to force overtime and higher productivity on their core workforce, thereby increasing both unemployment and burnout. Schor does not investigate the root cause of these phenomena, although capitalistic greed is suggested; possible causes like competition from nations with lower wages and longer hours do not enter into the author's equation. There is also no consideration for the national individualistic, adventuresome character, which moves people to start businesses and own their own suburban homestead while, for instance, most Europeans simply rent. Other pertinent phenomena like the American distaste for the welfare "cradle to grave" society, the wealth of savings buried in pension funds, the retirees who pursue intensive schedules doing volunteer work are not mentioned. But we know, to the author's satisfaction, that American men are now cooking and cleaning, doing about 60% of the housework women do -- up from 40 percent two decades ago.

Does Schor speak for a new generation of workers who prize ease of life above all, and cannot care less about the Japanese 12 hour workday? All chapters point a finger to the familiar "isms," like capitalism and consumerism ("capitalism's squirrel cage,") although Schor mentions in passing that the American textile worker's five day week and paid vacation package is losing ground vis a vis the Chinese worker's brutal schedule. (Who would have thought of the Chinese masses as an example of capitalism/consumerism?) Workers *may* actually prefer money and all it brings over free time, but ,the author insists,

"In return for a 1970 standard of living, employers are now demanding far more hours." She calculates that people, "just to reach their 1973 standard of living, must work 6 plus extra weeks per year, or 245 more hours." Of course, the same people also want two cars in the garage, the camcorder, the VCR, and a larger home with more bathrooms than was customary 20 years ago. The typical 1989 tract home is three times the size of the classic Levittown model of the Fifties.

An interesting table on p. 82 lists vacation allotments for European workers, by nation: they range from 4 to 6 weeks, independent of seniority. The author does not mention that many European companies send their workers home, with full paychecks, during "dead time," like the month of August. She also does not elaborate whether this system in any way affects the economic welfare of "cradle to grave" providers like the U.K., Sweden and Italy. Schor is on the money when observing housework patterns; in spite of capital investments in labor saving appliances, the home still demands the same amount of time because -- again -- we have simply upgraded our standards. We change clothes daily, cook gourmet meals, vacuum at first suspicion of dust, having outgrown the simple tastes of the emigrants who settled this continent.

Yes, there is a *Parkinson's Law of Housework*, "which expands to fill all the time available for its completion." Perhaps this is why this book is dedicated to the author's mother, recently deceased, "who always had time." "Consumerism is not a historical trait of human nature, but a specific product of capitalism," preaches Schor, who thinks that the American consumer is "like the drug addict who develops a tolerance" and therefore "needs additional hits to maintain any level of satisfaction." In harmony with the Zen path to happiness which reduces desire, Schor wishes to stem the tide of rising expectation. The American *Homo Economicus* could exit the squirrel cage if only, if only....

by Giuliana A. Lavendel

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"Workforce America!," by Marilyn Loden and Judy B. Rosener. Homewood, Il., Business One Orwin, 1991.

"By the year 2010, white men will account for less than 40 percent of the total American labor force," write authors Loden, a San Francisco consultant on organizational change, and Rosener, who lectures on cultural diversity and management at the University of California's Irvine campus. The "don't rock the boat" corporate school of thought is going under. We will have a lively melting pot in our offices, retail outlets, and factories, and this has its good side, according to PARC's Margaret Graham, author and lecturer on organizational behavior themes, who thinks that "the way of dealing with a more diverse workforce is to embrace it as a source of creativity." As Graham sees it, this is not a new phenomenon on the American scene. Massive waves of immigration at the turn of the century filled the labor ranks with non-English-speaking people and allowed innovators like Edison and Henry Ford to revolutionize office practice and introduce factory automation. It was then a case of assimilation, while now we are counseled to handle, nay, preserve and enhance "otherness."

Prescriptions are dispensed liberally in "Workforce America!," and they are hardly revolutionary: for instance, that younger and older employees want "to be taken seriously", while women want "recognition as equal partners." A lexicon of appropriate terms condemns not only *girls, ladies, gals* and *females* in favor of *women* but excudes the use of the world minority; you have to be specific/wordy, and use *Asian-American, African-American,* or *People of color.* As for Anglos, *European American* is preferred, but the authors recommend the use of the country of origin as in *Irish-American* or *Polish-American* -- which excludes the Mayflower brigade. In their intent to promote "otherness," the authors push to differentiate between foreign nationals and American born, a practice which many (this writer included) would find objectionable in the extreme.

For management to recognize diversity as competitive advantage, Loden and Rosener state, three conditions must be met: that the presence of enormous cultural and ethnical "otherness" already at work in the U.S. be recognized, that it be valued, and that common ground be found on which to build "relationships of trust and mutual respect." (All constitutional, and politically correct!) The service sector is challenged to develop commitment in diverse workgroups, since this is where the most jobs -- and especially the most entry-level jobs -- will be created. Employee diversity began to increase in the Seventies. Corporate America's reaction was either indifferent or negative, but during the Eighties, revolutionary demographic phenomena occurred: immigrants began to account for one third of total population growth while the '70s baby bust hit corporations seeking to recruit the young. (New college graduates looking for jobs in this summer of 1992, and primary schools all over the country, bursting at the seams, show that some phenomena are cyclical.) Similarly, Loden and Rosener bewail the declining productivity of the U.S. workforce -- a conclusion refuted by the most recent statistics, but the authors are trapped in the hand-wringing which was prevalent just a short time ago, at the apogee of Japanese business expansion. Perspectives may change rapidly, and this is a risk in the book business. Would the authors, today, describe Ross Perot as "adventurer, corporate renegade and risk taker"? They do in portraying him, with Iacocca and Henry Kravis (p. 43), as the "homogeneous" ideals for their respective organizational cultures.

The primary message of the book, on which its modest originality rests, is that egalitarian assimilation is not the way to go. We should not glory on appearing blind to race, age, gender, etc, but on the contrary seek out and utilize the otherness of "women, people of color, lesbians, gay men, differently abled, older and younger employees." Acquiring "a pluralistic management view" means promoting a multicultural society *against* the monocultural, assimilating ways now

prevailing at work, in the suburbs and urban ghettos where Americans still indulge in homogeneous clustering. Women, regrettably, have been told to cultivate "a precise balance between being assertive and being feminine." African-Americans "learned that displaying strong emotions in the workplace was dangerous to do." Latinos learned that speaking Spanish on the job was frowned upon (although Miss Manners would find it ungracious to converse openly in a foreign language others don't understand).

The authors lead us towards a future society scheduled for the year 2000, when commitment to diversity is becoming a corporate commonplace. Chapter One, "Diversity in the 90s," begins with a boardroom session for the Fortune 1000 Home Products, Inc. White males present are mostly grey haired, differently abled or named Mendoza; the finance VP lectures on American Indian history, and the VP of public relations sports a gold earring. (Only one acceptable vestige remains from the past: a coffe-carrying executive secretary.) The same Home Products gang appears in the final chapter on "Workplace 2000: From Assimilation to Valuing Diversity, " where marketing VP Carl Philips (30 years old that day) extols the support received for the BRITE detergent ad campaign from the Hispanic Network and the Gay Alliance, key target groups. Across the street, competitors OR&C are in the doldrums. Back in the Nineties, management considered focusing on differences counterproductive, and now the company is moribund because of persistent labor problems and lack of new product success (inability to select key target markets?). Out of 12 corporate officers, OR&C has just one person of color, and one woman (coffee?).

"Workforce America!" alerts decision makers to the need for managing employee diversity here and now. It is also useful as a synthesis of observations which crop up one by one in the daily life of the workplace; for instance, that in the low-context culture of the United States, messages are explicit, with rules and regulation spelled out in detail, leaving little for us to interpret. This could be a formula for success, but the authors point out that such practices unduly penalize people from Asian and Arab cultures, for whom "the words used to communicate carry only a small part of the total message." Chapter synopses in an appendix are a welcome feature in a book where the message is repetitious ("We must depart from the old, worn, familiar road and set out enthusiastically down a new path towards the culture of diversity, etc. etc.") while helpful observations are sparse but valuable -- e.g.remarks on the pluralistic leaders' useful role as third-party mediators in resolving culture clashes between diverse groups.

Loden and Rosener would have been more effective, perhaps, if they had chosen to observe and analyze rather than preach, aiming for some balance in their recommendations. Are there dangers in having all sorts of "otherness" groupings march to different drummers? Is there a common bond of aspirations, ideals and behavior patterns which attracts people to America, and pushes assimilation rather than "otherness?" This is a book with a CAUSE, and it doesn't say.

by Giuliana A. Lavendel

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"Head to Head," by Lester Thurow. New York, Morrow, 1992.

"Americans are particularly resistant to changing their system, since they tend to believe that they got it right the first time. Given a chance, everyone in the world would like to be an American. The Japanese, in their secret souls , are really socially imprisoned, low-saving, high consuming Americans."
Euphoric because "The [Russian] bear in the woods is gone?" M.I.T.'s Thurow wrote this 300 page book to destroy our illusions. He dedicates it to the architects of the Bretton Woods accords; in the aftermath of WWII, they crafted the economic system which greatly enhanced the standard of living in almost all nations. But the system died slowly of old age, and the locomotive which pulled it, i.e the U.S. economy, ran out of steam. This success-disaster was brought on by the same factors which made the system great: read open markets, the Marshall Plan, the most favored nation game, all the good things which created a gaggle of competing locomotives.

Inventing new products spells success, and "the skills of the labor force are going to be the key competitive weapon in the twenty-first century; "this is why educating the top 25 percent of the population is critical -- but so is the capacity of the bottom 50 percent (Thurow is unabashedly elitist) to learn new processes and staff them. Thanks to the global economy, goods can be sourced in low wage Third World countries where the pool of unskilled workers is enormous, but it follows that wages must fall for the unskilled who live in rich countries (us). Our schools are concerned with the war on drugs, teen-age pregnancy and such, but Japanese students spend five times as many hours on homework as Americans do. We vainly hope of "generating action in a system with fifteen thousand independent schoolboards, whose incentives are in the other direction..." What a relief when the author, a most distinguished academic, admits that

American colleges and universities are second to none -- and that is worth something. Although at times contradictory in his conclusions, Thurow amazes for the wealth of original thoughts, facts, and observations he scatters with characteristic incisiveness and wit. Who says that the service economy equals low wages? Most services can be converted to high wages by way of technology. If in the U.S. service wages are two thirds of those in manufacturing, they hover around 90 percent in Germany and Japan, both objects of Prof. Thurow's admiration. "Failure requires change, but so does success, he writes, indicting the the "Lone Ranger" individualistic tradition of Anglo American capitalism, as contrasted with the "communitarian" capitalism of Germany (Das Volk) and Japan, Inc.

Prof. Thurow's generalizations and quips make his prose so much more entertaining than, e.g. that of Mike Porter; among his economist colleagues, only Galbraith can challenge him for readability, if not for substance, but at times Thurow allows his enthusiasm to get the better of him. He contrasts economic versus military superpower, but points out that to succeed at both Spartan self-discipline is required. Sounding like a worried, protective parent, the Prof. expresses doubts about the future of the U.S. as an economic superpower, but believes it will limp on for a while, supporting the world's foremost military might. Just like the Roman Empire, he says, since "Rome won most of the battles with he barbarians on its borders during its centuries of decline," and "while Rome was in the economic dark ages, Roman military power was still alive and well in Byzantium." Hardly! The United States will become the second largest economy in the world on Jan 1, 1993, where the barriers will fall and Europe will unite. *Unite?* Thurow is quick, however, to point out economic warfare is a huge step forward, since "the game is both competitive and cooperative."   Of course, the European Community's main strength lies in its 850 million well educated citizens. (This is a broad brush statement, since education, for Prof. Thurow,

means being capable of handling computers, statistical quality control, CAD-CAM technologies -- such as most citizens of, say, Liverpool, Palermo, Lisbon, Gratz or Nice have never encountered even in nightmares.)

The per capita GNP of Germany and Japan are slightly larger than that of the U.S., but America's per capita GNP is larger if we look at purchasing power, i.e. what can be purchased at home for a dollar or the equivalent. So where is reality? And who is practicing the Spartan virtues? Germans get more social services than Americans do, work 10 percent fewer hours, are absent from work ten more days per year, and get 30 days of vacation, plus 10 national holidays. (According to DRI/McGrawHill, the average German worker earns $21.30 per hour in wages and benefits. In comparison, a Japanese gets $12.84, an American $14.83, and a Chinese laborer 27 cents.) American GNP approaches 6,000 billion per year, which makes the size of the U.S. deficit less frightening to some, but statistics are not always meaningful, because we are talking apples and oranges. In March 1990 the two biggest *keiretsu* in the world, Japan's Mitsubishi and the German Daimler-Benz groups met to discuss how to leverage their businesses through an alliance; from a U.S. point of view, observes Thurow, "the Singapore meeting was criminally illegal" because it contravened our antediluvian antitrust and banking laws.

Obviously, Thurow believes that the U.S. should have an industrial policy: "both Europe and Japan believe that government has a role to play in economic growth," while "in American theology, government has no role in investment funding, and a legitimate one only in basic R&D." The seven key industries of the next century - microelectronics, biotechnology, new materials, civilian aviation, telecommunications, robotics/machine tools and computers -- are all brainpower-fed, but "those who can make a product cheaper can take it away from the inventor," since reverse engineering has become an art form. Corporations should emphasize return on human investment rather than ROI or ROA; in Japan, the head of Human Resources is the second executive in line after the CEO, and "to become a CEO, it is a job one must have held."

Statistical fireworks are handy to prove that the U.S., the former macroeconomic locomotive, has been everybody's open market of first resort. All successful countries in the past half century have become strong by sending most of their exports to the United States market. Now The House of Europe is putting it together, and will not buy Japanese cars even if we allow Honda to

manufacture them in America. FIAT's Gianni Agnelli is quoted: "Nothing could be more Japanese and less global than a big Japanese company, even if it operates on five continents." Why? A Japanese company is not a standalone company like "IBM, Digital, Intel, Apple, Xerox", which are " some of the leading lights of American industry." Recent history has shown that a solid industrial structure beats individual brilliance. If "America is not used to having to design national strategies to help its industries catch up, " then it better learn fast.

This is indeed a heady, exciting book, which spares no one in these United States, including the environmentalists. "Every conceivable technique for producing electricity produces waste, and every conceivable technique kills people, but the benefits that flow from electricity are worth it, " writes the Professor, who even disregards the spotted owl in his concern for U.S. economic survival: "No one knows the future value of biological diversity, and there is no market where it can be purchased." Count one for the lumberjacks.

by Giuliana A. Lavendel

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You Just Don't Understand, by Deborah Tannen. New York, Ballantine, 1990.

Dog days of summer, and the reading is lighter -- VIPs in the Fortune 500s, plagued by NOW, the press, and their own Human Resources departments, are poring over this paperback about "women and men in conversation." It is about a combination of the social contract and hormones. Why do women feel comfortable asking for directions rather than unfolding a roadmap? Men, instead, feel honor bound to fulfill the masculine "requirement for help and self-sufficiency," and would rather drive around in circles than ask for directions. This results in "mixed metamessages of help." In her previous *That's Not What I Meant!* Tannen dwelt on various conversational styles, based on different geographic, ethnic or class background. The impact of these discontinuities on everyday life seemed minor, since we are not necessarily pairing for life with people who are so different from ourselves, but in one of that book's chapters -- ten in all --the author had focused on male-female different styles, and this topic fascinated the readership: "Everyone wanted to know more about gender and conversational style." Hence this second quiverful of insights into the mysteries of gender.

The author, Professor of Linguistics at Georgetown University, theorizes that women may make better teachers; intent on establishing connections, they try to make the knowledge gap between pupil and teacher less obvious. Men, instead, cannot resist having the upper hand and are often deliberately involved and obscure when teaching, just to preserve their *ex cathedra* advantage (Socrates notwithstanding). Many of Tannen's darts, though, hit a bullseye. "Would you like to stop for a drink?" asks thirsty wife. "No,"says husband, who keeps on driving. Although miffed at each other,they show "different but equally valid styles." She: "I showed concern for my husband's wishes but he didn't even consider that I might be thirsty." "If she wanted a drink," thinks the husband,"why didn't she just say so?" In reality, the woman was starting a negotiation about what both would like, says Tannen, and it was another case of doublespeak.

Men see the world as a hierarchical social order, while women look at it as a network of connections, where hierarchies are "more of friendship than of power and accomplishment." (The fact that women are often fiercely competitive with each other, especially in the business world, seems beyond the scope of this book.)

The chapter on "Different Words, Different Worlds" is about gender differences in the way we talk; researchers have noted them in children as young as three. Where boys say "Gimme that" and "Get outta here," girls say "Let's do this." In a day care center, girls preserve harmony by "compromise and evasion," while boys appeal to rules and pummel each other -- a type of cross-cultural communication which persists at the adult stage. Learning about style differences won't make them go away, but awareness "can banish mutual mystification and blame," especially when men and women talk at cross-purposes, which is the subject of the chapter on "Asymmetries." Again, when information is being asked for and given, two different and simultaneous metamessages are involved, and men focus on one, women on the other. "The fact that you have the information, and the person you are speaking to doesn't, sends a metamessage of superiority, but when you offer information the information itself is the message." Point is, Sybil believes that the person who doesn't know the answer to a question will say so, but for Harold the admission "I don't know" is humiliating. Get it? They do in Japan, where people at official dinner parties throw at the guest of honor questions they are sure he can answer with authority. Being in the know is essential for the masculine mind.

An "American icon" features the silent man and the talkative woman but studies show that when men and women talk equally in a group, people believe that women talk more. Men hear women talk in situations when they would remain silent: on the phone, or chatting with friends, or at home indulging in what Tannen cleverly calls "rapport talk" in the chapter entitled "Put That Paper Down and Talk to Me!" Even women lecturers and keynoters refer to personal experiences, while men tend to make categorical statements about right and wrong and do better at public speaking, which the author dubs "report talk." At meetings, men do not mean to prevent women from speaking but "being admitted to a dance does not ensure the participation of someone who has learned to dance at a different rhythms."

Female "rapport-talk," discussed at length in the "Gossip" chapter is a bonding exercise especially when talking troubles, while many men do not discuss their problems with anyone; as a result, they mistake the woman's "ritual lament" for a request for advice. Immersed in symmetrical connections with the group, girls feel it is crucial that they be liked by their peers, while boys (and men) seek only respect from their peers. Women and men find themselves in "asymmetrical" alignment. In "I'll Explain It to You" the author remarks that "there are so many situations in which men have factual information requiring lengthy explanations to impart to women, and so few in which women have comparable information to impart to men." (But men lecture one another too, don't they? Tannen cites de Tocqueville: "An American...speaks to you as if he was addressing a meeting," but in the end she characterizes conversation with a man as "First Me, Then Me.") Many of the examples and case histories cited in "Community and Contest," "Who's Interrupting?" and other chapters are taken from novels, short stories and interviews written mostly by women. A sequel of common if reality-based complaints is found in later chapters; vigorous class discussion is taken as a sign of incompetence if the professor is female; women are reluctant to show how successful they are for fear of being disliked and referred to as "dragon lady". Women make comments at conferences and meetings which are ignored, but when a man contributes the same thoughts later on they are "picked up, approved or discussed, and attributed to him rather than to her." Tannen suggests that the woman's diffident manner, her subdued voice and the almost subliminal "Have you considered..." lead others to ignore her contribution. (Women's voices being ignored at business meetings is an endemic phenomenon to which men are increasingly sensitized; many will speak up: "Excuse me, George, but this solution was suggested by Mary a short time ago, I agree with you that it has merit...")

Tannen goes on and on through "Damned If You Do," "Look at Me When I'm Talking to You," and a passel of cookbook tips in "Living with Asymmetry: Opening Lines of Communication." We are scared into believing that the misunderstanding between the sexes can degenerate (is degenerating?) into "complementary schismogenesis" or a mutually aggravating spiral of responses, each promoting a fancier form of divergent behavior.

"Gender is a category that will not go away," of course. The source of the great frustration and puzzlement which mark the difference between the sexes is the difference itself: "We feel we know how the world is, and we look to others to reinforce that conviction. When we see others acting as if the world were an entirely different place from the one we inhabit, we are shaken." Had it been co-authored by a man/woman team, *You Just Don't Understand* might have presented a more balanced view from both worlds, but we are indebted to Dr. Tannen for dishing out a basically feminist message with grace and style. Not since *Men: An Owner's Manual* has the subject been approached with such a knowledgeable yet endearing touch.

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

Revolutionizing Product Development, by Steven C. Wheelwright and Kim B. Clark. New York, MacMillan, 1992.

This is Wheelwright at his driest, to be enjoyed by those with product fire in their bellies. Many years of research, through the '70s and early '80s, led the authors to a series of principles which represent "quantum leaps in speed, efficiency and quality," as witnessed by happy practitioners of the fast cycle in the U.S., Europe, and Japan. Reams have been written about the management of R&D, too little on the integration of marketing, manufacturing, and engineering under the benevolent eye of enlightened senior executives. Part of this story appeared in the 1988 best seller *Dynamic Manufacturing*. This sequel shows what the authors have wrought in the last seven years: they have tried to fill the gap, teaching the gospel of development performance in Harvard's halls of ivy and in the real world. (Prof. Wheelwright reveals his mastery of process by having successfully moved a family with seven children from Palo Alto, California to Belmont, Massachusetts.)

Product and process development are driven principally by three forces: intense international competition, fragmented and demanding markets, diverse and rapidly changing technologies. These require fast response, and a product which is distinctive and "not only satisfies but also surprises and delights a customer." To create a new product or process, a complex set of activities come into play which cut across most functions in the typical corporation, as shown in many familiar charts.

Wheelwright-Clark show one which limps through four phases. It assumes -- horror -- a thirty-six month cycle, from Concept Development to Product Planning and Product/Process Engineering, ending with Pilot Production/RampUp. Complexity and uncertainty are the order of the day, and lead to a well-documented example of "schedule slippage" ascribed to a hapless Northern Electronics. A nimbler if equally fictitious

competitor, Southern Electronics, captures the market with new products in only twelve months, thanks to familiar panaceas recommended by the fast-cycle "design it right the first time" school, like testing and validating product and process designs before hard tooling or commercial production. A twelve month cycle allows Southern to begin developing the product closer to market introduction date, and to launch it well in advance of competitors; then Southern can choose between claiming premium prices or market share. The general principle is that "speed in development is rooted in the ability to solve problems quickly, and to integrate insight and understanding from engineering with critical pieces of knowledge in manufacturing." Cited among the practitioners of this craft are disk-drive manufacturer Quantum, and also Philips, Applied Materials and Matsushita.

The Northern-Southern Electronics simulated contest sets the pace in Chapter One. Chapters 2 through 5 outline development strategy, the use of mapping to chart the course, the "aggregate project plan" where the multiple project portfolio is situated, and where both process and product constitute the development effort, since "choosing the mix of projects establishes how the firm will allocate resources at any point in time. But the aggregate project plan sets out how the portfolio of projects will evolve over time..." (The authors do not allow for flukes, revolutions, divine intervention, or the likes of Hurricane Andrew.) In "Structuring the Development Funnel," the authors sketch a diagram reminiscent of John Seely Brown's "skewer," which starts from a Product/Process Idea Generation and Concept Development (Phase 1, funnel's mouth), goes to an intermediate Detailing of Proposed Project Bounds and Required Knowledge (phase 2) and to Rapid, Focused Development Projects of Multiple Types (phase 3, narrow end of funnel) which ends in an arrow inscribed "Ship." The funnel's mouth is set as wide as possible, to be narrowed at Screen 1, which represents a go/no go *evaluation* point; senior management controls go/no go *decision*

point at Screen 2. "Management commits itself to fund the entire development effort or stops the potential project..." The buck still ends up there.

Chapters 6 through 10 are more applied, and make use of case histories and examples of products and processes, including the Kodak Stretch Camera, Ford Taurus, Lockheed Skunkworks, GE's Tollgate and Motorola's Cross-Functional Teams. First the framework for development is defined by its phases, with guidelines for measuring performance and for decision-making; then the area of cross functional integration is emphasized, since integrated problem solving is a fundamental tenet of the fast-cycle school. The organizational structure which fosters product development through leadership is described in Chapter 8, which dwells on the role of the corporate sponsor and "the challenges and the advantages of building capabilities for several approaches to development," as Chaparral Steel demonstrated. The "Project Manager Profile" and the "HeavyWeight Team Contract Book" (Executive Summary, Business Plan and Purposes, Development Plan, Product Design Plan, etc.) are handy tools for managers in a quandary.

Chapters 9 and 10, on Tools and Methods and Prototype Test Cycles are definitely cookbook, while chapter 11 examines the problems and rewards of "learning from individual development experiences," and concludes that "learning from development projects is one of the most difficult things an organization can do. It requires focused effort and attention, and the willingness to make hard choices." An exhibit of sample questions on the Project Audit (e.g. What was the motivation for the project? What conflicts arose?) is stimulating, and leads to a final chapter on the capability of developing new products and processes rapidly and efficiently, which is a powerful source of competitive advantage. To achieve long-term success, though, the firm must be good at development now, and getting better all the time. Four prevailing development approaches all have opportunities, risks, and a preferred context for nurturing success. They are: 1. Creating a development strategy; 2. Introducing substantial change to the company-wide development process; 3. Establishing building block tools and skills; 4. Pursuing a demonstration project -- which is rather idiosyncratic, because the rest of the company still may not have a clue.

Fast-cycle practitioners and apprentices might feel intimidated by the Professors' prose, which is lofty and often soporific. They could, however, restrict themselves to viewing the book's charts or "exhibits," which are profuse, and self-explanatory, since the authors' compact reasoning becomes clearer through visual representation on the page. This is not intended to discourage potential readers, who would like to update themselves on a hot topic and master the related doublespeak. Where else could you find, between two covers, ripe pickings of "downstream-friendly solutions," the "seek-relief" leadership mode, "functional hat accountabilities," and the "pizza bin" development approach?

by Giuliana A. Lavendel

★ ★ ★ ★ ★ ★ ★★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

MONDAY TELLER is a publication of the PARC Information Center.

"Accidental Empires," by Robert X. Cringely. Reading, Ma, Addison-Wesley, 1992.

A grab bag of quips, quotables, and quid-pro-quos, this book, ostensibly on the greats and near greats of Silicon Valley, belongs in the tradition of gossip and innuendo sanctified by journalists like Walter Winchell, Louella Parsons, and Suetonius. The author of the "Notes from the Field" column in the weekly InfoWorld --published by Bob Metcalfe of Ethernet, PARC, and 3Com fame, godfathered by the legendary Pat McGovern -- is a mystery figure; according to some, actually three people, all of them with a poison pen or pen computer in their breast pockets. "Empires," however, was officially written by a failed programmer who came to California in 1977, and is the reputed father confessor of naive Valley professionals, since "companies lie, bosses lie, but engineers are generally incapable of lying." Smart companies keep their techies protected from the media, but simple-minded engineers have been known to whisper company secrets to Cringely's soothing telephone.

"Chronicling the maturing of this industry, from Xerox PARC to the last days of IBM," as the jacket reads, Cringely details "how the boys of Silicon Valley make their millions, battle foreign competition, and still can't get a date." It is not clear to whom the last dart refers, since even Steve Jobs got married recently and settled in a "cottage ornè" in Palo Alto. Bill Gates, the chief victim designate of the author's tongue, operates far from Silicon Valley, and suffers no dearth of female admirers, in spite of hairstyle deficiencies and his legendary stinginess; Cringely finds a parallel between him and that other ill-tempered revolutionist, Henry Ford. Silicon Valley is just one of the locations involved, since many pages are dedicated to companies like Microsoft, Compaq, Dell and, of course, IBM, whose main footprint is located elsewhere.

Some shrewd observations in "Accidental Empires" mingle with the anecdotal and the paradoxical. Shopping is America's favorite entertainment, and it could not have happened without personal computers, which both created the longest continuous peacetime economic expansion in American history and ended it, all accidentally and by intervention of amateurs (the Silicon Valley tribe). The personal computer business was started to satisfy the needs of disenfranchised nerds, who embark in such exploits to impress each other. Adolescent energy is the source of the constant change which affects or afflicts the PC business -- and "the Japanese can't take over because they are too grown up," but at the very best companies, "suits and nerds see themselves as part of a greater us." In fact, companies like Lotus and Ashton-Tate almost went under when they lost their chief architects, but Novell and Microsoft were smart enough to retain their technical leaders. Since the time when Metaphor sought to put PARC software on a mainframe using a Lotus operating system -- nothing came of it -- IBM has had a lot of fantasies and "whacko joint ventures" with different potential software partners, just to keep abreast of the industry. "Think of dogs sniffing each other," comments Cringely, no respecter of institutions or persons.

And war stories, an avalanche of them. How multimillionaire Bob Metcalfe put his name on two MIT professorships but cannot complete the crossword puzzle in the N. Y. Times. How metaprogrammer Charles Simonyi in his prime could remember 200 pieces of data, and simultaneously think of 30 distant data points, much above the range of Miller's short-term memory curve (on the average, people can remember a sequence of seven digits for a few minutes). How 3Com almost went under when erratic genius Ron Crane chose to investigate the sound conductivity of his ceiling rather than design an Ethernet card. How Shockley's "traitorous eight" started Fairchild Semiconductor, the archetype of Silicon Valley startups, from which

approximately fifty silicon-based companies were spawned; other great technological centers benefited, including Hewlett-Packard and, of course, PARC, the other archetype of computer invention. How Intel was started because Fairchild's East Coast moneybags could not accept Noyce's idea that stock options should be extended to all employees -- much of today's "empowerment" strategies are derived from Noyce's acumen.

Until Lowe came along, Big Blue could not fathom the idea of doing real work with a microcomputer; at IBM, synapses pop only occasionally. After Intel begat the microprocessor, Gates and Allen created MITS BASIC and the whole panoply of programming languages. Operating systems were done in a laid-back way at Digital Research on the scenic Monterey coast; when IBM emissaries came in search of an operating system for the PC, Digital's CEO had forgotten about the appointment and was flying over the Santa Cruz mountains in his private plane, so the IBM suits hopped on a flight to Seattle, and went to Microsoft instead. The rest is history, according to one half of Silicon Valley; the other half maintains this story is apocryphal.

Digital is still there, with Gem, which is now called Ventura by Xerox customers. So are Adobe, Aldus, Apple, Chips & Technologies, NeXT, Sun Microsystems, the whole alphabet of the incestuous computer industry where nearly everything, both inside and outside the box, is derived from earlier work. This is why the squabbles about "look and feel" are piffle, and most of it was invented at PARC anyway. Cringely loves PARC's "bearing on the culture of the personal computer" as much as he loathes Microsoft's influence, and has conflicting feelings about the Alto dilemma. "Why didn't they (Xerox) sell the stuff?...Good question." But the Alto would have had to sell at approximately $25K to make money; it was way too expensive, not a personal computer. "When personal computers finally did come along a couple of years later (sic), the price point that worked was around $3000." This book is about faith: "in a way, we are replacing God with Bill Gates," writes Cringely, sounding like a militant atheist and mumbling anti-trust curses. (When Microsoft's Bill Gates travels around the world he preaches a new religion called Information at Your Fingertips, "but Information at Your Fingertips was invented at Xerox PARC in 1973!")

To any old PARC hand, this book appears populated by friends, enemies and acquaintances -- sort of a Dante's Inferno to a fourteenth century Florentine. It presents a world of technical visionaries suffering from "such blinding insights that it's probably not safe for them to drive by themselves on the freeway;" all those popping synapses, no doubt. Fortunately, Cringely gives its due to basic research, which is pursued only by a few companies which can afford to do it and "cannot afford not to." They dominate their markets, and the one percent of sales dedicated to pioneering research is cheap insurance, "since failing to do basic research guarantees that the next major advance will be owned by somebody else."

There is not much rhyme or reason to this book, except that it makes pleasurable reading by appealing to the lower instincts of the individual, in particular the Silicon Valley dweller, who enjoys snooping into the lives of more successful neighbors. Since the subject is high-tech, we are a notch above "People" magazine; there is a lot of slick knowledge in how the narrative, whether fact or fiction, is put together. As for the the disarming disclaimer: "...any errors in the text are mine. I'm sure you'll find them," we did, but truth is less colorful than the yarns woven by Cringely who, not being a historian, "can get away with printing only the juicy parts."

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

The Challenge of Business Integration, edited by Barbara McNurlin. Andersen Consulting, 1991.

The electronic backbone -- or knowledge network -- is recommended for organizations inclined "to solve problems more effectively by tapping their own resources." Along with the backbone, business will have a corporate memory for storing experience and ideas in a permanent and usable fashion, an electronic clearinghouse, and company-wide workgroup support "to share product development tasks and easily disseminate their results... Knowledge must move quickly and powerfully through the integrated organization" states this fourth issue of *Trends in Information Technology* by the Arthur Andersen think tank. Granted, this is no scorched-earth statement. The Olympic motto "faster, higher, stronger" fits our present expectations for time-compressed delivery of goods and services.

Shades of Heraclitus! We won't be able to hold on to anything because change, technological, social, strategic, global or glocal will engulf us. While only three years ago Andersen pundits saw the business world gravitate towards Telecommunications, Artificial Intelligence, Computer-Aided Systems Engineering, and CIM (Computer-Integrated Manufacturing), now the focus is on "how technology should be integrated with the other components of a business -- its strategy, its people, and its operation." Conscious of the AI winter and the hibernation of CIM, AA picks five technologies/methodologies to shape the 1990s world of business: Multimedia and Human-Computer Interfaces, Cooperative Processing, Telecommunications and Interorganizational Networks, Object Oriented Systems, and CASE. And, by the way, forget the ivory tower: technology spells business advantage only if used right in the marketplace.

"Leadership examples" are chosen among AA's customers, most of them new faces in the productivity game, with names like the Paris Bourse, Brooklyn Union Gas, and Lubrizol, a specialty chemical company in Cleveland which can produce an accurate MSDS (Material Safety Data Sheet) in 24 hours, thanks to a combination of relational database and knowledge-based systems. Apparently, even the Lubrizol chemists are elated: no more razor's edge decisions, no more written reports. United Stationers, the largest U.S. wholesaler in its field, has re-engineered its spasmodic loading and unloading of materials with a distribution software package. As for *kanban* -- a Japanese auto maker aims to turn inventory 100 times a year -- AA has a fitting example: an anonymous "large American equipment manufacturer" trains line workers to switch to a different engine assembly "just in time" by displaying the appropriate sequence of instructions in digital multimedia. Northwest Airlines merges with Republic and doubles its business overnight, helped by an imaging system which scans 17 coupons per second. In Singapore, Electronic Data Interchange (EDI) TradeNet handles all trade and customs declarations in the country, so that companies no longer need to warehouse their goods while waiting for the red tape to unravel. HL7, a U.S. cooperative of 400 hospitals sharing patient data, is thus named because its standard is used at the 7th level of OSI; it is likely to become international because Europe is eyeing it.

International alliances are in. Amadeus, a consortium of Air France, Iberia, Lufthansa, and SAS, will use distributed processing to allow travellers the use of smart cards -- this is considered "global transformational leader" stuff. "On-demand production, electronic self-design, and interorganizational networking" will, for instance, cause a French-speaking agent in South Belgium to print tickets for a northern destination in Dutch. Change is encouraged, and management gets involved: these are the virtues Brooklyn Union Gas sought when revitalizing its obsolete customer information system, stiffened by 20 years of patchup maintenance.

Woven through these case histories, apparently pell-mell, are maxims, factoids, and prophecies couched in the think tank's ponderous style. Electronic documents are nice because they can be stored efficiently and allow simultaneous online access to multiple users. Image processing is becoming part of mainline applications because it complements rather than replaces these systems and leads to a "less paper business environment." (Industry spends well over $100 billion a year on paper for photocopies, forms, and reports.) Cooperative processing is a compromise between mainframe systems and the micro, which handles everything for a single user on a dedicated machine. Of course, "the client-server architecture provides the best of those worlds," and that technology is transparent to the user. Voice devices already permit commodity traders at some exchanges to record trade information with a throat microphone connected to a computer screen.

When hardware prices dipped a few years ago, and software prices rose, it became more cost effective to run those expensive packages on fewer machines, and companies started consolidating their data centers; now cooperative processing prompts companies "to distribute machines." Metropolitan Area Networks (MANs), half way between LANs and WANs, provide city-wide links of 100MB per second, capable of handling all sorts of data. Modular object-oriented systems keep the "what to do" and the "how to do it" separate, simulating "the working of the business itself" and making the dream of code reusability real.

AA sheds a tear, in spite of the current layoff climate, over a lost mother lode of human resources, down by half a million per year since 1981. For some time there will be fewer 16-to 24 year old entrants into the U.S. workforce,which is now divided into "physical production, physical service, management/administration, and technical/professional." By 2005, half of U.S. workers will belong to the last category, and they'd better be smart: in the 17th century the average person was exposed to less information in a lifetime that can be found in today's issue of the Wall Street Journal.

This, again, is a no brainer, since we are all aware that "...the success story of this decade will be written by those who learn to manage the information deluge."

by Giuliana A. Lavendel

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Monday Teller

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PARC INFORMATION CENTER

Empowered Teams, by Richard S. Wellins, William C. Byham, Jeanne M. Wilson. San Francisco, Jossey-Bass, 1991.

"Empowered individuals know that their jobs belong to them," so when the personal empowerment curve begins to flatten after a while, that's where team religion comes in. Tom Peters called teams "an exercise in purposeful chaos" Our authors consider teams the productivity breakthrough of the '90s, and no wonder. They are DDI (Development Dimensions International), the Pittsburgh consulting group responsible for *Zap, the Lightning of Empowerment.* Differing in knowledge and personality traits (and gender), the authors have merged their styles to write this book in team unity; psychologists all, they appear on the dust jacket in their shirtsleeves, but theirs is a starched-collar, prescriptive manual. Intended as a cookbook and obviously put together as course material, this second effort consists of four sections and an epilogue with the ritual "what next?" leading perhaps to a third volume.

We wade through a preface, acknowledgements to partners from Texas Instruments to Sara Lee, authors' bios and a prologue which someone might be tempted to substitute for the whole. It would be a mistake: this well ordered piece of work contains forms, Q&As, team minutes, tables and presentation material to gladden the heart of any management trainer intent on "creating self-directed work groups that improve quality, productivity, and participation." Training, incidentally, is a major portion of DDI's thrust: "A lack of effective training is the number one barrier to successful team implementation." We encounter here another contemporary paradigm, the "learning organization;" Subaru-Isuzu is recognized for helping workers through learning stress with a special course on "Learning to Learn."

"A self-directed work team is an intact group of employees who are responsible for a whole work process or service ... work together on an ongoing day-to-day basis...not brought together for a special purpose such as a product launch team, a quality action team, or a quality circle." (Quality also is BIG in this book, as the no. 1 reason why anyone would want to move towards empowered teams.) American society is oriented towards individual performance: "All through life we celebrate the individual." Fred Taylor's assembly line was well suited to poorly educated, migrant workers, many of whom did not speak English. Now, pioneers like Volvo, Procter & Gamble, the famous Gaines dog food plant in Topeka, Kansas, and the Baldridge winners, Xerox included, are the stuff shining examples are made of. (The list, alas, includes some less successful disciples, such as the currently troubled Westinghouse Furniture Systems.) Innovation, information sharing, employee involvement and task/job significance are the area in which self directed team member scores high.

Based on a survey of more than 500 firms using self-directed teams, and with in-depth research in 28 organizations, DDI presents a 3-part coursework: How Teams Work, Preparing for Teams, Building Strong Teams. Managers are rather unpopular : 95 percent of the surveyed who operated their teams with fewer managers found the change to be beneficial. A look at a daily page from the diary of a group leader (manager? NOT!) reveals a series of meetings and functions which are managerial in nature, even if roles are described as "coaching, facilitating, filling in, providing feedback." A whole chapter is dedicated to the manager's new role, and the various modes in which leadership from above can be disguised, including the title of "unleader." There are many meetings, which can generate skepticism in line managers, but "on the whole, meetings help productivity rather than hinder it." Eliminating the manager often means adding people to the team or the organization just because there is more to do; average size of the team is from six (a cheese processor plant) to twelve or fourteen (GE's aircraft engine plant).

Multiskilling and job rotation are viewed very positively, and the authors, in their enthusiasm, enjoy the sight of a skilled horticulturist washing windows at the San Diego Zoo, one of the surveyed 500.

Administrative support will offer enhanced service and training to teams, assign administrators to them, or integrate support functions into the teams themselves: if each team has a maintenance person, the maintenance organization ceases to exist at IBM and Pfizer. Members of self-directed teams serve on company-wide policy and process teams; we do not know whether this is considered a career leg up, and what it takes for the original team to select one of its members for this distinction.

Skill--based pay is closely tied to multiskilling - but should every team member be capable of performing every task? Some organizations have shifted to pay for performance because skills acquired for compensation's sake decay, if not practiced. "What are the basic dimensions required by team members?" postulate the authors. They mean what qualities the members should possess, because the "dimensions" are ability to learn (Applied Learning), analysis (problem identification), job fit, tolerance for stress, work standards and others, all relevant because of "quality/productivity/team issues" and other incantations dear to the hearts of management theoreticians. Smaller facilities seem more conducive to team-oriented cultures; the trend is towards smaller manufacturing units. "For example Bill Gore, inventor of Gore-Tex, keeps all his facilities staffed with fewer than 250 people." Large compounds develop factories within factories or "manufacturing cells;" we are perhaps becoming less sensitive to the concept of workers working in self-contained "cells," as per Soviet mystique.

Design and implementation of teams follow, with special concern for the role of senior management and former management: the strategic change model is an inverted pyramid which ends up with "Responsible, Informed Decision Making at the Team Level." Values must be developed, four to six are a "manageable number," enough to fit a mission statement. Team readiness is assessed by means of a four-page questionnaire, and it may mean readiness to jettison corporate middle class structure in favor of steering committees and "design teams," which may, regrettably, join the local union in pursuit of WIIFMs (What's In It For Me?). DDI has made a science of these complex relationships, creating tongue twisters like multifunctionalism and Support Congruence.

Three levels only are recognized: upper management, team leaders (or "cell supervisors") and team members. Group leaders are liaison between the top two levels. How one progresses from team to group leader and even to upper management remains a mystery, in DDI's non-competitive environment.

Pilot areas, phased-in conversion and total immersion where all systems change at once are the three options for "rolling out the design." Job analysis is an essential tool, and so are advertising and recruitment, for which DDI offers step-by-step guidelines. It won't do to select only the applicants who score in the top one percent of a cognitive ability test if you are hiring production team members, since a workforce that can "think" may not be motivated to work in a manufacturing environment.

Teams *get started*, then *go in circles*, get *back on course*, and *rush* full steam ahead. "Commitment, trust, purpose, communication, involvement and process orientation" relate to these phases, and could ensure a smoother ride. One senior manager in an automotive plastics plant: "The worst thing you can do is call me in to visit if things aren't going right. I may not be able to keep myself from telling everyone what to do differently." Success speaks in places like the new Saturn plant in Tennessee, where the labor agreement calls for consensus on decisions which affect team members, like the selection of a new advertising agency. This is empowerment at its best, and it works well in a manufacturing environment. White collar teams are another matter, and they may be *going in circles* for a long time. How do you measure productivity of service organizations? How do you deploy multiskilling and crosstraining, pay-for-skills, shadowing, job rotation, etc.? "It would not be feasible to cross-train *everyone* to be lawyers, accountants, or marketing specialists," owns DDI. "Nevertheless, while white collar teams might take on a different appearance... their growth is imminent." The Pittsburgh team must be nursing a third empowerment cookbook *in pectore*.

by Giuliana A. Lavendel

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Monday Teller

Who's Bashing Whom? Trade Conflict in High Technology Industries, by Laura D'Andrea Tyson. Washington, D.C., Institute for International Economics, 1992.

The press calls her "a trade hawk", but she refers to herself as a "cautious activist;" others see in her "a superbly trained neoclassical economist." A few days ago Laura D'Andrea Tyson -- Professor of Economics and Business Administration, Director of the Institute of International Studies and Roundtable on the International Economy at UC Berkeley -- was chosen by Clinton to head his Council of Economic Advisors. Perhaps the President-elect has turned his back to the mainstream of the profession, where macroeconomists feast on arcane forces and forecasts. If so, he has chosen a pragmatic and experienced advisor to august bodies like the Senate Banking Committee. The first wife and mother to be chosen as White House chief economist concentrates on how it works, rather than what the models say: "Unlike most free traders, unilateral and moderate alike, I believe that what we as a nation make and what we trade matters." We should not delude ourselves: market forces alone will not preserve our technological preeminence or our paychecks.

The original title of this book, published by a Washington think tank, was "Managed or Mismanaged Trade." (The shift to the current sexier title does not promise a lighter tone, but implies that there is reciprocal bashing going on all over.) An impeccably researched analysis of timely economic issues, where even the index shows a measure of the work's quality, it reads well thanks to the incisive elegance of the author's style -- e.g., about the Airbus: "By the end of the 1980s Europe had realized its goal, and the United States had lost its patience." We learn at the start that international trade policy comes in four flavors: free, fair, managed, and strategic. Whether government should intervene or not depends on the costs and benefits, which are "devilishly

difficult to measure," but still try we must, even if our government's effectiveness to intervene on behalf of worthwhile enterprise is in doubt, pork barrel and all. A "defensive" trade policy seems safer, because sometimes the costs of inaction are unacceptably high. Generous R&D tax credits, funding of education and promotion of high-tech producers make sense, and so does the support of particular technologies, when circumstances warrant it; Tyson fires away proposals, based on her case studies of trade conflict among the U.S., Europe and Japan. A historical overview of the competitive positions of the three can be found in Chapter 2, warning that the U.S. is getting weaker, and that it matters. There are four tightly packed chapters (3-6) with case histories of still festering trade conflicts, objectives and actions of the trading partners, and consequences, always with a "policy lesson" from Prof. Tyson. The recommendations in the final Chapter 7 are clear and sensible -- just what a President-elect would like.

High tech goods accounted for 30% of American, 20% of European, and 35 % of Japanese manufacturing output in 1990, but in the 1980-1990 decade the U.S. share declined by 11% and Europe's by 17%, while Japan increased its own share by 59%, at the same time more than doubling its exports and sporting the smallest import increase of all. The erosion of the American and European position is especially pronounced in electronics and high-tech, sources of a significant share (41% in 1988) of U.S. manufactured exports. While some of these statistics are born of the inevitable, Tyson considers "the loss of American technological leadership to be a justifiable policy concern," and chastises those who "dismiss this anxiety as the petulant whimpering of a diminished economic giant." R&D is a fountainhead of benefits, with spillovers of all kinds exceeding the parent firm's returns; Tyson must be grieving over IBM's announced cut of 1 billion in research dollars. High tech industries have economic impact because of their R&D

contributions and for the high skill, high wage opportunities they offer. A strong presence in a particular field fosters the generation and diffusion of knowledge via information networks: buying a product does not have the same effect, because technical knowledge is a hands-on affair. The nation willing to sacrifice a high-tech industry in reality sacrifices much more. As for foreign investment, the U.S. should mimic the European strategy of creeping local content, even if local customers are hit by higher prices; when the investor is a foreign government, however, it is a case of seller beware. For product certification, Japan relies on design rather than performance, so that foreign products may be barred even if they perform better. Japanese design standards are often drafted by industry-government committees from which foreign competitors are traditionally excluded.

These and other conclusions pepper the riveting histories on which the author rests her case. The MOSS (market-oriented sector specific) talks directed at protecting U.S. industry in electronics, pharmaceuticals and medical equipment, and telecommunications were only somewhat successful. The distinction between industry and government bureaucracy is largely meaningless in Japan; in Japan, besides, private industry guards its research results while in the U.S., where much of basic research is government-supported, such results are openly available. This prompted stopgap measures -- like establishing Sematech, a notable success. In the cases of Motorola and Japan's cellular telephone market, followed by the odyssey of Cray and U.S. supercomputer manufacturers, Tyson points to the "informal cartellization of the procurement process in Japan" and the bona fide structural impediments to entering that market. "Trade policy is not an adequate substitute for a defensive industrial policy," she reasons, opting for trade subsidies within the framework of industry-specific talks rather than economy-wide ones.

The piece de resistance here is a tightly written analysis of the semiconductor industry struggle in view of the U.S.-Japan SCTA (Semiconductor Trade Agreement); it could stand by itself as a monograph, but so could Tyson's chapters on the Commercial Aircraft Industry and the one on "Europe's Evolving Strategy in the Electronics Industry." Europe is becoming a fortress against import and a magnet for direct investments, as distinguished from the "disguised dumping" of Japanese "screwdriver" operations on foreign soil. We learn that Japanese rather than American producers were targeted by the European in the cases of the VCR (originally developed by Ampex in

Redwood City, California, in the early 1950s) -- and HDTV, where the jury is still out, but American prospects look good. Tyson approves of the 1988 FCC's ruling on compatibility, which effectively ruled out both the Japanese Muse and the European MAC.

In sum, industry policy yes, but only if it encourages competition and trade. VRAs (Voluntary Restraint Agreements) do not work, but targeted subsidies do, and should have been employed in the display industry disaster, which revealed "the absence of strategic vision in U.S. policy towards high-tech competition." U.S. trade policy "should be criticized for insufficient pressure rather than excessive aggression;" retaliation threats should have teeth. Are you listening, Bill, Al?

by Giuliana A. Lavendel

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Intelligent Enterprise, by James Brian Quinn. New York, Macmillan, 1992.

As Will Rogers used to say, "Even if you are on the right track you'll get run over if you just sit there." Today's management experts are of the same opinion, but differ on the engine which should get the U.S. economy moving. Author Quinn (Management Professor at Dartmouth's Amos Tuck, consultant to Fortune 500, member of boards, Federal advisories and academies) knows how to make it happen, but warns that the more efficient, competitive and flexible intelligent enterprise is still in the future. The ritual Tom Peters foreword is even more florid than usual here ("Oddball corporations are defining traditional corporations right out of business"), but Quinn is in his best *Harvard Business Review* manner, announcing that "...service technologies and human intellect have emerged as the prime determinants of business and national economic success." The U.S. is well ahead of Europe, and Japan doesn't even rate, in most cases, so here, clearly, lies our competitive advantage, since up to 75 percent of manufacturing costs are attributable to service activities.

Prof. Quinn handily manipulates figures and graphs, courtesy of the Bureau of Economic Statistics, the U.S. Department of Labor, and a bevy of experts and press organs. His own charts, however, scattered here and there to score points, are discursive, crowded and, from a visual point of view, ineffectual. Most of his "vignettes," or supporting case histories, instead, are done to a turn, especially if they belong to Quinn's field of expertise -- the likes of Nike, Apple, Sony, General Mills, Intel. A masterful albeit succinct description of the relationships that existed between Bell Labs and AT&T, Western Electric, and the Bell System complex affords a fascinating view of the relevance and contributions of R&D to the organization at large.

"Products are only physical embodiments for the service they deliver:" a car, for instance, delivers transportation and personal image. A misconception persists that services can only be small scale, and produce only a modicum of wealth, but Quinn substantiates that service sector growth can be sustained just as long as industrial growth proper, for long stretches. McKesson, Toys'R'Us, McDonalds are all service industries with worldwide presence: when McDonalds wanted to experiment with a shrimp dish, it dawned on management that there are not enough shrimp in the world for the demands of a chain which feeds twenty-two million people every day.

Employment was always more stable in services than in manufacturing, although this trend changed in 1991 and 1992, perhaps because, in the U.S., service-related jobs now occupy seventy-seven percent of the labor force. Besides, "the new service economy may prove more stable than the industrial economy" because, in a recession, people go easy on new refrigerators and cars, but step up consumption of health services, telephones, banking, insurance, police and fire protection. While the debate about the U.S. manufacturing decline has mesmerized the country, intellectual and service activities now constitute the "core competencies" on which a corporation's "best in the world" rating hinges. These competencies are knowledge-based activities such as R&D, market research and marketing, product design, customer information functions (answer centers?), advertising, distribution. Pharmaceuticals like Glaxo and Merck are highlighted which fight their battles through R&D, patents, rapid chemical clearance through federal bodies, and strong preemptive distribution systems. For these, the technological aspect of manufacturing is trivial.

Intellect and services predominate in Quinn's "value chain," where Apple shines for marketing and software triumphs, having leveraged its management and capital resources: Microsoft, Mentor, Silicon Graphics, rather than IBM or NEC

are the dominant players in today's computer industry. Ernesto and Julio Gallo, the number one wine distributors in the U.S., operate few if any vineyards, but invest in R&D and a strong knowledge base for purchasing, pricing and collecting customer information feedback from distributors.

It is important to benchmark with such "best in class," as Xerox did with L.L. Bean's inventory and customer services. Some value companies outsource everything, like Nike does for sporting goods; *insourcing* an activity where you are not "best in the world", unless for strategic reasons, forces you to give up competitive edge. Quinn is management's Pritikin, to whom a slim waistline encompasses all virtues: you should flatten, divest, outsource, contract, free up to simulate, within the firm, the creative independence of university faculties, "bound mainly by a common library and plumbing system." Firms should focus on the unit with the best cost/benefit, and clone it. Contact or "point" people are the key to customer service, and must be empowered in the intelligent enterprise, which will assume one of several "new conceptual configurations:" infinitely flat as per Desert Storm example, or spider's web, shamrock, or inverted pyramid. Reporting spans of twenty-five people are becoming more common, but the infinitely flat organization will tolerate hundreds of subordinates within a single span of control -- better call it communication or coordination. Spider's web organizations with minimal hierarchy operate best in dispersed firms like Arthur Andersen, which has 2400 partners, and more than 51,000 people in some 243 offices in 54 countries: a variant is the skunkworks spider's web, or cross functional design group. Probably the most promising formation is the shamrock, a disaggregated organization with a small permanent core of highly qualified managers, professionals, and technicians, in Leaf One. Other essential work is outsourced to specialized people and firms in Leaf Two. In Leaf Three are all the part-time and temporary workers, many of them working from their homes via computer; Rank Xerox is a model, with seventy former employees working as contractors to the central office. "Service based disaggregations with strategic focus," which used to be called SBUs, are flat, have core service competencies, rely on intellect, motivation, and knowledge bases. They now assume "starburst," federal," or "cluster " form.

Repetitious and roundabout, erudite and suffocatingly documented, Quinn's five hundred page encyclopedia (almost!) leads to conclude, with Andy Grove, that "only the paranoid survive." In a few years, paradigm shifts may replace the author's organizational architectures, but in the meantime we would be well advised to bone up on *core competencies*, identify *contact points*, *empower* teams, *flatten* the organization, adopt the *shamrock*, fly with *starbursts*, invert the *pyramid*, *outsource* the resources, combine *gestalt* and *measures*, all in the name of service productivity. Products are moving more "toward commoditization...Rewards come from intellect, not brick and mortar." Eminently quotable.

by Giuliana A. Lavendel

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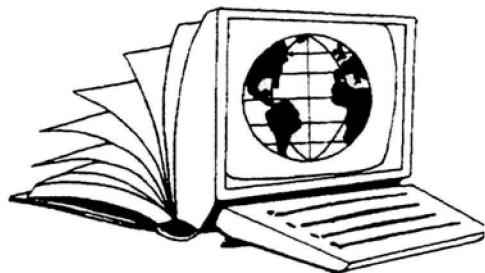
Monday Teller

No. 57   February 1, 1993

PARC INFORMATION CENTER

Inside Windows NT, by Helen Custer. Redmond, Washington, Microsoft Press, 1993.

Writers in the computer trade press speculate endlessly about the upcoming battle to control the computing desktop. The press has been anticipating Microsoft's Windows NT product for many months now; it appears in market share projections as a major contender against Windows, DOS, UNIX and OS/2.

Inside Windows NT (that's how the title appears on the title page, and we'll take it literally) gives us a look at the operating system inside the Windows NT product. Distinguishing the operating system from the product is important. Much of the success or failure of the product will depend on aspects such as packaging, marketing, utilities and applications that are related to, but not properly part of the essential operating system. In fact, they are not covered in this work, which is very much a technical, operating systems book, focused on
the overall structure of the operating system and delving into its various subsystem streams.

Though author Custer cooperated closely with the Windows NT team during the system's development, much as Tracy Kidder worked alongside the Data General Eclipse developers in researching *The Soul of a New Machine, Inside Windows NT* has none of the flavor of Kidder's book. *The Soul of a New Machine* is popular nonfiction; it's subject are the people who built the Eclipse, while Custer's subject is Windows NT itself, not the developers and managers who toiled on it. From time to time we are reminded of the real people behind the

shrink-wrapped packages on store shelves; their names are mentioned, and we are reminded of their great expertise in the area of OS development. e.g. "Mark Lucovsky, a Windows NT developer who has written process structure components for both a UNIX system and an object based operating system, designed and wrote the NT executive's process manager" [p. 83]. Dave Cutler, principal architect of Windows NT, provides an autobiographical foreword that helps explain some of the choices made in the design, and connects them with experiences from building other operating systems.

Following the foreword, the book is organized into a preface, nine chapters, an epilogue, glossary and annotated bibliography. Chapter 1 (The Mission) provides some insight into why Microsoft chose to develop a new operating system, but our sense is that the choice was mostly motivated by a perceived opportunity to gain independence from IBM. Chapter 2 provides a system overview, and chapters 3 through 9 look at individual components in more detail. After chapter 2, the remaining chapters are designed to stand alone, and sometimes seem repetitious when read in conjunction with the others.

The book contains ample introductory material to operating systems concepts. Anyone with a basic programming background could read it and learn a lot about operating systems in general as well as about Windows NT. Moreover, *Inside Windows NT* is deep enough that someone with operating systems experience, having skimmed the introductory

material to garner the vocabulary used in the book, will learn a good deal about Windows NT. There is enough here to pick out important differences between Windows NT and other familiar systems such as UNIX, Mach, DOS and OS/2. This, however, is not a programming reference tool, and there are many questions about the details of the OS interface that will only be answered by going back to the programmers' documentation.

Programmers and others interested in operating system design will find *Inside Windows NT* a useful introduction to the new Microsoft system, but those who want to install and use a Windows NT system or network won't find much that's directly helpful on these pages.

Guest Teller: Carl Hauser
PARC Computer Science Laboratory

MONDAY TELLER is a publication of the PARC Information Center.

Gates: How Microsoft's Mogul Reinvented an Industry and Made Himself the Richest Man in America, by Stephen Manes and Paul Andrews. New York, Doubleday, 1993.

...or how to write a chronicle (not a biography!) which drowns the reader in trivia and becomes a crashing bore. The fact that as a youngster "Trey" Gates was frequently named "Dirty Boy" at the end of Scout outings may be construed as striving in pursuit of excellence, but we scarcely would want to learn such detail even of Napoleon -- although Gates, we hear, is fascinated by the deeds of that "ugly little guy, who wasn't even French." We are informed that Gates' little toe curls in; we are addressed in cutesy jargon like "...In a move that spoke megabytes.."

"Witness the transformation!" repeated *ad nauseam* frames this rather unsatisfactory portrait of one of America's most fascinating personalities. No wonder that the biographee, having obtained a copy of the manuscript (he would!) grilled the culprits on the phone for seven hours without interruption, inspiring a *Wall Street Journal* reviewer to comment on His apparent freedom from the needs of the flesh. Having accumulated reams of detail and gossip during their journalistic routines, Manes (*PC Magazine* and *PC/Computing*) and Andrews (*Seattle Times*) are determined not to let any of it go to waste, and the devil take any attempt at finding out what the Bill Gates phenomenon really means. Perhaps there is more material for meditation in a recent *Wall Street Journal* coverage, where we learn that "Each quarter, Mr. Gates normally sells about a million Microsoft shares from his mammoth personal stake of 81 million shares..." One Microsoft share worth $1 in 1981 would fetch over $1,500 today. Blame the Midas touch?

Bill Gates' first company was a cottage industry job, processing data from boxes counting traffic from a hose stretched across a highway: in those days he indulged in juvenile pranks, like pouring soup down mail slots in his high school building. He is described as chameleonlike, or smarter than honest, "having a whole repertoire of tricks at his disposal, everything from aggression to charm." While the pioneers of the legendary Homebrew Club wrote programs for art's sake, and shared the fruit of their keyboards, Gates and Allen developed their personal computer BASIC for profit, and asked people to pay for it -- although the language was written at Harvard, at least in part with Government funds. "He was a hell of a good programmer," reminisces the director of the Harvard Computer lab.

As a kid, Gates could break into any computer system, and use it for free. When Microsoft was born, he secured 60% of the revenue, while Paul Allen, older, experienced, and degreed, was content with 40%. Again, licensing BASIC for a flat fee on a non exclusive basis was a financial coup, and guaranteed no piracy problems. Blame Lady Luck? The fledgling Micro-soft (sic) almost went under with the Focal language fiasco, but General Electric claimed the right to use M 8080 BASIC for a $50,000 it found bouncing around the bottom line at year end. Windows was announced in 1983, two full years before delivery, and was the very first instance of "vaporware," but Gates' dogged persistence won over time (Borland's dropping of Jazz is given as an example of management vacillation, playing into Gates' hands).

Making money and making deals are a large part of Gates' magic. Little of what he sells is original, e.g. "The GUI concept was invented neither by Bill Gates nor by Microsoft. Windows was a descendant -- some would say "ripoff" of earlier graphical user interfaces, most notably the experimental versions from Xerox's Palo Alto Research Center..." But offering DOS and then Windows on a per-machine deal rather than per copy-basis was creative (apparently, they were sold for a lot of machines that never saw the light of day, because production plans were cut.) Blame perfect timing? Rather than engaging in a technology duel with Mitch Kapor and Philippe

Kahn, Gates instituted a clever business strategy which allowed Microsoft's software products to keep cost at 20 percent of revenue -- and, in the case of MS/DOS for OEM, less than 1 percent. No wonder IBM, which thought proprietary lines, lost the battle against all that openness, in spite of the adventuresome Bill Lowe, and his "wild ducks."

The authors hopefully impart their own, "authentic" version of Silicon Valley legends, like the one about Digital Research's CEO, who did not go joyflying over the Monterey Peninsula when IBM came calling for an operating system. Gary Kildall was flying on business, to visit customers, and had left competent people in the office to handle the IBM deal. What mattered was Kildall's lateness in delivering CP/M 86, not DR's refusal to sign a non-disclosure agreement. Micropro had rebuffed IBM's advances to license Wordstar -- which survived. CP/M did not; it was submerged by a quasi-clone whose first version was named QDOS, Quick and Dirty Operating System. The rest is history.

The details of the contract negotiations between IBM and Microsoft should be of interest to anyone negotiating a partnership or joint venture. "That's run by Bill Gates, Mary Gates' son," commented IBM President Opel, who sat with Mary on United Way's board. The contract terms imposed on Microsoft a brutal schedule which allowed very little time and energy for private life and the pursuit of non-desktop happiness; this has remained the foundation of Microsoft culture to this day. Two weeks before the IBM deal was signed Charles Simonyi, the developer of Bravo for the Alto, had walked in from PARC, "the Valhalla of computerdom, an idea factory spawning the present and future software Hall of Famers." Simonyi and his PARC colleague Scott McGregor would later chart the future of Windows. Upon hearing that VisiCorp's VisiOn was to be shipped, Gates launched a preemptive strike, and Windows was everywhere although it had not even been designed yet. IBM had used the technique twenty years earlier against Control Data, and had found itself in court, accused of selling "paper machines and phantom computers." But Bill Gates squeaks by unabashed: figure out what the competition is going to do and beat them to the punch with an announcement, press conference, news leak, whatever -- as long as the word gets out.

Profiting from others' failures is another way in which the Billmobile has left competitors spinning out in flames (authors' metaphor). There is some insight on the internal culture at Microsoft, and the total burnout it often engenders, e.g. "having your body give out on you," torn between lots of stock and lots of abuse. "A computer on every desktop and in every home, running Microsoft software"

evokes a faint echo of Napoleon, but the Emperor was only talking about a chicken in every Frenchman's pot. Unfortunately, even the dramatic events of the "Look and Feel" legal action brought by Apple's Sculley against Microsoft and Hewlett-Packard drown in details of repartee and FUD (Fear, Uncertainty, and Doubt). This 500 page stream of consciousness leaves you with an unsatisfied itch for an editor's red pencil, and wondering whether the detail stream is as pure as it is claimed to be (who is the "requisite Man From PARC," Digital Research's Lee Lorenzen?)

Manes and Andrews, however, could be held blameless in the midst of this maelstrom; in the words of a close collaborator, Gates is such a complex human being that only one person could solve the enigma - Himself, and, at 37 years old, he has time left to write his autobiography. This tedious analysis of Gates hires and encounters is useful in that it portrays the quintessential successful nerd: the hacking skill, the love affair with money, the manipulative *modus operandi*, even the rocking motion in repose, a trademark of some of the best in the computer world (e.g. Alan Kay, "PARC's philosopher king"), who share this habit with autistic children. Great nerds are complex.

"Reader, those are the facts: influence or compromise are for you to decide," states the author duo; how like Jane Eyre, but alas, no romance.

by Giuliana A. Lavendel

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MONDAY TELLER is a publication of the PARC Information Center.

Computer Wars, by Charles H. Ferguson and Charles R. Morris. New York, Random House, 1993.

Architecture is the thing. Like the brontosaurus moving deeper into the swamps when mammals took over the forest, IBM took refuge in old technology, but markets for big computers, like those swamps, are shrinking. At this moment, IBM's decline is a major and disturbing event. Can you visualize a scenario without "the best company in the world in the world's most important industry?" General Motors slipped for a multiplicity of reasons, but IBM, where R&D was king and produced some of the best technology in the, world, experienced a monumental management fiasco. *Wars'* subtitle carries a promise -- "How the West Can Win in a Post-IBM World" -- and the prescription reads: administer proprietary architecture, control by means of standards, cultivate manufacturing skills, run ahead of continuous change, cannibalize your own progeny.

This is a feisty piece which demands active, participative reading - a lean, professional job born of deep thinking, capable of generating even more thought. It was obviously not constructed, like some current best sellers, by stringing together packets of sundry e-mail messages from whomever it may concern. It is not *really* about Big Blue's prematurely announced demise, although the first six chapters on "The Fall of IBM" describe the behemoth's slow decline. Readers of *Electronic News* or *Computerworld* may find their worst suspicions confirmed here, as in "Bill Lowe was a forceful manager who, by common consensus, had little understanding of technical issues. During the three years he headed the PC division, he was responsible for a series of critical decisions that effectively sank any last hopes IBM had to succeed in the personal computer business." Many of the facts and fancies elegantly scripted in "Coloring the World Blue" are known, such as the debilitating blow dealt to American industry by the '69 U.S. vs IBM lawsuit, however inconclusive; a major consequence of Attorney General Ramsey Clark's stance was that in the '70s and '80s "in the anti-IBM atmosphere prevailing in the government, the United States typically refused to help against a much less principled assault mounted by Japan..."

The "Guerrilla Warfare" chapter (enter Gates) does not shed new light on the fatal flight of Digital Research's Kildare, who, whether joyriding or on a business trip, "blew one of the business opportunities of the century" and offered Microsoft the future on a golden platter. The "hairline cracks that were crisscrossing IBM's edifice in the mid-1980s had nothing to do with technology; "R&D capabilities were still best in class, the authors state in "Roots of Decline," where the F/S fiasco and the birth and subsequent burial of RISC are described. "The Rise of the Clones" is about Boca Raton, the launching of Compaq by three Texas Instruments engineers, and the "psychological watershed" when IBM passed up Intel's 386 in favor of sticking with the 286. Then Gates advances ("Revenge of the Nerds") with his three-phased pattern of software development: first a makeshift version of the product like DOS, which serves as "market research," then a more serious "learning exercise" like OS/2, and finally the bull's eye, as in NT; of course, IBM's Darwinian "management by intimidation" did not have a prayer. "Picking through the Shards," however, the authors remark that for thirty years IBM business "was carried on in the face of official hostility on the part of governments" in the industrial world, notably Japan and the United States. But the Soviet-style *nomenklatura* environment born of corporate politics made dissent impossible, and was at the heart of the decline. Even Jack Kuehler, the sole technologist in IBM's senior management ranks, was phagocytized.

In the second, or prescriptive section of *Wars*, the same analytical and historical treatment is extended to the "Three Contenders:" the big American and, to a lesser extent, European

computer companies; the integrated Japanese vendors like Fujitsu, Toshiba, Hitachi and NEC; and finally California's Silicon Valley group, obviously the authors' pet. To experience the heartbeat of American competitiveness, readers are invited to "drive the forty miles or so along Route 101 between San Jose and San Francisco...California's fabled Silicon Valley. The nervous tension, the sheer intellectual megawattage that radiates from the mile after mile of low-slung buildings, most of them with science-jargon Greek names, is astonishing and exhilarating." Xerox gets some of the IBM treatment: "The work at PARC was mostly ignored by Xerox management, who were financial specialists, salesmen or copying engineers...A full four years after PARC built the Alto, Xerox put its money on a traditional electromechanical typewriter..." whose printhead it announced as "the most important introduction of technology to the office in the last decade by Xerox."

Ferguson and Mitchell start making their pitch under the heading "Competing in Radically Decentralized Systems." We land on the Architectures centerpiece, from which our authors have derived a much praised article appearing in the current issue (March-April 1993) of the *Harvard Business Review*. Directed to the expert and peppered with jargon, it prescribes "internal proprietary control of architecture and critical implementations, externalized commodities and niches." The book, instead, meanders through discursive chapters on "Winning in a Post-IBM World" and "Prospects and Opportunities," with insightful pages on "Managing Intellectual Property" and nuggets like "the American advantage in architectural contests is based on a massive advantage in rapid innovation, conceptualization and flexible design, rather than detailed engineering..." "while "the lack of a deep research base in Japan may be a fundamental handicap." Although architectural franchises are built upon good products, such products, as Lotus and WordPerfect have learned, are not the same as good architectural control, which creates the environment where products operate, and works through standards. "The franchise is won when a proprietary architecture becomes a *de facto* industry standard," but inventing and re-inventing the proprietary architectures for open systems is critical, since components on a network come from unrelated vendors, and what matters most is whether they will work together. Lessons from industrial failures: manufacturing skill is essential, users are NOT better served by nonproprietary architectures set by committees. Low-end systems swallow high-end systems, and newcomers like a Microsoft or an Intel have not yet made the commitment to R&D that has been the "often

uncommercialized glory of an IBM, an AT&T, or a Xerox." It is interesting to cull, from the pages of *Wars*, the passages in which authors Ferguson and Mitchell describe, with laudable accuracy, "the many technologies that Xerox PARC bequeathed to the world."

"Big winners in computers are companies that establish long-term, proprietary, general-purpose, expandable, industry-standard architecture." Whether you agree with the authors' dogma or not, this is a mighty good read. People of an apocalyptic bent, who describe errant management systems (IBM's) as a "Grindel-like beast," are naturals to write about "the most competitive, swiftest-moving, and hardest fought industrial battle in history."

by Giuliana A. Lavendel

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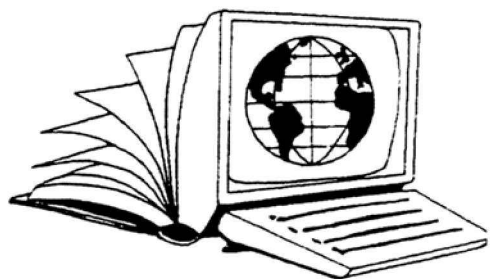
The Work of Nations, by Robert B. Reich. New York, Random House, c1991, 1992.

"There will be no national products or technologies, no national corporations, no national industries." Today's political challenge is the competitiveness of the American workforce, since "each nation's primary assets are its citizens with their skills and insights." Prof. Reich, formerly of Harvard, now heading the U.S. Labor Department, is a self-styled "talking head" and key member of the White House brain trust. First published in 1991, *The Work of Nations* was lately reissued with a postscript on "National Identity in a Post-Soviet World" which does not quite succeed in updating this book, but may still be indicative of current thinking within the Clinton administration.

Most articulate and pleasurable are the historical Part One on the roots of "The Economic Nation" and Part Two on the "Global Web," where national identity is diagnosed as progressively disappearing in a borderless maze, since "corporations and investors now scour the world for profitable opportunities." Section Three on "The Rise of the Symbolic Analyst" contains the author's centerpiece, his version of a quasi class struggle among an upper fifth of *symbolic analysts* -- most readers of this review would fall into this category -- and the remaining four fifths of U.S. population. (A hint of Aldous Huxley's *Brave New World*, complete with Alphas, Betas, and Gammas.) *Symbolic analysts* are the fortunate inhabitants of the world of ideas, in charge of solving, identifying and brokering problems and situations. They are engineers, PR executives, researchers, teachers, "even a few creative accountants." *In-person servers* and *routine producers*, instead, labor under a widening gap in income, working conditions, educational opportunities, housing, and "the regressive shift of the tax burden," which separates them from the privileged upper fifth. Yet, symbolic analysts (lawyers and MDs, our current scapegoats, are included) remain America's greatest resource, since our country will continue to excel in symbolic

analysis, in spite of global competition; "no nation educates its most fortunate and talented children -- its future symbolic analysts --as well as America does. And "no nation possesses the same agglomeration of symbolic analysts already in place, and able to learn continuously and informally from one another."

The final section on the "Meaning of Nation" reads more like campaign literature in its anti-establishment (read anti-Bush, but mostly anti-corporate) sentiments, and sounds therefore a mite behind the times. All through Reich's arguments and perorations, the large or "core" U.S. corporation appears like the modern equivalent of the Great Whore of Babylon. He simply calls it "the last plank of economic nationalism," which is a gross no-no.

Reich is a master of historical parallels, and they are the most enjoyable part of this book. For instance, he compares the expansionist techniques of France's Colbert, the great Minister of Louis XIV, to those practiced by "the modern Japanese, Korean, Taiwanese...and any self-respecting governor of an American state." Mentioned are historical subsidies for most valued manufacturers, trading companies, even some forerunners of TQM. The foundations of economic nationalism are under investigation here, with helpful refreshers on John Stuart Mills and Adam Smith; Alexander Hamilton asked for tariffs to protect American industry in its cradle, but preferred subsidies as easier to dispose of in the end.   Apart from slavery, the tariff was the most highly debated economic issue in 19th century America. Even universities took a role and declared themselves for or against the protection of local industry, except for Cornell, which straddled the issue. Northern manufacturers were for it, Southern farmers against it. Britain, whose manufacturers were the most advanced, and therefore had benefited the most from free trade, refused to engage in protectionism; this free market stance invited a German and American "economic invasion" which was picked up by the

Japanese half a century later, when they sold their products at prices sufficiently high at home to be able to "dump" them everywhere else.

Reich's survey moves on to a six-fold increase in productivity spurred by inventions like railroads and machinery, which caused gross and sudden overcapacity. As a related phenomenon, "the debate about the role and legitimacy of the giant American corporations dominated the first half of the twentieth century," although Prof. Reich is still brandishing his cudgels in this final decade.

Karl Marx having failed to unite the workers of the world, America's middle class was one of capitalism's greatest triumphs, for which "the American core corporation could claim significant credit;" thus corporate bureaucracies, organized like the military, were on the whole a good bargain. "In return for prosperity, American society accepted the legitimacy and permanence of the core American corporation," whose survival became a public responsibility, along with education for the masses and national defense; working in cahoots with corporate statesmen, the CIA discovered Communist plots. "Products and purveyors of vestigial thought," many Americans look back with longing to the time when their country had "a relatively closed economy organized around high-volume standard production." Alas, this is all gone with the Berlin Wall; now that the Soviet menace has disappeared, it is not only the defense industry that is threatened: it is our sense of ourselves. While the 19th century Europeans felt that sacrifices were legitimated in terms of patriotism and honor - sort of a *noblesse oblige* principle -- Americans believed that economic sacrifices were incurred in enlightened self interest, as de Toqueville duly noted, both in assisting one another and for the welfare of the state. Our author asks the reader to consider whether conditions have changed: "Will civic virtue survive?"

During the Cold War, "at stake was our pride, our place in history, our purpose as the best hope for mankind," and our crusades "were founded in the same self-awareness of the American ideal under intense scrutiny, at home and abroad. " Will we rediscover our identity and our responsibility to each other? America could simply become a microcosm of the future world, with a fading of our collective identity, or it could find a reason once again to join together. Prof. Reich interprets rhetoric about "the Japanese challenge" as reveille for the American people: "Join together: American government, American business, American workers. Join together: wealthy Americans, poor Americans, Americans of every

creed and ethnicity." Symbolic analysts in the "fortunate fifth" have special obligations because they sell their expertise on the global market. In fact, they are becoming less dependent on the nation -- as the nation becomes more dependent "upon how and where symbolic analysts decide to dedicate their energies and money." In the meantime, global executives "guide ideas through the new web of enterprise" and the core corporation, "no longer even American," is increasingly just a facade.

by Giuliana A. Lavendel

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Monday Teller

No. 61   June 1, 1993

PARC INFORMATION CENTER

Reengineering the Corporation, by Michael Hammer and James Champy. New York, Harper, 1993.

Let us reverse the industrial revolution and start all over. Forget the last 200 years: "America's business problem is that it is entering the 21st century with companies designed during the 19th century to work well in the 20th." Thus reengineering maestro Hammer, who emigrated from MIT to his own consulting firm, is joined here by co-author Champy from his consulting chair at CSC Index. Reengineering's charm lies in presenting a conceptually new model based on "discontinuous thinking": not how we do things but why we bother doing them at all. The problem is that most organizations today can trace their work style and organizational roots to the all-American division of labor, and well rounded generalists need not apply.

A pox on *The Wealth of Nations*, say our authors; it was Adam Smith who observed that the productivity of pin makers could be increased "by a factor of hundreds" if the eighteeen specialized tasks involved in making pins were divided among laborers. Then railroad companies invented the business bureaucracy because, without formalized procedures, collision would have followed collision on the single-track lines which carried trains in both directions in old America. Henry Ford and Arthur Sloan followed, and delivering products and services became increasingly complex. As companies indulged in "fragmenting work into simple, repetitive steps, and organizing themselves hierarchically," a population of functional managers appeared as part of the organizational pyramid of planning and control.

End of scenario. The old way of doing business is not working because of the three capital Cs: Customers, Competition, and Change. To begin, firms should drop mass market mentality because each customer counts, and customers today have access to a lot of data. Competition is led by startups that carry no organizational baggage, and by niche companies pressing new market rules: only the best in class survive. Change? Product life has gone from years to months: "Ford produced the model T for an entire generation, but the new computer produced today may stretch to two years, but probably won't." Only reengineering -- no miracle cure, but lots of strenuous work -- can carry us over the impasse. Closed global markets, our poorly educated workforce, the low cost of Japanese capital, Reaganomics and other scapegoats cannot hide the fact that many U.S. companies (the list, surprisingly, includes Honda) are doing exceedingly well focusing on the three C's rather than mass production, stability, and growth. As for the "meat and potatoes" of a business -- "inventing products and services, manufacturing or providing them, sellling them, filling orders, and serving customers"-- they are America's fortune, and we should do a better job around process. Instead of looking upward to our bosses and inward towards our departments, we should look outward at the customer. Bosses do not really pay salaries, customers do.

Our fragmented organizations reveal appalling diseconomies of scale. In the notorious case of Ford's five hundred bean counters against Mazda's five, the authors recall that Ford successfully reengineered not Accounting but what the accountants do, with heavy emphasis on Pareto's 80-20 rule. Bureaucracy is almost a lesser evil, "it is the glue that holds traditional corporations together," but it fosters the problem of fragmented process. Quality programs, although similar to reengineering in some aspects, are based on the *kaizen* of continuous improvement of the status quo ("do what we already do, only do it better") while re-engineering is much more iconoclastic, a toss-and-build-from-scratch proposition. A case in point focuses on baby bottom products, and how Wal-Mart successfully put the monkey ot its Pampers inventory on Procter and Gamble's back:

apparently, the reshuffle had internal benefits for a svelter P&G. In the "New World of Work" chapter, having progressed from functional departments to process teams, empowered people advance on the basis of ability, not performance. There are separate results reviews and development reviews. "Traditional point schemes, in which the size of a person's salary is a function of the number of subordinates...and the size of the budget," are excess baggage. Will it ever be possible to evaluate people objectively, "for value created,"as Hammer-Champy suggest? Small things like ambition, greed, fear and the urge to succeed found in any group of humans are overlooked by the authors who, like many in the management consulting business, address an idealized workforce of well-meaning little soldiers.

IT (Information Technology) enables decision-making to become part of everyone's job, since what was once available only to management is now accessible to all workers. In fact, centralization and decentralization are no longer mutually exclusive. Since companies do not reengineer processes -- people do -- roles are identified which are crucial to the organization's makeover, such as leader (an executive patron saint), a process owner responsible for the process, the reengineering team and a steering committee which develops strategy and monitors its implementation. There is also a reengineering czar, a techie who acts as a catalyst across the firms's reengineering efforts. There are insiders who are intimate with the process and outsiders who look in from another vantage point, both with key roles; on the reengineering team, "a ratio of two or three insiders to each outsider is about right." Insiders and outsiders should spend a minimum of 75 percent of their time on the reengineering effort, which is definitely not a ninety day assignment, since it usually takes a year to establish just the first "field pilot site." Processes that are either broken or particularly close to the guts of the firm (ask the customers!) are best selected if the project seems feasible, but it is important to have some understanding of the process currently in place before starting the works. Don't go overboard on detail, but rather watch how the customers use the process. If you benchmark, do it with the best in the world, and never mind which industry you're in. Xerox benchmarking with L.L.Bean remains the classic example.

Hallmark, Taco Bell, Capital Holding's DRG (a direct insurance marketer) and Bell Atlantic are held up as successful case paradigms, but 50 to 70 percent of the companies experimenting with reengineering fall flat on their faces. In spite of these odds, reengineering success looks more like chess than roulette, since it depends on knowledge and ability, not on luck. Unfortunately, methodology, "an orchestration of the change campaign, the design and timing of releases...and tactics for dealing with the most common problems that arise in implementation" are not within the scope of this book. Readers will have to be content with a prescription for staffing with generalists who can act as specialists as the occasion demands -- and this seems a tall order. While loftily reassuring the reader that "the curtain is rising on the Age of Reengineering," Hammer and Champy must be busily writing at their laptops. Shall we reengineer or wait for the next one?

(Giuliana A. Lavendel)

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Fuzzy Logic by Daniel McNeill and Paul Freiberger. New York, Simon and Schuster, 1993.

Fuzzy algorithms underlie much of human thinking; whether we know it or not, we employ them all the time, "when we walk, eat, drive, or park a car, tie a knot, cook food, recognize patterns, and make decisions." This is because the brain summarizes and approximates all along, to the satisfaction of Gestalt psychologists. Fuzzy logic has been around since the early Sixties, when Lotfi Zadeh invented (discovered?) it at the University of California. Since then, the expression has become familiar in educated circles, and no longer sounds like an oxymoron. People talk glibly of how adaptive fuzzy systems - a combination of fuzzy logic and neural networking -- should have been used to track more accurately the Patriot missiles during the Gulf War. Scientists now are reading "Fuzzy Logic," with occasional animadversions on the journalistic hype offered by the authors. Both are writers specializing in high tech; one of them, Freiberger, works in Silicon Valley at Interval, a new research cauldron modeled on Xerox PARC and funded by Microsoft co-founder Paul Allen.

This book's subtitle reads "The discovery of a revolutionary computer technology -- and how it is changing our world," but the technically more sophisticated reader will seek reassurance in further literature, such as Zadeh's "Making Computers Think Like People" in the 8/84 issue of *IEEE Spectrum*. Since the idea of fuzziness is both revolutionary and obvious, Science with a capital S has had difficulty accepting it, as its promoters like Zadeh himself, USC's polymath Bart Kosko, and the National Science Foundation's Maria Zemenkova can testify. Authors McNeill and Freiberger delight in the romance of high tech persecution, which gives them the opportunity to castigate some sacred cows. Having shown back in 1973 how fuzzy logic could make smarter machines, Zadeh is presented as an American Galileo: "Fuzzy logic is an outcast in the United States. It is one more technology the United States has created and neglected, only to watch the Japanese pick up, nurture into profitability, and sell back to us." For starters, fuzzy logic has given the Japanese intelligent washing machines, microwave ovens, cameras and camcorders, automobiles and "fuzzy TV sets which, ironically, show sharper pictures." In fact, "fuzzy logic is not logic that is fuzzy, but logic that describes and tames fuzziness," a product of traditional logic, set theory, philosophy, and custom. The sliding scale of multivariate logic yields superior precision: not only true or false, not true/intermediate/false, but quantification through a continuum of, e.g. 1.0 through 0.8, 0.6, all the way to zero. If a novel must be at least 90 pages long and a novella less than 90, is a 91-page work a novel? Is an 89-page story a novella? The same ambiguity prevails for the distinction between tall and short people, or when a diminishing heap of sand becomes a non-heap. Fuzzy logic avoids these absurdities, and is the rightful successor of Artificial Intelligence, which still hibernates in a long winter under the weight of its own complexity.

For non-historians, the juiciest chapter is "Fuzzy Engine, Fuzzy Inferno," where the technical engine of fuzzy logic is laid bare. DNA, the brain, bureaucracies, and computers are all based on control, which requires the processing of information. Fuzziness is control's natural companion. Without it, control theory becomes so abstrusely mathematical that the relation between theory and real life applications is tenuous at best. Fuzziness is different from probability, although both describe uncertainty with numbers. Probability is a yes/no statistical proposition, while fuzziness deals with degrees, and does not require a *priori* ignorance. While we think of the animal world as populated by distinct species, ornithologists know that among the 607 species of birds in North America 46 hover between subspecies and new species -- confirming the view that evolution is fuzziness.

friendly. Regulation scientists, however, prefer more logical, precise, very Aristotelian thinking tied to a simpler perception of reality, and this is why our authors refer to fuzzy logic as "the cocaine of science," since it may befuddle the orthodox followers of scientific method (and those who believe in the Tooth Fairy and the Easter Bunny). Aristotle, father of the yes/no process, was in reality more progressive than some contemporary academics who cannot stomach fuzziness; he wrote in the *Metaphysics* that both more and less are present in the nature of things. Mankind must strive towards a golden middle, he prescribed in the *Nicomachean Ethics*: courage is a continuum to be found between the two poles of foolhardiness and prudence. Valor is in the middle -- and isn't this fuzzy?

The authors follow for several chapters the painful birth of the fuzzy revolution, whose acceptance requires the sort of paradigm shift Thomas Kuhn describes in his *Structure of Scientific Revolutions*. Proceeding like the hermit crab, which periodically discards his shell for a larger one, scientific opinion advances gradually towards fuzziness, and there is a lot of name dropping in the process of identifying likely supporters, all in a heap, from Plato to Gödel, from Fresnel to Bertrand Russell, Wittgenstein, Kant, Buddha, even Lao Tze, the master of paradox, who wrote:

"The great square has no corners...
The great note sounds muted...
Great straightness seems crooked...

Chapters here follow one another with abandon. "Fuzzy Engine, Fuzzy Inferno" is full of IF-THENs, which also come in patches and have practical applications like the fuzzy kiln controller. In "The Vague Archipelago" McNeill and Freiberger explain why fuzziness found a ready welcome in the Far East. There are over 1000 fuzzy specialists operating in Japan, and in China 10,000 professionals are engaged in fuzzy special purpose industrial applications of which, of course, little is known in the West. Vagueness is more central to Asian thinking, which has no Aristotelian (or Baconian) paradigms to overturn. It seems appropriate that a few years ago Lotfi Zadeh was awarded the Honda prize, placing him in the company of Carl Sagan and Ilya Prigogine, both considered stars of the first magnitude by their scientific peer communities. Europe, though, has DRUMS, a subprogram of ESPRIT which examines the fuzzy logic in "Diffusable Reasoning Uncertainty Management Systems."

"American Samurai" Bart Kosko, a young USC mathematician who is also an engineer, musician,

sci-fi novelist, karate black belt, scuba diver, archer and body builder, is Zadeh's most ostensible follower -- apart from the customary Japanese engineers. Kosko has developed a hypercube which models all fuzzy sets and permits mathematical proof; he developed the theory of subsets -- how much one set belongs to another -- using simple percentages and much extending the horizons of fuzziness. He ended up by developing the Fuzzy Cognitive Map, a new kind of decision system based on networks rather than one-way trees. Kosko foresees a day "when you can take any document that's been ever written, beginning with the Sumerians, take all the technical journals and the books, the world's accumulated knowledge --wouldn't you like to see what that Fuzzy Cognitive Map looks like?" This, of course, is the stuff dreams are made of.

A lightweight work with a heavyweight title, *Fuzzy Logic* is quite informative but feels rather pop, in spite of a well-constructed index and a 10-page bibliography. But who are we to blame McNeill-Freiberger for having made readable what confused Aristotle? All things considered, this is is a good, fuzzy book.

(Giuliana A. Lavendel)

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Monday Teller

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PARC INFORMATION CENTER

Reinventing Government, by David Osborne and Ted Gaebler.   Reading, MA, Addison-Wesley, 1993.

This is not about Clintonomics and Washington, D.C.: it is happening in places like Visalia, a farm community in sun-baked San Joaquin Valley, and in Sunnyvale, at the center of that other valley where people bake silicon chips.   Both are in California, where embattled Governor Wilson argues "We will not suffer the future. We will shape it...But to shape our future, we need a new vision of government."   Governors of all persuasions - whether from Michigan, Minnesota, Oregon, Arizona or New Jersey --feel the same way; having been the first to hit the wall, state governments are prompt to respond to the new realities.

This book is about "how the entrepreneurial spirit is transforming the public sector," so that comments like "My friend doesn't work, she has a government job" will no longer be heard. Hostage to the media, the average citizen does not realize that today local governments are the site of revolutionary change.   Deadline-pressed media reporters fall back on their standard lens, which relies on conflict to sell a story, focusing on "heroes and villains, rather than innovation and change."   Actually, the business of reinventing government is old hat.   It has been done all the time through history; for instance, the welfare state goes back to 1870, when the Iron Chancellor Bismarck started it rolling in Germany (and the populace in imperial Rome was given "panem et circenses," bread and games).   On the other hand, respectable governments didn't think anything of manufacturing weapons in armories, but would not get involved in fighting fires, which were considered a private matter.

Osborne and Gaebler set the date for the latest reinvention cycle at the early decades of the twentieth century, roughly from 1900 through 1940, when America was coping with the new industrial economy, its opportunities and pitfalls. Now the time has come for another reinvention, based on trends innovators love: competition is rife among service providers, citizens/customers rather than bureaucrats are empowered, outcomes take the spotlight over inputs, market mechanisms are at the ready. Citizens are offered options for housing, schools, training programs and recreation; the three sectors - public, private, and voluntary - are "catalyzed   into action." Entrepreneurial governments "put their energies into earning money, not simply spending it."   If things don't go as they should, it means that we do not have too much or too little government, we have the wrong kind.

Granted, government cannot be run exactly like a business, but it can be entrepreneurial and even anticipatory, if given a chance.   Years ago the Surgeon General estimated that 50% of illness is behavior-related, 20% due to environmental factors, another 20% of genetic origin, and the remaining 10% related to medical care.   Stress causes losses in the neighborhood of $10 billion per year. Prevention, then, seems the logical way to approach the medical care problem.   Oregon halted the funding of surgical transplants in 1987, rerouting the money towards preventive care for pregnant mothers.   This triage affirmation is credited to John Kitzhabe, a senator who is also a physician, who decided to stick his political neck out.

This paperback reads easily. Ten how-to chapters describe the multiple strategies of entrepreneurial government, and the case histories are diverse and diverting. Saint Paul, Minnesota, is described as a "down at the heels," dying city in the Frost Belt until the election of George Latimer in 1975. Latimer is the hero of the chapter on "Catalytic Government: Steering Rather Than Rowing," and we are reminded that "government" comes from the Greek word for "to steer a course." Policy decisions (steering) should be separate from service delivery (rowing), in all types of organizations, as Peter Drucker remarked some time ago. "Steering requires people who can see the whole universe of issues, and can balance competing demands for resources.   Rowing requires people who focus intently on one mission, and perform it well." Strategies used in desperation by cities like St. Paul, Indianapolis

and Lowell, Massachusetts, rely on the steering type of leadership exercised by Mayor Latimer and then Congressman Paul Tsongas. Tactics for delivering public service without incurring ever larger deficits are divided into Traditional (legal rules and sanctions, licensing, subsidies, etc.), Innovative (e.g. franchising, public-private partnerships, rewards) and Avant-Garde, which includes seed money, co-production, and even demand management, which means reducing demand for service. Diamond lanes for multipassenger cars, or low flush toilets where water is scarce do exactly that.

Community-owned governments empower rather than serving; an example is Lee Brown, police chief in Houston and then in New York City. Brown believes that public safety is a community responsibility, rather than simply the task of professionals -- and acts accordingly, setting up police ministations in storefronts and taking care of redirecting gang members: "You can't rush in with the police car, handle the call and leave." These techniques have no frontiers: Arkansas imported its successful HIPPY (Home Instruction Program for Preschool Youngsters) from Israel. Citizens' councils are "the new democratic unit in the community." While institutions and professionals offer service, communities offer care; let us manage the transition from service to empowerment, even through difficulties like those encountered by the Ford Foundation and HUD when trying to stimulate tenant management from the top down. "I at least want the opportunity out there for everybody," comments Jack Kemp.

The Phoenix Public Works Department struggled hard to continue collecting garbage in the face of fierce competition from scavenger firms: they upgraded their 25 cubic yard trucks to 32 yards, added a mechanical arm, and reduced attendants from three to one. The most compelling issue in this area, though, is not garbage collection but school choice, and the authors make the most of the Minnesota experience, where Governor Perpich pushed through a reform bill which "allowed juniors and seniors to take their state education dollars to a college and finish high school while earning double credits." Further on, mission-driven government scrapes the barnacles off the ship of state in Florida, in Washington State, in Arizona and New Mexico, but the laurel goes to little Visalia, which "decided that two regulations had to be eliminated for every one written."

Result-Oriented Government, which funds outcomes, not inputs, was brought forth by injurious snafus like the one discovered in Illinois, where the state, by paying more for bedridden patients in nursing homes, gave them an incentive to keep the patients incapacitated. From such

cases was "performance management" born. The performance leader is Sunnyvale, a city of 120,000 in Silicon Valley: "As the home of thousands of computer jocks, Sunnyvale has a culture steeped in information technology. Few other places on earth would be so receptive to the use of performance measures." Sunnyvale measures the quantity, quality and cost of everything it delivers. It uses "community condition indicators" to give the city information on its quality of life, e.g. the number of traffic accidents per million vehicle miles; an objective is to achieve a ratio of 3.42 accidents per million miles traveled. Performance indicators provide specific measures of service quality, such as the percentage of trees needing replacement which are replaced within two months. So successful has the City of Sunnyvale become that it sells its basic performance management package as a guideline for municipal honesty and reinvented government. Sunnyvale accepts only prepaid orders, since invoicing ($18.00) would require dispensable labor and paperwork.

From the chapter on "Customer-Driven Government (Meeting the Needs of the Customer, Not the Bureaucracy)" to the ones on " Enterprising Government (Earning Rather Than Spending)" and "Market-Oriented Government (Leveraging Change through the Market)", theory and case histories lead to "Putting It All Together," where three of the most intractable problems American society faces are put to the test of the principles of entrepreneurial governance. Here the authors suggest how to create an effective health care system, and reinvent public education; we should rethink our approach to crime by using steering organizations -- Public Safety Coordinating Councils -- to bring together providers (police chiefs, district attorneys) and customers (neighborhood organizations, superintendents of schools). We are witnessing "nothing less than a shift in the basic model of governance used in America."

Or is it back to the town meeting on the village green? This is a cheerful but not pollyannish view of the world, sort of a happy Western where even the bad guys wear light colored hats, and begin entrepreneuring in the grand finale. The obligatory quotes from Kuhn's "Structure of Scientific Revolutions" are in place; this is indeed a paradigm shift of global proportion, and it is nice to know that even the Aussies and the Brits ("A Global Revolution") are marching along with us.

(Giuliana A. Lavendel)

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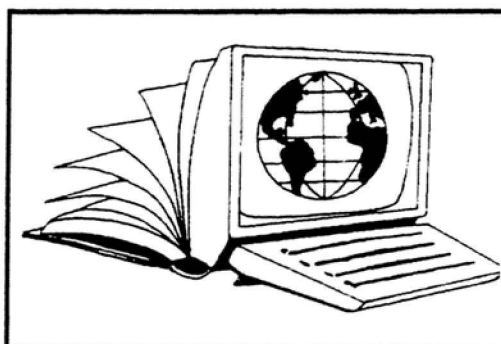
Summing up, the science of reviewing research by Richard Light and David Pillemer. Cambridge, MA, Harvard University Press, 1984.

What do Head Start, job training, and coronary bypass surgery have in common?   Statistics, that's what, and they are inconsistent, contradictory, all over the place; people still say that there are lies, you-know-what lies, and statistics.   Meta-analysis is a process for making sense of them, but this impressive term is not found on *Summing Up*'s title page; perhaps it is too florid to be used in a paperback, even if issued at Harvard or, more likely, "meta-analysis" is a restricted term, for cultists only.

In a recent seminar organized by the American Statistics Association in San Francisco, meta-analysis was hailed as a necessity born of the information explosion, which floods decision-makers with data and complicates choices which often affect human lives.   Such are the statistical implications of research in areas like acid rain, the link betweeen alcohol and cancer, or the Pygmalion effect, which makes pupils perform according to the teacher's expectations.   In fact, the quest for meta-analysis goes back many years.   Authors Light and Pillemer quote a 1970 speech by the then senator and future presidential candidate Walter Mondale, who remarked, "For every study, statistical or theoretical, that contains a proposed solution or recommendation, there is always another, equally well documented, challenging the assumptions or conclusions of the first. No one seems to agree with anyone else's approach."

The meta-analysis groundswell, which became front-page news thanks to the oat bran affair --

does it lower cholesterol or doesn't it? -- attempts to revolutionize traditional literature reviews, and make statistical sense out of them. Reviews represent a well-intentioned effort to accumulate and summarize data which are by their nature subjective, scientifically unsound, and inefficient for extracting useful information; expert opinion, another popular recipe, suffers from the same chronic complaints.   Statistical procedures for combining diverse findings are more negotiable for people familiar with multiple end points, multivariate analysis, confidence intervals, coefficient of variation and other devilments, but *Summing Up* is here to help the uninitiated.

Light and Pillemer develop four general directives: first, seeking for the structure provided "by clearly specifying a review's purpose;"   second,   pointing out that "disagreements among findings are valuable, and should be exploited," because the reasons for conflicting outcomes provide clues for future success or failure. The third and fourth directives state that, while both quantitative and qualitative information are needed for a successful analysis, "statistical precision cannot substitute for conceptual clarity."   Tallies and numbers do not indicate, for instance, where different techniques are to be used, or how they might be improved. These four principles guide the reader through the six chapters of *Summing Up.* Chapter one serves as a general introduction, and chapter six offers a checklist of the elements which constitute a well-balanced review.   We start with the premise that formulating a precise question is a strategic must, and this can only be done via a rigorous scientific summary of research, to avoid the quandary described by Henry Kissinger at his State Department best: The

production of so much research often simply adds another burden to already overworked officials... Few if any of the recent crises of U.S. policy have been caused by the unavailability of data. Our policymakers do not lack in advice: they are in many respects overwhelmed by it."

In reviewing research results from diverse sources, the investigator should decide whether to test a hypothesis or simply "to explore available information," keeping a wary eye out for the "false positives" which seem to indicate a statistical relationship but are in fact chance occurrences. When selecting studies for a review, it is helpful to divide them into categories, and pick a few from each one; this is called "stratification." Expert panels as selection tools may be guilty of bias, since it is proven that "policy experts pay more attention to "large n" studies with modest research design than to well-designed smaller studies." A notorious example from the education field is the Coleman report, an enormous survey of over 600,000 pupils, which undeservedly influenced how money was spent on schools over a whole generation.

The long, meatiest chapter on quantitative procedures starts with a quotation from statistician J. Tukey (a well known figure at Xerox PARC) who believes that "theory, whether statistical or non-statistical, will have to guide, not command;" sound judgment is what counts. Conflicting results or variations must be examined for substantive insights, and the reviewer is held to determine "whether a difference has practical significance," which statisticians refer to as "effect size." Graphs, or "visual displays", are used to advantage, and the reader is treated to the virtues of frequency and funnel distributions. Available studies can be divided into three groups: those with positive, those with negative, and those with insignificant outcomes. Statistical tests examining how much results differ in various studies can be performed with ready-made formulas for evaluating variations, courtesy of several authors, all more or less in disagreement. The worst problems arise when statistics are simply left out, so that numbers like means and standard deviations cannot be calculated. "Yet it is surprising," the authors remark, "how often this information is unavailable." In the end, quantitative knowing must proceed from the qualitative: "Man is, in his ordinary way, a very competent knower," quote the authors from a well-known psychology study. Psychology is in evidence when Light/Pillemer mention scripts as helping in the management of information: "For any recurring event, a person develops some general expectations about it. These expectations are scripts." Statistical and descriptive evidence reinforce each other in well-conceived reviews, which in essence help society discover what is already known.

In the summary chapter entitled "What We Have Learned," review papers and meta-analysis appear as powerful tools indeed, considering the subjects in which they determine "effect size:" coronary bypass, classroom size, gender and cognitive abilities, inner-city block grants vs federal programs, coaching for SAT exams, preventive health care for children. Case histories and examples betray the book's age, since there is no mention here of AIDS, teen-age pregnancies and other current disasters. But the one decade's perspective actually gives the reader the opportunity for some reflective detachment a *posteriori*, and an appreciation for the authors' efforts when they conclude, quite credibly, that research design matters.

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(Giuliana A. Lavendel)

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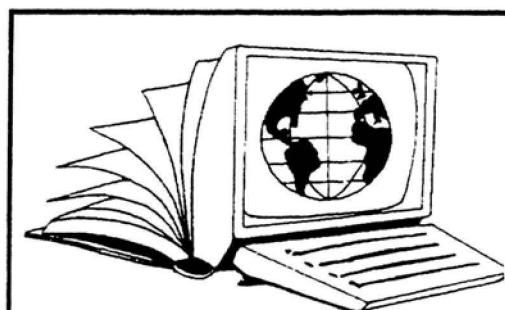
Monday Teller

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PARC INFORMATION CENTER

Creating a Government That Works Better and Costs Less; Report of the National Performance Review, by Al Gore. Washington, D.C., U.S Dept. of Commerce, Sept. 1993.

The devil, as they say, is in the details, but here is a vision of what government ought to be in the next century: one that "works better & costs less," mindful of taxpayers, sparing with red tape, ready to drop programs and services which smell of pork barrel. In the words of the *Washington Post*, the Gore task force, working for six months over this report, saw "a crisis of trust in America because taxpayers no longer believe the government treats their tax dollars with respect." Another quote, found on p. 69 of this lengthy (168-page) report: "But you've got to trust. People don't come to work with the intent of screwing up every day. They come here to make it better." This is Bill Goins, President of Xerox ISO, who was a participant in the "Reinventing Government" summit.

It goes without saying that many of the ideas and by-now clichés come from the Osborne book about reinventing government, based mainly on the entrepreneurial adventures of some hitherto little known communities in Northern California, agricultural Visalia and high-tech Sunnyvale; author Osborne is currently lionized by the media, as reflected in his lecture fees. The contemporary touch, straight from the Osborne page turner, surprises readers of the Gore report, who expect a bit of Rooseveltiana -- and the diehards who believe that to reinvent government all you need to do is put on a dark blue suit, a light blue shirt, a sincere red tie, and go commune with the audience on Oprah Winfrey.

The report is well organized and sectioned, MIT-style, obviously formatted and thought out on computers; the "new" White House is big on digital. There are four chapters, each one with four progressive steps, and a conclusion, plus an overall summary and assorted appendices, among which the "Summary of Savings" is reaping the most skeptical and fearful responses. (Stress is rampant among civil servants, since the axe is promised to one quarter of a million headcount.) The list of "Major Recommendations by Agency" is particularly ambitious after just a six-month study; obviously, the Clinton crew had enough time to discover for themselves that the buttons on the President's desk are not wired to anything...

Among the recommendations nestle "End the Wool and Mohair Subsidy," (Agriculture), "Use Sampling to Minimize the Cost of the Decennial Census," (Commerce), "Establish a Unified Budget for the Department of Defense," (DOD), "Create a Single Point of Contact for Program and Grant Information," (Education), "Support the Sale of the Alaska Power Administration," (Energy), "Improve the Presidential Transition Process" (Executive Office of the President). Some of these recommendations create enormous mare's nests, e.g. "Improve Border Management" (Justice), which cause concern, from NAFTA to the protection of small business interests, to violations of civil rights -- then why is the lady in New York harbor hoisting her torch?

The Chapter on "Cutting Red Tape" starts with a little apologue: two foresters, searching for details of agency policy in acres of manuals. reports, and binders, recall the first all-inclusive

Forest Service manual - small enough to fit into a ranger's shirt pocket. There is also a quote by General Patton: "Never tell people how to do things. Tell them what you want to achieve, and they will surprise you with their ingenuity." Like the remaining three chapters, this one has six steps, in this case "Streamlining the Budget Process," "Decentralizing Personnel Policy," "Streamlining Procurement," "Reorienting the Inspectors General" (a bit of Chekhov?), "Eliminating Regulatory Overkill," "Empower (sic) State and Local Governments." Among the case histories there is plenty of comic relief. For instance, regulation AA-A-710E of the General Services Administration (superseding GSA AA-A-710D) pertains to *Ash Receivers, tobacco (desk type)* and waxes long and mighty about how government regulation ashtrays are to be constructed, their dimensions, materials, and vicissitudes such as testing. The tested specimen, on a solid support of prescribed dimensions, when stricken with a hammer "should break into a small number of irregular shaped pieces not greater in number than 35..."

The plot is similar in Chapter 2, "Putting Customers First," where we are promised that first class mail will be delivered within three days anywhere in the U.S. It is time for federal agencies' printing and real estate monopolies to expire, but the President should reconstitute the FCCSET (Federal Coordinating Council for Science, Engineering, and Technology, toothless in spite of a well-sounding acronym) and really empower a National Science and Technology Council summit. Chapter 3, "Empowering Employees to Get Results" recommends that" over the next five years the executive branch will decentralize decisionmaking and increase the average span of a manager's control," mainly through self-managed work teams and "delayering"; personal accountability and training are keys. A National Partnership Council will be established to cement labor-management relations with the three main unions to which civil servants belong. Another new body, the President's Management Council, should "lead the quality revolution and ensure the implementation of National Performance Review plans."

The final chapter on "Cutting Back to Basics" talks about eliminating the obsolete and the redundant, and selling the valuable but nonessential, like the Alaska Power Administration. For many agencies -- from Small Business Administration to Army Corps of Engineers and the more than 12,000 agricultural stations -- this would mean closing or consolidating field offices, libraries, overseas missions. (We find here a delicious story about our British cousins, who after World War II discovered that the civil service was paying a full time worker to light bonfires along the Dover cliffs, in case the Spanish Armada showed up.) Did anyone defend the position in Commons? Someone in Congress might have.

As almost invariably happens to large institutions, the Federal Goverment, through the years, has transformed what was meant to be a vocation of service into a priesthood of power. GM's Alfred Sloan, a prophet in his own country, warned long ago against the perils of overcentralization, Soviet-style; after all, Julius Caesar, before invading Britain, did not have to fax to the Roman Senate for approval, comments John Gardner of Common Cause. Skepticism abounds around the issue of reinventing government, although the select men and women who put together the U.S. Performance Appraisal meant well -- but don't we all, as Bill Goins says? We can only conclude, with Controller General Chuck Bowsher, that now is the time to give it a good try.

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(Giuliana A. Lavendel)

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Monday Teller

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PARC INFORMATION CENTER

Softwars; the Legal Battles for Control of the Global Software Industry, by Anthony Lawrence Clapes. Westport, Quorum, 1993.

This is not a study but a grab bag of reports from the front. A war, both intra- and international, is raging between software originators and copiers; as a result, litigation is determining the future of competition in the computer, i.e. the software industry. "Software is soft," vulnerable to marauders because the distribution medium is cheap and the material stored on it precious.   With battles lively, author Clapes, an IBMmer with a glint in his eye, enjoys every bit of the Wild West shootout with a writer's abandon which favors the typos and small inaccuracies found in this extended fireside chat: is National Research *Counsel* (sic) an admissible lapsus for a lawyer?

Computer programs are akin to literature, exercises in imagination as per the *Mythical Man Month*, that Bible of the hacker coterie. Programming is an art form, performed by unconventional egocentric types who love the intellectual challenge and ignore the rest. At a recent CHI conference the computer profession "collectively took its eye off the ball" and voiced its preference to have neither patent nor copyright protection for user interfaces. A legal scholar in attendance (she?) publicized this opinion widely, ignoring that disestablishment of legal protection for software might impair the livelihood of those assembled -- Clapes, at any rate, feels that academics are loose cannons in the softwars, while the League for Programming Freedom represents "the radical fringe"battling the industrial infrastructure of the computer world. A subtle interplay among economics, law and business strategy animates the softwars, which

deep down are religious wars between two belief systems, the protectionist and the free-for-all, represented by Mitch Kapor who considers software patents "toxic waste." Beyond these sentiments, the softwars have political implications of a global nature, since they involve suppliers in North America, Europe, Japan and other countries of the Far East.

MIT's Randall Davis, who has earned the author's grudging admiration ("His bias is not that of the partisan, but rather of the skeptic") calls software "the ultimate creative medium" made of "dreams and imagination." Clapes himself believes that "computer programs are written works," that "source code contains recognizable words and symbols," that creativity in software should be protected -- just as a plot in a book is sheltered by copyright law more and non-literary elements less.

Softwars reviews some familiar cases over nineteen chapters, starting with *Whelan v. Jaslow Dental*, which went in favor of original authorship, notwithstanding that Miss Froy, hailing from a large American university, called the decision "an abomination." (In one of Alfred Hitchcock's most successful thrillers, *The Lady Vanishes*, a Miss Froy leads a double life as a governess and spy.   The choice of monicker for the copyright expert reveals the extent and purpose of Mr. Clapes' vitriolic wit.) The same academic appeared as copyright expert in a famous antitrust suit instituted against *IBM* by *AMI*, a small Pennsylvania company which subsisted against the giant using pricing arbitrage techniques. IBM won, and brought a countersuit to prove violation of the copyright protecting its 309x microcode,

which AMI had disclosed to others and massaged by creating "rainbow tapes." The AMI case created a precedent for the protection of microcode via copyright, confirming that business strategy is no defense when copyright infringement is established. Similarly, *Apple v. Franklin* -- manufacturer of the Ace, a bit-by-bit Macintosh clone --"teaches that a desire to be compatible does not excuse copying." *Whelan v. Jaslow* had already determined that pushing a copyright holder's business into a new market could not be condoned.

Among other cases the author entertainingly dissects are the spreadsheet suit by *Lotus v. Paperback Software International*; this was a loss for the clones. The *Merrill Lynch* case, when its cash management software was unsuccessfully threatened by *Paine Webber* as non-patentable, is of particular interest because it concerns software for which a patent was granted. (In the author's opinion, Paine Webber should have tried to invalidate the patent for "lack of statutory subject matter.") The intellectual property dispute between *Fujitsu* and *IBM* fills one chapter, although the details will remain hidden from public view until the year 2002, by decree. It concerns reverse compilation -- a reverse engineering clone -- and involves the European Community; IBM, Siemens, Philips, Apple, DEC and the Software Protection Association are on one side, and Fujitsu, Olivetti, Bull, NCR and Unisys on the other. Apple's "look and feel" lawsuit against Microsoft and Hewlett-Packard, unresolved as *Softwars* went to press, suggests that it makes sense to leave the sequential appeals of an intellectual property case with the same judge on a learning curve (hear, hear!). *Autodesk v. Martin Dyson* over the "AutoCAD lock" in Melbourne and *Microsoft v. Shuuwa* or "The Sun also Rises" in Tokyo were in the end decided in favor of the innovator, but the convolution of legal process and language leave the lay reader perplexed. *Nintendo v. Atari* is clearer: the Atari lawyers goofed. In the *Open Systems* controversy, through competing opinions by Bill Gates and Scott McNealy "a germ of commonality emerges," that of multiple sources for the supply of similar goods - software in Microsoft's case and operating systems for Sun: open systems is "a legitimizing of cloning within the neutral zones." In the chapter

"Revenge of the Nerds: Guerrillas, Terrorists, Peaceniks and the Legion of Doom" Cliff Stoll rediscovers *The Cuckoo's Nest* amidst snafus and theatrics.

The reader is thankful for enlightening opinions like "between copyright, trade secret, and patent, copyright is the least exclusionary. Second comers are not excluded by copyright from providing a functionally similar program, though they would be by patent...A trade secret is, by definition, secret." And further: "The sand (between copyright and patent) is shifting but... egregious conduct aimed at diminishing competition will cause a court to refrain from aiding a copyright plaintiff." Still, there is enough verbiage to drown one, but a lifeline may be found in the "Endnotes" appended to each chapter, where the author opens his kimono to explain the economics of copyright ("Author, Author! Programmer, Programmer!") and how function, not idea or algorithm, is the province of patent law which protects the novel and the non-obvious; copyright has no requirements concerning novelty or non-obviousness. But how confusing and baffling this whole issue is, in the pursuit of economic and technological Nirvana. The idea (unprotected) and the expression (safeguarded) dichotomy is still with us, since idea can only be parsed from expression by means of "subjective and intuitive judgments." Sundry judges, the Saddharmapundarikasutra, von Clausewitz, St. Augustine and even friends Alan Kay and John Shoch enliven with their presence the battleground as seen by Mr. Clapes, IBM's Assistant General *Counsel (touché!)*.

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(Giuliana A. Lavendel)

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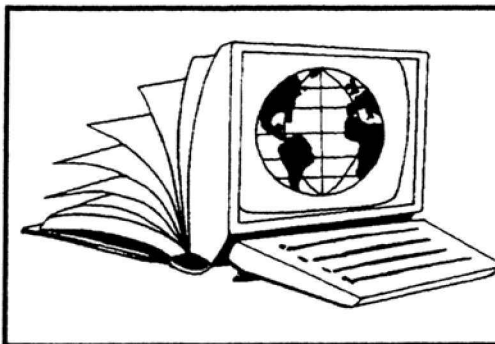
Monday Teller

No. 67   December, 27 1993

PARC INFORMATION CENTER

"*The Virtual Library: Visions and Realities*," edited by Laverna M. Saunders.   Westport, Meckler, 1993.

In the virtual library, the user experiences remote collections of information "as though physically in the library." Will the information space be navigated by human agents? Jesse Shera, father of modern librarianship, believed that the librarian's function is "to serve as mediator between man and graphic records: not only books, but sound recordings, pictures, audiotapes, charts, whatever contributes to the advance of human knowledge." (This should please the Document Company.)   From this point of view, "*Virtual Library*"'s enticing title may be misleading; a niche collection written for and by academics, these essays resonate with the university's special interests and concerns. Only the chapter on "The Computer Center Perspective" sounds frankly contemporary, although it contains the surprising proposition that librarians should "Adopt-A-Computer Center Person" to foster collaboration (outsourcing trend makes strange bedfellows).   Still, the book's insular vision cannot be ignored, simply because the large academic institutions house a majority of the large library collections   --   one of America's most valuable resources.

What, then, is the virtual library?   It is, first of all, a utopia, if D. Kaye Gapen of Case Western can list, among the ingredients for the infrastructure, "national and international telephonic networks...digitizing devices... online systems... copyright, royalty, and leasing experience..." in the same breath as "a commitment to open, no-fee access to library collection and programs."   We are obviously far removed from the realities of the

marketplace; the virtual library is the digital library -- what else? -- and it is not free of charge.   Neither are information and its ultimate object, universal knowledge, which in the ultimate virtual library users will access from all sources, using powerful desktops. We are learning, though.   Under pressure by document delivery services, universities have recently started comparing cost of acquisition vs cost of access, and engaging in cooperative collection development and expense management over geographically dispersed systems.   Even thesauri, first developed independently of one another, are being linked by projects like the National Library of Medicine's UMLS (Unified Medical Language System).

Quotes and references makes up a lion's share of "*Virtual Library*." Sociologist Beniger of "*The Control Revolution: Technological and Economic Origins of the Information Society*" finds that last century's growth pains have produced a combination of information control and technological advances.   Taylor's "*Value Added Processes in Information Systems*" is quoted showing three models around which information systems can be formed: the user-driven model is concerned with use and utility, while the content-driven paradigm, stemming from traditional divisions of knowledge, and the technology-driven model, from clay tablet to terminal, "are no longer enough in our information-rich world."   In general, authors agree that information is a unit of thought, or, better, a stimulus, while knowledge is a consequence of the filtering process. Librarians are charged "to enable the interaction between knowledge and social activity."   They can create a virtual library, or fail miserably at it, since in reality the virtual

library is a metaphor for a "societal control revolution." Networking, as Lee Sproull and Sara Kiesler forecast, will restructure the organization and the nature of work, management permitting.

Some chapters vibrate with religious fervor, others are bread-and-butter descriptions of experimental systems, whether operational or "*in pectore.*" SUNY librarians focus on organization charts, digitized journals, and experiments like the electronic reserve book room at San Diego State. They think that "functional distinctions between library staff and computing center staff" are likely to blur, in spite of the fact that a recent survey by the Council on Library Resources found 42 percent of library staff's salaries lower than the lowest of computer center's salaries. Still, "for the virtual library to become a reality, computer and networking skills will have to be more generally distributed throughout the organization." The 21st century library will spend more for the acquisition and organization of information than for service.

Richard Lucier of the University of California at San Francisco -- an authority on the information connectivity of the Human Genome project -- has launched the concept of "knowledge management" which "insinuates the library at the beginning of the information transfer cycle rather than at the end," and where librarians and faculty alike share knowledge-related responsibilities. Midway between the public (not the academic!) and the private sector, New York Public's Bill Walker is mentioned for preparing to open a science/business library based on value-added, technology-based service for the paying customer and a frank recognition that information has a price. ("Libraries may have to charge for some services to recover costs..." comments a timid contributor, preoccupied by how users will react to lack of immediate access to material on the shelf.) We are in a transition between the print revolution, which is not yet over, and the electronic revolution, which is not quite underway; librarians are caught in the middle. Clarifying expectations is a problem, since users often expect that "everything is online," and full text is both indexed and omnipresent; downloading, combining and organizing data from multiple sources must be approached with caution.

Publication, from its Latin root, means "to make public." Graphics, data sets, sound and images are necessary to a coherent and contemporary presentation of knowledge, but electronic journals have difficulties with these. The academic community should rise up and develop electronic resources, otherwise "the job will be left to those moppers-up of scholarly activity, the publishers and the librarians." But who belongs in the scholarly community of practice? And who is disseminating knowledge? Universities are increasingly becoming candidates as network-based electronic publishers. Of particular interest to technical readers, the chapter on "Virtual Qualities for Electronic Publishing" lists six worrisome issues for the information industry: the rate of technology investment, upgrading the telephone system, the integration of research networks into a national infrastructure, standards for text and images. Last but not least are a resolution of the copyright enforcement problem, and "the development of photographic quality displays and printers."

In the end, can access replace ownership? "We have a plethora of (technological) challenges to meet before the virtual library can become a reality." This according to Maurice Mitchell, who heads Academic Computing for the State of Nevada and is in favor of "fat pipes" for everybody.

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(Giuliana A. Lavendel)

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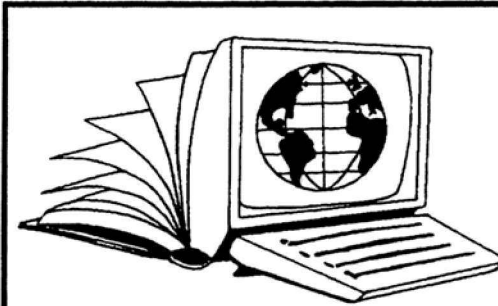
The Teamnet factor, by Jessica Lipnack and Jeffrey Stamp.   Oliver Wight, Essex Junction, 1993.

"Fewer bosses, more leaders!" The Lipnak-Stamp duo, a dynamic presence in management seminar circles, offers a timely crowd pleaser about crossing boundaries and becoming "winners in the 21st century economy." These days, horizontal spread is fashionable for organizations where various infrastructures wrestle to emerge or even survive, and the authors remind us that "hierarchy, bureaucracy, and networks mix to manage large organizations and small for different needs and purposes." A global point of view is emphasized in the *Afterword* entitled "The Risk of Democracy: Teamnets for the 21st century," which is in the guise of a political manifesto.   Lipnack and Stamp are FOBs, Friends of Bill, whom they felicitously met as Rhodes scholars at Oxford.

"Teamnet means network of teams," and if "applied to small groups, means more networked teams," while "teamnet applied to large groups means more teamlike networks." Fundamental to these wisdoms are the five teamnet principles, all designed to help teampeople cross over boundaries. First comes the Unifying Purpose -- which is the teamnet's reason to exist; then Independent Members who are committed to the Cause, Voluntary Links in a rich web of relationships, multiple Leaders who assume specific responsibilities, and Interactive Levels to connect to various teams circulating in the environment. These principles are first seen as applied to five fertile testbeds. Armstrong of flooring and textile fame is matched with the Philadelphia Guild of six Pennsylvania furniture

makers in friendly "co-opetition" (sic) for turfs and territories. They are joined by Europe's Asea Brown Boveri, a multinational electronic giant which has dispensed of 90% of its headquarters staff, since "for many purposes, networks replace bureaucracy." Organizational cameos populating *Teamnet* seem hundreds, but probably aren't.   While Xerox is mentioned in passing, we span from IBM (*Big Blue to Baby Blues?*) to tiny Commemorative Hope Wood of Arkansas, which manufactures mementoes of the President native son. Some cases, like the Sydney Opera House story, are classic *Reinventing Government* material rather than networking examples, but bureaucrats are still the "rascals in paradise."

Thoughtfully, almost midway through the book (p.191), a two-page summary of *Teamnet Manual 1.0* lists the decalogue of Teamnet Principles (purpose, members, links, leaders, levels) and Phases of Growth, (start-up, launch, perform, test, deliver). It is designed for readers in a hurry. They are advised to jump to a Chapter Eight tutorial, back to "Seeing the Obvious" in Chapter Two, forward to "Linoleum, Furniture, and Electrical Systems" in Chapter Three; then it is *en avant* again to Chapter Nine for "Launching Teamnets," where you get "the workhorse techniques you need to get your team off the ground," e.g. asking Who, What, When, Where, and Why as reporters do.   This is part of the Target Method, which relates to the five T's of targets, tasks, team, time, and territory.

Teamnet Principles allow the flexible organization to keep one foot in the past and one in the future, without falling into the widening gulf between them. As in "if you blame the system, you are probably right,"

there are no revelations to be found among the definitions, windows, highlighted paragraphs, bolds, italics and font assortments which keep the reader's eye alert and disconcerted -- only that teamnets are spilling over uncharted territory, where they become "businesses' potential secret weapon." By way of orchestrated jumping from concept to case history examples the reader is guided to the "scratch and sniff experience" the authors recommend as a taste of what if feels to work in the teamnet mode. Readers of Wellins's *Empowered Teams* will be interested in the added dimension of intercompany crossovers, which are really beginning to materialize. A February '94 article in the San Jose Mercury describes an experiment conducted in Oregon by the American Electronics Association: a three-year, five company partnership in which the partners, led by MIT theorist Daniel Kim, helped one another on specific projects, saving hundred of thousands of dollars. Dr. Kim thinks that technologists are ok when launching new companies, but later on firms needs "team-learning and infrastructure." Raytheon's CEO Bob Sadich, president of AEA, believes we have here the equivalent of the Japanese *keiretsu*, and is all for repeating the experiment in Silicon Valley. Lipnack and Stamps, however mention in passing that "Auntie Trust" may give such doings her unwelcome attention.

This book is written with an euphoric crescendo reflected in charts and language which become increasingly complex, as in the graph of *Concurrent Cube -- Team, Task, and Time*. Silicon Valley is an *Economic Megagroup* of the *Voluntary Geography* species. In"Holism for the Left Brain," each of the five Teamnet Principles has a corresponding system principle, so that a network "member" is related to a system "holon. " Here the authors borrow, supposedly from Arthur Koestler, what seems a rather contrived etymology. (For accuracy's sake, it may also be extreme to describe Emilia-Romagna, even circa 1970, as "the fourth poorest"region in Italy, since it was even then producer of Reggiano, prosciutto, and Lambrusco.)

The book is about network dreaming, and Tom Peters once again emotes in a dust jacket paragraph, where *Teamnet* takes shape as "a formidable-- and matchless, to this point -- set of tools." Like the Peters books, this one suffers from the rapid change phenomenon, since stars at writing time are often publishing time flops. The success of Taligent, the Japanese economy, Domino's Pizza and Digital in particular are, at this writing, in doubt, but familiarity intervenes, since the authors spent two years at DEC, researching "how groups can become smarter by using technology." (DEC is one of the authors' corporate clients, along with Apple and the United Nations.) A "superb example of a teamnet" is the Four Hour House, a 1500 square foot, three-bedroom, two bath, fully landscaped house with amenities that the Building Industry Association of San Diego can produce in ditto time, by involving more than 140 firms and thousands of hours of planning.

Cui bono? Overflow, cross-over networking is a natural product of the information revolution, but the English language's fortunate propensity for short words has allowed Lipnack and Stamps to create, with *Teamnets*, a catchy neologism. It remains to be seen whether it will be widely adopted by organizational behaviorists and by the media. Only then we should add *Teamnets* and boundary crossing to our mental glossary with the likes of empowerment, the virtual corporation, paradigm shift, *keiretsu*, the resurrected group dynamics, and whatever else is necessary to keep our business English fashionable.

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(Giuliana A. Lavendel)

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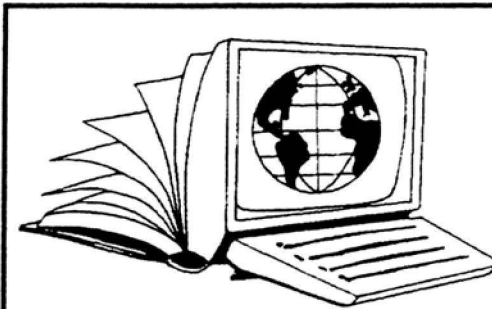
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Monday Teller

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PARC INFORMATION CENTER

"Big Blues: the Unmaking of IBM" by Paul Carroll. New York, Crown, 1993.

Warren Buffett, quoting a pundit whose name I can't remember, said that American stockholders must become accustomed to the idea of idiots running large corporations, because sooner or later one will. The twilight of the gods in *Big Blues,* however, is not about stupidity but rather about hubris;"Sort of a Greek tragedy," writes Carroll. "It is a very sad story." But is it true that latter days senior managers at IBM referred to their workforce as "the clerks and jerks?" With the success of the early Eighties, arrogance became a way of life. People flaunted their salaries, and learned that "the way to get ahead wasn't necessarily to have good ideas....The best way to get ahead was to make good presentations." The foils had it.

"Perhaps the toughest management job in America," according to the *New York Times,* belongs today to Nicholas Donofrio, a tired-looking executive with a Mediterranean mien who used to design chips. Now halting the decline of IBM's mainframes is his business, as President of IBM's Large Scale Computing division at a time when sales of mainframes and related products are down by fifty percent. Donofrio has at the most two years to replace the mainframes --listing at up to $20 million each -- with parallel machines which, although large, may cost one tenth as much. Big Blue must run leaner than it has been accustomed to; although mainframe revenues are not reported separately, those computers alone must have accounted for at least $10 billion of 1992 sales.

The delay in shifting to new technologies - even when developed in house, like the RISC chip or CMOS -- has plagued IBM like other corporate elephants.   Cannibalizing one's revenue base takes the brand of guts which are not usually found in corporate boardrooms; God created the world in six days and then could rest on the seventh because He did not have to worry about the installed base. Still, by 1996, prices will be down to $15,000 per MIPS from $60,000 in 1992, and IBM is toying with the idea of offering its mainframes as servers talking to other computers in client-server networks. Better than going ballistic as vice-chairman Rizzo did when he saw a big pack of press clippings about the PC, "a fact that had been driving IBM senior management nuts" since this popular product represented zero percent of the company's revenues.

Carroll, who for the past several years has covered IBM for the *Wall Street Journal* -- he now runs the *WJS* bureau in Mexico City -- has downloaded his electronic files onto the pages of this book.   This is a common penchant among reporters with long memories and a laptop, but Carroll in particular does not spare his readers anything, from the story of Thomas Watson who liked to don his wife's dresses on Sunday to amuse the children to the long skirmishes Don Estridge and Bill Lowe fought for the soul of IBM in the Eighties. Even the famous apocryphal (?) story about DRI's president missing out on the deal of the century because he way joyriding in his new plane over the Monterey Peninsula is told for the nth time, with the variant that the IBM "suits" called Bill Gates on the phone, rather than catching the next flight to Seattle. It is helpful, however, to have all the misses and near misses collected together, if nothing else

for the sake of archival correctness. How Noyce and his Fairchildren stepped elegantly around the slow moving giant and created the Intel "computer on a chip," thus preventing IBM's second coming. Then IBM sold its 20 percent share of Intel and passed up the chance to buy 10 percent more -- for an immediate gain of $225 million and an ultimate opportunity loss of over $6 billion; such is the quarterly return game. How Bill Lowe tried to use IBM technology for the second PC generation; the 1,000 programmers detailed to OS/2, at an estimated cost of $125 million, and how Canon "unburdened by IBM's wealth of information," leapfrogged the robotized IBM facility at Lexington, and went ahead to build an inexpensive laser-printer engine. How Lowe refused to buy 10 percent of Microsoft, which only a few years later "won so many battles that the IBM programmers decided that IBM stood for Intimidated By Microsoft." Bill Gates, however, was not invited for the official unveiling of the PC at the Waldorf Astoria; he received, after a few weeks, a form letter with the words: "Dear Vendor: Thank you for a job well done." He had to endure more grievous indignities from Jimmy Cannavino, a prickly, profane survivor who took over the PC business when Bill Lowe "was going to nice, quiet Xerox."

Glenn Henry, a senior IBM scientist, designed a hybrid chip which could run both PC and workstation programs and "would have let IBM control the future," but Henry spent all his time traveling to attract his superiors' attention, and finally took refuge at Dell. The brain migration from IBM is one of the most poignant phenomena in the history of modern technology; it was topped this January by the news that elegant, dynamic John Conrades had been chosen as President and CEO of Bolt, Beranek, and Newman. Heading IBM's 110,000 U.S. salesforce, Conrades had been considered a likely successor to "smart, forceful, optimistic, politically astute" Akers, one of the purest examples of the IBM culture, who instead demoted him by public execution in November 1991. Author Carroll considers Conrades "a great leader" and "the ultimate motivator". The story of how he was defeated by Cannavino, who (with predecessors) spent $2.5 billion developing and marketing OS/2, is an engaging corporate soap opera with touches of Grand Guignol. In particular, there

is a description of Cannavino trying to shed forty pounds on the Stair Master, while a "suit" next to him took notes "as wheezing *obiter dicta* were issued."

The Harvard Business School has written one of its deservedly famous case histories on IBM's peripeteia, but as far as author Carroll is concerned, there is no mystery about it. The corporation was overpowered by a combination of company culture, cost analysis gone amok, strategic overplanning and its Management Committee (may it rest in peace), "arranged in a structure somewhat like a Mayan pyramid, with three to six members sitting at the top," where the pyramid's tip often stuck up through the seat of out-of-favor executives and technologists. The MC was disempowered by IBM's new chief Lou Gerstner, a Harvard MBA from McKinsey and American Express "with a bit of a New Yawk accent," who doesn't know one computer from another but, unlike Akers, uses one.

In the end. the picture Carroll paints for the future may be too somber. Wall Street has noticed that the vision-spurning Gerstner regime is making the company turn the corner, mostly by forcing costs into a new business model. In the meantime, sundry corporations which have been accused of wasting opportunities in the last twenty years can take heart. Demonstrably and on a global scale, IBM has wasted more of everything, and this is why mourning becomes Big Blue, by comparison.

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(Giuliana A. Lavendel)

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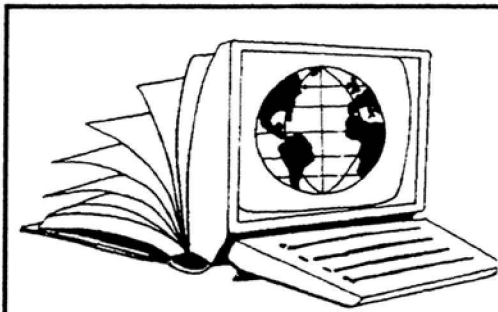
Monday Teller

No. 70   April 11, 1994

PARC INFORMATION CENTER

The 1993 Report On the Computer Industry by McKinsey and Co, Electronic Practice, 1994.

"The move to client/server marks the most significant architectural shift since the adoption of IBM's 360 beginning in the early 1960s," announces the fourth McKinsey's yearly pronouncement on The Industry. The team sounds fatigued; nothing more exciting was found as a focus than the "customer perspective, " as customers are left in the lurch by a missing infrastructure to support the shift to client server. Inevitably, this vacuum depresses demand, but a turnaround is promised by our brave analysts. Their material is organized in three chapters, with an appendix where the painstaking reader can find the rules of the game. Definitions, McKinsey database description, and a comparison between its content and the industry universe confirms that we are looking at 80 or 90% of whatever is worth mentioning in the computer world.

There are four roadblocks on the way to client/server: switching is costlier than anticipated, applications and tools are scarce, and so is expertise. Direct sales or other channels do not provide the value/cost ratio the customer is seeking. If we overlook the red ink at IBM and DEC -- and it is a big if -- the industry has benefited from client/server as a "catalyst for overall improvement." The customer, however, is faced with a switch which is almost a leap in the dark, and the malaise born of cost controls has particularly ravaged MIS departments, with the familiar outsourcing outcomes. On the other hand, expense scrutiny has been a bonanza for the packaged software and service crowd, accounting for 76% of "last year's" growth.

Last year means 1992, as evident from the charts provided by the McKinseyites; although this attention getter was, *de facto*, unveiled in 1994, the '92 figures appear a bit stale to the eye of any observer accustomed to the daily round of marriages, demises, and IPOs which characterize The Industry today. Process redesign, currently generating a measure of ennui, is seen by the McKinsey analysts as an instigator of client/server architecture. It empowers "front line workers," promotes crossfunctional linkages, makes the integration of products by diverse vendors possible, and it costs less in the end. Roadblocks to this heaven are the switching costs, as dollars needed to get clients and servers working together often puzzle the technology's pioneers, who anticipate savings that do not materialize. The "immaturity of supporting products," besides, causes up to 20 % downtime, which is still a great improvement over the notorious "sneaker net." Mission-critical applications which require 99 % reliability are still at sea. In fact, "the expertise to implement client/server systems is in short supply:" lack of skills still forces the industry into "desperate needs for services," a sector which grows beyond expectations (27 % in '92).

Legacy systems have left a trail of old distribution channels and applications. Many customers recur to "greenfield" tryouts rather than conversions, just to test the client/server mettle. Customer segmentation is another hurdle which most vendors fail to overcome -- they see in it only a sales tool rather than a diagnostic idea generator for developing new products. There are exceptions, and Sun Microsystems is held up as an example of strategic adroitness for addressing different

product and service segments when it formed several operating companies in '91. The new emphasis on segmentation is expanding from a focus on size, location, and field to embrace internal skills, vendor relations, even the willingness to take risks. 3Com is praised for having exited "the work group business" to concentrate on internetworking products, since "a vendor must identify the segment where it can add unique value." Manufacturing is an outright prerequisite for success. As for headcount, it declines only well after net income does; until the bottom line falls through the floor, computer companies tend to project a large happy family image. While the industry grew at 8 percent CAGR (Compound Annual Growth Rate) in the period '87-'92, this represents a decline from the previous quinquennium. McKinsey shows nominal dollars and real ones at current exchange rates, then nominal dollars at constant ('85) rates; this spells a revenue downer, if not total gloom and doom. Dramatic shifts are happening in the mix of products and markets, but the data offered here are of mainly historical interest and no obvious prognostic significance, except for the doubling of service revenues from '87 to '92. This is the only spectacular trend observed.

North American vendors, facing slower growth at home, are gaining global market share: 70% of growth comes from abroad, but while Packard Bell, Dell, AST Research, Apple and Compaq prospered in the U.S., giants IBM and DEC declined at home and posted gains worldwide. Software companies -- Microsoft, Oracle, Novell, Lotus -- generated over half of revenues on foreign soil, while the home turf favored service providers like EDS, Systematics, Science Applications. Arthur Andersen of accounting renown is stronger abroad, where it obtained more than half of its systems growth.

The industry is slowly fragmenting (crumbling?) because "standards lower the entry barriers for new players." Of the "Top Ten," IBM, still in the driver's seat, lost four points of market share, but the next nine competitors gained and changed places: Apple came up and Olivetti dropped out. The Ten devoured many others: Fujitsu acquired ICL and Nokia, Siemens swallowed Nixdorf, AT&T bought NCR; only IBM, NEC and Unisys were forced to restrain their appetites. Xerox held its own

on McKinsey's list of computer giants, at the 22nd slot globally and at the 11th ('87) and 12th ('92) in the U.S., where there are plenty of newcomers like Microsoft and Sun Microsystems to contend with.

As for large computers, pie charts patently show how Fujitsu and Hitachi feasted on IBM's core. Most fragmented of all, the software market has witnessed an astounding changeover of players, with Oracle and Lotus the newest arrivals among the Top Ten. While iron stalwarts declined in the software market, IBM and DEC are up and running in the service arena growing 25% a year. Sadly, The Industry no longer queens it over the Standard and Poor industrials, it trails them on Wall Street. In '83 its profitability was more than double that of the pack.

McKinsey's busy eyeviews of revenue growth show Cabletron, Sybase and Synoptics raising the bar. Microsoft, Novell and Sequent excel in creating shareholder value. For these six vendors, cost of revenue is up (61.6%) and so is R&D expenditure (8.8%), but SG&A shows a slight improvement, at 23.4 %. IBM, plotted in splendid isolation in Trends, p. 36, is less fortunate.

As reported by the media and optimistic pols, productivity is up at $180K per hardware firm employee and $115K in software and services; growth is 9% from 1987. Overall, headcount remained the same, which means RIFs all over, of course. Here '92 is harbinger of '93, which will probably not fare any better, but we are holding our breath until we hear from McKinsey, same time next year.

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(Giuliana A. Lavendel)

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Monday Teller

No. 71   May 16, 1994

PARC INFORMATION CENTER

Connections by Lee Sproull and Sara Kiesler. Boston, MIT Press, 1991.

Unmindful of bits and protocols, *Connections* is a social analysis of the benefits and complications of the wired world. "In our vision of a networked organization, an organization chart would be obsolete before it could be printed and distributed." In fact, "We write in the same spirit as social analyses of other technologies -- the railroad, telegraph, telephone, steel axes, guns, stirrups, snow mobiles and CAT scanners," promise authors Sproull and Kiesler, noting that, if electronic communications root mostly in tech ivory towers, successful networks materialize increasingly in places like elementary schools and restaurants. Connected by e-mail, bulletin boards, online conferencing which break space and time and also hierarchical barriers, we are experiencing "pioneering changes." Still, a lot of executives in America read only what their staff prints and serves them in hardcopy; no *infobahn* for them.

Each chapter is conceived as a standalone essay, which makes arguments and examples repetitious at times. The social history of the nineteenth century -- enter again the railroad, typewriter and telephone -- is followed by two-step analyses of changes introduced or triggered by computer communications: from small scale to broad societal processes, from sporadic to general phenomena. How coordination among people increases and what happens when both physical and social barriers are broken, how an etiquette of electronic mores is pieced together. Meetings, communications among workers at remote sites, and altered authority patterns are explored, with a forecasting finale in chapters

seven and eight. The bulk of research for *Connections* was done at Carnegie Mellon, but the list of supporters, whether financial or spiritual, includes among others the National Institute of Mental Health, the National Science Foundation, and Xerox PARC.

Sproull/Kiesler believe that the new communication technologies are unique, since they have a first level, or an anticipated technical effect, and then socially long-reaching second level effects, which "lead people to pay attention to different things, have contact with different people, and depend on one another differently." Indeed, some 1st century A.D. sage could have proffered the same observations about papyrus. Even then new technologies were embraced first for their efficiency gains, which were then forgotten in the wake of broader impact on the prevailing culture. No one has been able to document cost savings derived from Gutenberg's invention -- or Chester Carlson's, for that matter. The full impact of a new technology is hard to forecast. Inventors are notoriously short-sighted, thinking as they do only of an immediate, problem solving application, like enabling common folks to read the Bible. Consequences of the second order are less involved with practicalities and more with the way we interact with each other, especially at work. This will in turn cause "people to renegotiate changed patterns of behavior and thinking." Finally, a technological change "can set the direction of a deviation-amplifying spiral." Such, indeed, is the effect of networking. Thanks to e-mail, graduate students can enjoy a free-floating apprenticeship with distant teachers, and scientists choose their colleagues on the basis of shared interests rather than proximity, as

Nobel geneticist Lederberg observed. In the electronic community of practice nobody is left out, even the "plodders" who slowly and painstakingly -- if brilliantly -- analyze and innovate in the security of their laboratories but are overshadowed in meetings by the "leapers," who can think on their feet and are skilled at intellectual debate. On the net, economies and efficiencies give all users their due. Besides, "cost savings occur because the technology is fast, asynchronous, and makes one-to-many communications as easy as one-to-one."

Sproull and Kiesler believe that "the fundamental unit of work in the modern organization is the group, not the individual." When groups meet face-to-face, however, they pay the price of *process loss* listening to one another, but e- mail "can decrease group coordination costs just as electronic one-to-one mail decreases one-to-one coordination costs." ⁻ Plain text and perceived ephemerality of messages often lull users into a never-never land where behavior rules are ignored. Do you realize who you are talking to? Electronic messages from the Iran-Contra negotiations were saved in the White House system, although they had disappeared from the participants' computer screens, and even Oliver North was lax about his electronic privacy. Similarly, people reveal intimate details when talking to Weizenbaum's emulator of a Rogerian psychotherapist, software charmer ELIZA, or to computerized marriage counselor Sexpert. Flames and intemperate outbursts enliven most distribution lists because of "deindividuation phenomena:" on screen, people feel anonymous and lose their sense of mores and values.

Electronic mail reduces conformity, as proven by group experiments where decisions are made half face-to-face, and half via computer; there is less effort towards consensus in digital exchanges, where disagreement easily becomes conflict. Electronic groups are most appropriate when "because of distance, time zones, organizational or social differences, one would otherwise have no group at all." E-mail may increase commitment in large firms by offering a "window on the corporation;" it may also give a voice to the voiceless. Managers are better talkers than listeners, and are often resistant to news. "Central management,"

Sproull/Kiesler observe," may not want to hear what peripheral employees, who start out at information disadvantage, have to say." The authors dedicate several pages to the information gap hypothesis, with an interesting diagram on "equivalent benefit" balancing the outcome for peripheral people and people at the core. Computers, conclude the authors, far from being cold and impersonal, "can be used to increase personal connections and affiliations" among people separated by geographic and hierarchical distances. An e-mail "Does anybody know?" is a great equalizer, whittling away at the power of traditional gatekeepers, but good communications can also increase control at a distance, by providing military commanders "with six-thousand-mile screwdrivers." Mentioned in passing is the plight of many knowledge workers, who use telework to augment office hours, not to substitute for them.

Networking makes for a complex but more democratic world. Russian poet Yevtushenko dreamt of a Soviet Russia where everybody could have access to a photocopier. What will the world be like when most people will be able to communicate in an interlingua (most likely, a pidgin English) on a gigantic global Internet? Authors Sproull/Kiesler have done their best to show that "computer-based communication amplifies some predicaments, poses some new predicaments, and makes some obsolete." As Alan Kay reminds us, it is easy to predict the future when you are creating it.

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(Giuliana A. Lavendel)

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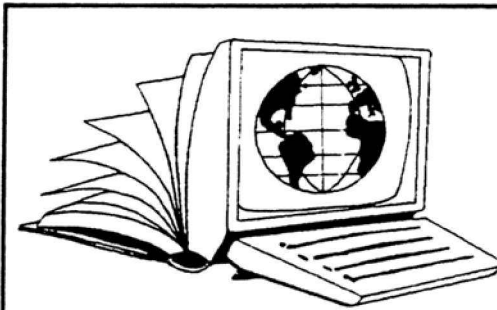
Monday Teller

No. 72   June 6, 1994

PARC INFORMATION CENTER

The Tom Peters Seminar by Tom Peters. New York, Random House, 1994.

As the foreword says, this is "the content of a typical Tom Peters seminar, circa early 1994," making the $14 price of this "designer" paperback a bargain. The colon clause/subtitle ("crazy times call for crazy organizations") and much of the content are familiar but still clever enough to surprise occasionally, like the back cover picture of a smiling Peters clad in business mufti from the waist up and sporting bathing trunks on his lower half.   Peters is proud of his revised waistline, the results of a health and fitness conversion which became a conversation piece in Silicon Valley.

This "book-communication vehicle," is a wordsmithing stunt full of quotes and quips in pursuit of a "new metabolism." The chairmen of General Motors, IBM, Westinghouse, American Express and Kodak were all fired within a few months of each other: isn't this significant? Each of the nine chapters in the *Seminar* begins with the word *beyond*, followed by managementspeak sacred cows: Peters' *beyonds* range from change to decentralization, to empowerment, company loyalty, disintegration, reengineering, corporate learning, quality, and back again to change, which is the author's *leitmotif*. Each *beyond* offers a model to pursue, no matter what the organization's size. But, of course, "atomized corporations" are preferred, and they are even better if the wiz kids in Mahogany Row are younger than 35 --or 30, or 25...

Harvard's Mike Porter, one of America's priciest/smartest lecturers, says that core capabilities count but core competencies do not, because you either hire or train for them.

Peters agrees, in "The Core Competence Trap:" Sears and IBM showed that leveraging a few skills doesn't help. You have to be prepared to commit suicide in the name of survival, so that your cherished CCs may become hobbles on the way to successful change or "self-inflicted catastrophe."   And on and on.   Middle management destroys value, professional staffers should be burnt at the stake, and specialists are not special at all, if they happen to be white collar and do not have a mom and pop store mentality -- but cybrarians are librarians who can navigate in cyberspace, and they are OK.   Janitors can be professionals, secretaries cannot (can't the boys in the head office type or make coffee?).   "Businessing" means to run one's own show; this is grammatical since Shoshana Zuboff used "informating" for her *In the Age of the Smart Machine.*

Loyalty to a mother corporation is a thing of the past. Your friend, mentor and power base is your Rolodex of contacts, combined with a "what-I-can-learn-next" strategy. Assume you have absolute authority, because powerlessness is a state of mind, and have your Rolodex security blanket ready, if all else fails. However, the carrot and the stick method is still viable, especially to mandate the transfer of personal knowledge within the team. This call to "sharing nuggets with others" is the only approximation of the Golden Rule Peters seems to allow.   It is particularly well developed in the "communities of practice" where knowledge development activities most felicitously occur, according to the Institute of Research in Learning, a PARC intellectual spinoff.

There are fourteen commandments listed, such as "Weed out the dullards, nurture the nuts!," which may lead to watergun fights on hot days in the accounting department. Beyond such prescriptions, "the new American fixation on quality was the most important new thing that happened to our economy in the last 15 years." It is even more important, though, to work directly on TGR (Things Gone Right) than concentrating on by-the-numbers TGW (Things Gone Wrong) analysis out of TQM. Products must have *spirit*, like the Swatches invented by Swiss watchmakers to counter the Japanese quartz invasion. The Japanese achieved *glow and tingle* when a primary manufacturer exposed *udon* noodles (a billion dollar market) to the music of Vivaldi and Beethoven to activate yeasts and enzymes; the product, welcomed by rave reviews, commands a price premium of over 50 percent.

For the hurried Nineties, Peters quotes a Northern Telecom executive, "There will be only two kinds of managers -- the quick and the dead." Quick managers get rid of *lumps* such as manufacturing, following the example of the omnipresent Bill Gates, thanks to whom "Microsoft's only factory asset is human imagination." Even at lumpy 3M salespeople from the electronic division do not carry sales kits anymore; they custom-engineer everything. In the disembodied enterprise, Brains R Us -- or Else! Workers, whether of the knowledge or the brawn persuasion, are there to be molded by the business revolution -- another wave of change is just coming in our direction, propelled by management's good intentions and supposedly embraced by the troops. One is reminded of the cautious way Star Trek veterans define their executives: "Starfleet commanders are like children: they want what they want, and they want it right away, but the secret is to give them only what they need."

Jollifications apart, Peters' new book is a gold mine of quotes by renowned and insightful authors like Charles Handy of *The Age of Unreason* (see Monday Teller # 24) and Homa Bahrami of UC Berkeley and *flexible organization* fame. Xerox's John Seely Brown scholarly statements contrast vividly with Peters' abandoned prose, as in JSB's "The modern knowledge economy turns on the better use of knowledge." Here and there a serious question mark surfaces, e.g., "How...do we deal with the widening gap separating the haves and the have nots in our society? What about the have and the have-not nations?"

Critics have observed that several of Peters' stars -- as extolled in *Liberation Management* and *In Search of Excellence* -- have suffered serious fortune reversals, as in the case of Philip Morris: "You bop in to see your local banker, borrow a cool $13 billion..." Enamoured with change and speed, Peters pushes the reader to throw out all sorts of traditional processes and recommends unusual combinations: "more intellect, less materials." This is the new age of "value via intellect and pizazz." Intellect, however, is what it has always been, the fastest medium around, working with "the lightning-fast route of the circuits of the mind, capturing and connecting remote points in space and time..." This is not by Tom Peters but by Italo Calvino -- that most intellectual writer -- in his Harvard *American Lectures,* a far cry from "Abandon Everything!" and Peters' list of OK words: Revolution, Zany, Weird, Crazy, Freaky, Nuts, Apeshit, Holy Toledo and other youthful utterances. As Peters puts it, maybe "Is It Weird Enough?" should have been the title of this paperback.
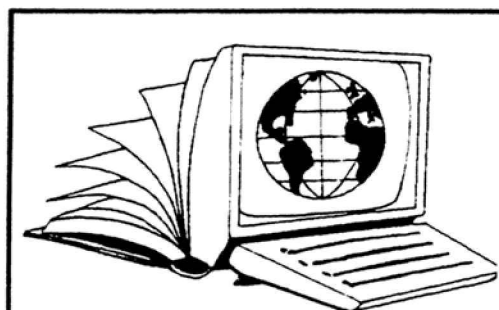
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(Giuliana A. Lavendel)

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Monday Teller

No. 73   August 15, 1994

PARC INFORMATION CENTER

Hoover's handbook of American business 1994: profiles of over 500 major U.S. companies. Austin, TX, Reference Press, 1993.

It is a rare publisher who puts his mission statement on the title page, but tiny Reference Press does it: "....To make that (business) information available whenever, wherever, and however our customers want it through mass distribution at affordable prices." And further on the same page: "We dedicate this book to the people who make it possible -- the workers of America -- for we believe that the noblest of tasks is to put in an honest day's work, no matter what your rank or your profession." This is a piece of Americana halfway between Henry Ford and Ben and Jerry; readers inured to the bottom line religion of the big league publishers, be they a McGraw-Hill or a Reed Elsevier, cannot but be awed by the *elan* of this tiny, employee-owned company, conquering or rather creating a market in only four years from mind to product.

The Hoover people warn that "the information contained here is as accurate as we could reasonably make it," and sometimes came from third-party material which they "were unable to independently verify." Compustat, Standard and Poor, *Advertising Age*, *Public Accounting Report* and brethren are the main providers of information about the 505 companies featured in *Hoover's*, from the largest -- GM, at 131 billion -- to the smallest -- the Boston Celtics at $46 million. The approach is egalitarian: each enterprise rates a two-page profile, no matter its size, and the format is constant, with mastheads in white letters over corporate blue. Each profile has an overview, a "when" mini-history, a "who"of the org chart, a "where" for headquarters and other locations, a "what"

basket of assorted products which may be "The Oprah Winfrey Show" (King World Productions), Conagra's Butterball turkeys, Lotus Notes, or the Washington Post's *Hankuk Pan*, which is the Korean edition of *Newsweek*. A novelty feature entitled "Key Competitors" is by no means reciprocal; for Xerox there are 21 competitors listed, from Alco Standard (operator of largest network of photocopier dealers and paper distributor), to 3M, Moore, and Toshiba. Canon is listed, and so is Hewlett-Packard. But Xerox does not appear on the list of Hewlett-Packard competitors, unless we can assume that SynOptics is a stand-in for the Big X.

The first edition of *Hoover's*, now four years old, took readers by storm, and found a hardcopy niche next to many desktops as "the first widely distributed, reasonably priced, easy to use annual reference book on major companies." (CD-ROM and online versions are also available, but not as cuddly.) In the current edition, Atari, the Henley Group and Chips and Technologies have been dropped, while part of Humana survives as Columbia Healthcare and Control Data becomes Ceridian. Adobe Systems, sharing honors with trendy health enterprises, was picked for the newly launched *Hoover's Handbook of Emerging Companies*. Hoover's editors have sharp eyes for who's doing well in the current climate. They also split away the foreign section, which became *Hoover's Handbook of World Business*, effectively covering 65 countries which compete in the global village.

Reference Press is run by whiz kids; for instance, the managing editor is only 30 years old. The approach is breezy, informal, yet accurate; in spite of the self-imposed brevity,

Hoover's is written in an animated, almost journalistic style, trusting that the customer, whether naive or wise, might prefer a bit of handholding. Founder Gary Hoover, a former Citibank analyst, guides the reader to the corporate profiles by way of a primer on the economics of the enterprise, complete with S curve and a reminder that the human element is paramount: "Whether Sears survives is up to the people at Sears. Whether 3M continues to develop innovative products depends on 3M's people. Every enterprise in this book reflects the people of the enterprise." Then we get Hoover's *nous* on ratios from ROI to ROE, the EPS Growth Rate, P/E and how to balance such pithy concepts on a road filled with potholes like LBOs. A rationale for profile selection follows: "What companies will our readers be mostly interested in?" Size, growth, visibility, and breadth of coverage are the criteria indicating that "these businesses are important enough." Among the selected are two sports teams, the Big Six accounting firms, and one ranch. It is the King Ranch, of course; *Hoover's* Reference Press hails from Austin, Texas.

Another example of handholding is in the "Further Reading and Resources" section, which includes thanks to the Public Libraries of Austin, Texas, and San Francisco, California, and information for would-be job seekers, in regulation or digital format. Finally, a lavish "List-Lover Compendium" ranks enterprises by a wide range of criteria, first as seen by *Business Week, Forbes, Fortune* and *Hoover's* itself, with the shifting perspective of several years. Then we are invited to meet the most valuable, the most profitable, the fastest growing, the fastest shrinking firms, their metropolitan areas and specialties, even the in-house legal departments of the top 25 Fortune 500 Firms (Xerox is 22nd with 140 attorneys, according to 1992 figures). The "largest newspaper" in the U.S. is the *Wall Street Journal*, and the largest magazine is *TV Guide*, while the Philadelphia Eagles rank first by revenues among professional football teams. We have the most admired corporations, the environmental leaders, those who have shown the most improvement, and also the environmental laggards, headed by American Cyanamid and Boeing. Indexes also blossom towards the end of this 1300 page volume: by brand, people, industry, headquarters location...

Sandwiched among primers and indexes are the 505 corporate profiles, alphabetical, from Abbott Laboratories to Zenith Electronics. One is tempted to let the desktop go dormant and read the gossip; did you know that the Coca Cola familiar script was penned by a bookkeeper in 1886, while a pharmacist mixed the coca leaves and kola nuts? That Motorola sold its TV business to Matsushita? That Medco's strength is the Prescriber's Choice software, which shaves up to 50% of drug costs? That Godiva chocolates come out of Campbell Soup? That Amway tried in vain to buy Avon? That Apple is called Apple because Steve Jobs spent time on an Oregon farm? For reality among the corporate trivia just look at the Xerox profile:"...With an eye to future alliances, Xerox signed deals to supply print engines to...Compaq and Apple....a particular coup, as chief US competitor Canon had been Apple's sole print-engine supplier since 1985."

Beancounters (legume comptrollers, in P.C. parlance), management prophets of the reengineering school, and just plain folks will enjoy *Hoover's Handbook of American Business 1994*, and be pleasantly surprised at its price -- only $35, enough to give the duly listed Key Competitors nightmares.

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(Giuliana A. Lavendel)
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Monday Teller

No. 74   **September 19, 1994**

PARC INFORMATION CENTER

The Empty Raincoat, by Charles Handy. London, Hutchinson, 1994.

Reading Handy again one feasts on artfully simple lines like "The secret of balance in a time of paradox is to allow the past and the future to coexist in the present." On second curve thinking: "The past might not be the best guide to the future," since, in business as in life, it is best to leap forward from a position just before the top of the curve to the "myths of 'the future," and the other sigmoid curves beyond. Like Handy's earlier *Age of Unreason*, this is a dangerous instrument for mulling unorthodox, at times painful thoughts. Although the former London Business School professor is a crypto optimist, the world of work has changed much along the lines he foresaw, and he has not found it comforting. "Life is a struggle for many, and a puzzle for most."

Why the raincoat? "Without Words," a sculpture by Judith Shea in a Minneapolis garden, focuses on a bronze raincoat standing up by itself, with no human in it. Handy is fascinated by the paradox of people becoming faceless numbers in a sea of statistics, the raw material of economics and sociology: "There must be more to life than being a cog in someone else's great machine." This is how many of us feel, but there are no plain yes or no answers, in this year 1994. Better to think, like Czech President Vaclav Havel, that we must cultivate respect for something beyond ourselves. Olives go unpicked on Tuscan hills because the old are too frail and the young not interested. "We have priced many jobs out of existence all over the industrial world," comments Handy (good wages are necessary to survive and pay taxes to the Government). The

$1/2 \times 2 \times 3 =$ PP rule prevails, i.e. half as many people paid twice as well and producing three times as much for Productivity and Profit. Cramming the 100,000 hours of work into 30 years rather than the traditional 47 (from 18 to 65) leaves a long inactive time at the end, something like 25 years which cannot properly be called "retirement." Handy has many hopes for this "third age," but only a few lucky seniors are examples of Jung's belief, that the first half of life is preparation for the second. Family, Friends, Festivals and Fun have been replaced by Profit, Performance, Pay and Productivity.

Surprise quotes show up among Handy's truths and numbers: from Margaret Thatcher's "There is no such thing as society" to New York's former Mayor Dinkins at Arthur Ashe's funeral: "Service to others is the rent we pay for our place on earth." Al Gore: "We have constructed in our civilization a world of plastic flowers and Astro-Turf...windows that don't open and background music that never stops...sleepy hearts jump-started by caffeine, alcohol, drugs, and illusions..." Adam Smith, a professor of moral philosophy, NOT of economics, taught in his *Theory of Moral Sentiments* that "sympathy," a regard for fellow human beings is a good and necessary thing to have. "The market," comments Handy, "is not a substitute for responsibility."

Are we sliding through the edge of chaos, from which a new world order is about to emerge? "There are few great causes or crusades any more. Maybe it is the end of history." We are ruled by nine paradoxes which buttress one another. Number One, Intelligence: the new source of wealth is the IQ, a quantity exceedingly difficult to measure, "which is why

intellectual property seldom appears on balance sheets." Number Two is the familiar Paradox of Work: those who have work and money have no time to enjoy, and others have time, but no work and no money, although "the British and Americans believe that any work is better than no work," an axiom which produces an increasingly deskilled work force. As for Paradox Three, Productivity, it means ever more and ever better work from ever fewer people. Paradox Four concerns Time, which "is coming unfixed;" we need more of it but have less, even if we live longer and use labor saving devices. The Paradox of Riches exists because wealthy societies have fewer babies and more older people with small consumer needs, while the Third World experiences a tide of rising expectations. As for Paradox Six, the Organization may be coming to an end along with full time employment; "an organizing organisation will look and feel very different from an employment organization." Paradox Seven rests on "the cohort factor" because each generation is affected by its own history; for example, "children are now a decision not an accident." Paradox Eight concerns the individual vs the team or society as a whole, and was best captured by Jung, who said that "I" needs "We" to be truly "I." Finally, Paradox Nine concerns Justice and its distributive dilemmas. Is it wrong to pay the lazy scientist more than the diligent garbage collector? Capitalism thrives on the principle that "those who achieve most should get most," but how will we meet the needs of those who need most?

The first part of *Raincoat* poses the problems; the second, map-like, is about "Finding the Balance -- Pathways Through Paradox." A *leitmotif* is that "Moving on requires a belief in...curvilinear logic, the conviction that the world and everything in it is a Sigmoid Curve of change." It is not wise to abandon the first curve too soon; for instance, *kanban* is now jamming all the freeways around Tokyo with delivery vehicles, so that just in time is often just too late. The inverted Conceptual Doughnut, with the hole of discretionary responsibilities on the outside and the essential dough of business tasks in the middle, offers more room for choice -- and for error. The Chinese Contract promotes continuous negotiations and compromise, reversing our Western and often ferocious self-interest stance.

In Part Three Handy offers practical advice for cruising on the Sigmoid Curve from one paradox to the next. Empowerment must become subsidiarity, which sounds even uglier but indicates that power already belongs farther down the organization tree. The Anglo-Saxon and European versions of capitalism (does it have a human face?) would survive better if combined. Cultures must blend. A company is a group of "companions, members of one another," and is based on a hexagon contract (Handy's imagination is very Euclidean) with six interest groups: shareholders, employees, customers, suppliers, society and the environment. To make a profit is just a requirement, not the main purpose for the "existential company, where employees are driven by their own self respect."

It is awesome how much fertile thought is crammed in this small book, which corners the reader into fervently agreeing (yes, there should be a sixth Maslow level beyond self-realization) or disagreeing. (Is creativity born in chaos? Does intellectual property mean people?) Half integrator and half innovator, the Irish sage preaches by paradox, metaphor and parable. He has filled the raincoat with some tantalizing future stuff with a wee touch of *deja vu*. You "go portfolio" when fees replace wages, and engage in "serial monogamy" upon divorcing. The flexible organization is a "mud doughnut," and volunteers do "gift work." "Money is seldom the measure of much" and, finally, "It is up to us to light our own small fires in the darkness."

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(Giuliana A. Lavendel)

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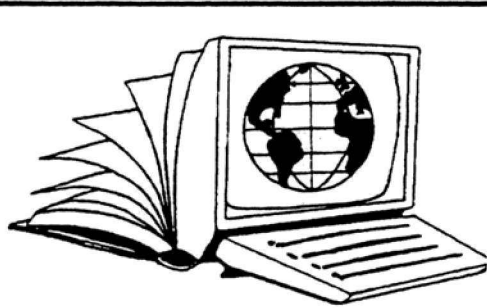
Monday Teller

Democracy and Deliberation: New Directions for Democratic Reform, by James S. Fishkin. New Haven, Yale University Press, 1991.

Lake Woebegon chronicler Garrison Keillor says we are a nation of soreheads. If this is true, Prof. Fishkin, Chair of the Government Department, University of Texas at Austin, is right on target thrashing about for a panacea, "while hope blossoms green," as the Poet says. But is it utopia or dystopia? Churchill and lesser pols have argued that democracy is the worst system of government imaginable except for all the others. This applies in particular to the non-parliamentary, federal democracy variety such as we enjoy in the U.S.A.

Enters, with the help of television and "appropriate statistical techniques," Fishkin's "deliberative opinion poll," which is actually an updating of practices familar to Athenians of the 5th century B.C. According to the cover blurb, all ten presidential memorial libraries will *beta* the author's proposal for the 1996 presidential election; we will have a chance to witness whether this is really a better 2500 year old mousetrap. Fishkin's reliance on electronic media, from statistical programs to TV, might be ascribed to the heady air of Silicon Valley, since this book and the theories thereof were conceived in Palo Alto at the Stanford Center for Advanced Study in the Behavioral Sciences, cradle of many sabbatical thunderbolts.

This one "is about how to bring power to the people," or how to facilitate the import of democratic deliberation from the ancient city-state to the megastate in which we live. In three sections, the author marches the reader from the personal democracy of the Founding Fathers to a "direct democracy" system to be achieved by means of delegation. Representatives (of sterling probity?) would constitute "a national sample of participants" and interact face to face with the major candidates of each political party. This "selected group of citizens," immersed in "intensive, face-to-face debate" -- sort of a national caucus -- is to be represented at the conventions of the major parties, sitting in judgment as a board of "super delegates" over the speeches and hoopla. In the author's vision, this scenario would help make the initial choices for the rest of us, since the pricey TV testimonials of the present primary system are not more efficient than any "deliberative opinion poll." In fact, the two early primary states, New Hampshire and Iowa, cannot be compared to the "megastates" because of their lack of minority and urban population.

Fishkin is very concerned about the problem of size, to which he dedicates a chapter where Aristotle is quoted, stating that bigness is unmanageable: "If a state is too large, who can give it orders, unless it has Stentor's voice?" Stentor, a Greek herald in the Trojan war, could bellow louder than 50 men - but perhaps so could a number of the members of Congress, which is populated by practiced courtroom attorneys. James Madison, although mindful of deliberation and nontyranny, felt that "an extended republic" could be successful, but Patrick Henry, John Adams and Alexander Hamilton believed that a single government cannot rule over an extended territory. Fishkin suggests that the direct-majoritarians of the Anti-Federalist movement lost the short battle over the Constitution but have "largely won the war in the long march of history." We now follow a plebiscitary model of democracy, largely driven by the worldwide

Why Zebras Don't Get Ulcers: a Guide to Stress-Related Diseases, and Coping, by Robert M.Sapolsky. New York, Freeman, 1994.

Zebras just have to cope with extreme stress factors like lions, not niggardly ones like traffic jams and teenagers: that's why. "We in our Westernized society now tend to get different diseases than we used to. But even more importantly, we tend to get different kinds of diseases now, with different causes and consequences." This book is about men and women, baboons, salmons and hyenas, and what happens to some species, ours in particular, when the habitat is morphing. The author, a MacArthur Fellow now teaching Biology and Neurosciences at Stanford University, hides under the academic cloak an irreverent sense of humor, which is in evidence when he tests his reader's armchair responses to a passage from D.H. Lawrence's Lady Chatterley, in the chapter on "Glands, Gooseflesh, and Hormones."

Sapolsky begins by clarifying the "nebulous concept *stress*" and how it mobilizes the brain and hormones; he then describes the links between *stress* and various types of ailments, its impact on growth, reproduction, the immune system, the psyche and aging. In general, as a species, we have learned to cope, but the professor has some qualms in the final, how-to chapter (13) of his book: "Perhaps I'm beginning to sound like your grandmother, advising you to be happy and not worry so much." Few of the things we find stressful in this age, like money worries, overwork, troubled relationships are "real in the sense than a lion or a zebra would understand." Thus nature and science provide us with an elegant, stimulating puzzle to solve, if we wish to survive and become healthy nonagenarians.

Sustained, repeated stress as a cause or aggravating factor is behind many of the diseases which plague us, like cancer, heart disease and other cerebrovascular disorders characterized by slow accumulation of damage. For animals like zebras, instead, "the most upsetting things in life are acute physical stressors." It is nice to know that our human bodies are equipped to cope with such challenges and also with the "chronical physical stressors" like drought, famine, parasites which afflict non-Westernized humans but are not often experienced in New York City, London or Silicon Valley. "How many hippos worry about whether Social Security is going to last as long as they will, or even what they are going to say on a first date?" A frequent stressor is anticipation of a happening.

Stress-related diseases result from activating a physiological system designed for acute real emergencies and keeping it on a slow burner, worrying about non-life-threatening events like promotions and mortgages. When all physiological measures like oxygen, temperature, acidity are at optimum level "for a given time of day, season, age of organism, and so on," we are in homeostatic balance, a sort of physiological Nirvana, but stress can throw a monkey wrench into the works. During stress, digestion is inhibited, growth halted, reproduction ("probably the most energy-expensive, optimistic thing you can do with your body, especially if you are female") is curtailed, since your body has more pressing things to attend to. The immune system is also inhibited during an emergency, along with the other long term processes. Look for tumors some other time, now it is "fight or flight"for the body, and it is costly; "if you experience every day as an emergency, you will pay the price." Thus, under continuous stress, we are less resistant to disease, including cancer, in the opinion of some experts. Hormones secreted during stress may destroy brain cells and cause memory loss in old age. Sapolsky invites us to look at the Two Elephant Model: if you try to balance two elephants on a seesaw, disaster will ensue. The elephants will

spread of public opinion polling, where "the face-to face character of deliberation...has been replaced by millions of atomistic citizens who bounce back unreflective preferences from the mass media."

Fortunately, what could sound like academic elitism is followed by teledemocratic solutions and a theory of "representative samples." We could hook up everybody on the Amex Qube, a TV system for voting from home; while Executive and Judiciary branches would carry on as before, "the legislative function would be in the ultimate hands of the public speaking through the Qube." To avoid this majoritarian Armageddon, the author suggests to consult, rather than the populace, a chosen sample of the electorate, authorized to instruct legislators one by one. If Professor Fishkin's faith in statistical wisdom appears infinite, it is by dint of contrast, since "the half vision which has dominated recent discussion can be characterized as direct-majoritarianism," aka The Plebiscitary Model. This model, however, could be replaced by a stream of opinion polls which sum up to an imaginary plebiscite; this is just one of the innovations which could alleviate "our present dilemmas of democratic reform." Democracy, in the author's vision, rests on three conditions: political equality, nontyranny, deliberation; not only the Holocaust, but also PACs and "political opinion in its raw form" are all mentioned as deviations from this triad.

The majoritarians are chastized over and over again. In Federalist no. 71, Alexander Hamilton distinguished between the "transient impulse" of manipulated public opinion and the "sedate deliberation" when better heads prevail. Even John Stuart Mill harbored elitist thoughts, and subsequent theories were built in which "numerical majorities" were subject to "concurrent majorities" of "significant groups" with veto power. For graphics, there is a democracy chart served like a square pie, in order of political shades: it goes clockwise from nondeliberative on top left to Madisonian, representative, deliberative, majoritarian, direct, and nondeliberative all over again. The walk through the quadrants allows contemporary digs at President Bush (Read my lips! Read my hips!) and a reminder that Presidential attempts to communicate directly to the people is another plebiscitarian, direct-

majority, un-American indulgence; even the Gettysburg address is off the map. As for voter apathy, the U.S. is the only country where the burden of registering is the individual's, not the government's obligation; 87 percent of registered voters vote, which is not such a bad statistic, after all. Real democracy, however, is not best served by having every Tom, Dick and Harriet come forward with their TV-inspired opinion, as the plight of many would-be democracies around the world indicate. (It's the government, stupid!)

In the finale several forms of restricted but participatory democracy are reviewed, mostly innovations and stratagems suggested by other academics. Mentioned are presentation vouchers to be assigned to delegates, a deliberative minipopulus sitting in judgment for a year, and the felicitous "constitutional moment" capable of making even the hapless masses rise, episodically, to the occasion. Among dreams of a teledemocracy, a MINERVA offers a Multiple Input Network for Evaluating Reactions, Votes, and Attitude" -- not quite the Minerva of the Athenians.

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(Giuliana A. Lavendel)

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spend too much energy in the balancing act, they will damage the flowers, and find it difficult to jump off. In the same manner, "if you repeatedly turn on the stress-response, or if you cannot appropriately turn off the stress-response... [it] can eventually become nearly as damaging as some stressors themselves."

Sapolsky makes his point with humor and passion, and proceeds to make his case in thirteen chapters, charmingly narrated, and annotated in a separate section which the non-academic reader can ignore. Hormones and the related stress responses are covered in Chapter 2, while chapter 3 through 9 are dedicated to the different body sytems; Cardiovascular (Chapter 3), the Metabolism (Chapter 4), Gastrointestinal (Chapter 5), Growth (Chapter 6), which is entitled "Dwarfism and the Importance of Mothers." Sex and Reproduction (7) and Immunity (8) follow, then Stress-Induced Analgesia (9), where runner's high is equated to the stimuli which "keep that zebra functioning when it is injured yet still must get away from the lion." With Chapter 10, "Why is Psychological Stress Stressful?" we enter into another region, which is further explored in "Stress and Depression" (11) and "Aging and Death" (12). Chapter 13, as mentioned, is prescriptive.

All through this learned disquisition alert readers are given the opportunity of assimilating useful notions aplenty, e.g. the role of the sympathetic nervous system which kicks into actions during emergencies, "or what you think are emergencies." The brain is the master gland, which instructs the pituitary, which in turn controls the peripheral glands. Glucocorticoids, the steroid hormones "that get you thrown out of the Olympics,"are the author's particular focus for stress response; these also are under the control of the brain. While the sympathetic nervous system helps rodents to cope with a challenge, the glucocorticoid system works best for mice that choose to give up. In the face of a maximum stressor, the heart, "just a dumb, simple mechanical pump," produces five times the normal blood output; up goes blood pressure, since the sympathetic system costricts your major arteries with a mechanism not dissimilar from that of connected garden hoses. At the same time, vasopressin, an antidiuretic hormone, kicks into action to conserve your fluids, just as it does for zebras. All well and good, but the increased turbulence in the blood vessels causes scarring and accumulation of plaques from fatty acids and glucose. Here

comes atherosclerosis; monkeys under social stress suffer from it, even on a low fat diet.

Do you really want to know whether what goes on in your head can make you sick? You are invited to commune with a newly evolved species of scientists now filtering into the halls of academe: they are called *psychoneuroimmunolologists*. It is interesting that positive and negative emotions are both threatening for the body because they disturb homeastasis, as noted by anthropologist Irven De Vore "who said that if two people look into each other's eyes for more than six seconds they are either preparing to kill each other or to make love." Psychophysiological or "voodoo" death happens, unexplained: if faith heals, it may also kill.

Type A individuals may be hard to take, but they are not more prone to heart diseases than other less overt personalities, if they are tolerant. Rather, harboring a high degree of hostility predisposes individuals to coronary disease. There is such a thing as "successful aging," and it is the delight of gerontologists, since the variance among individuals increases a lot with the years; "Not everybody falls apart miserably with age, not every organ system poops out, not everything is bad news." But if you have eaten your Thanksgiving dinner "with porcine abandon," insuline will fill the deposit slips at your fat bank.
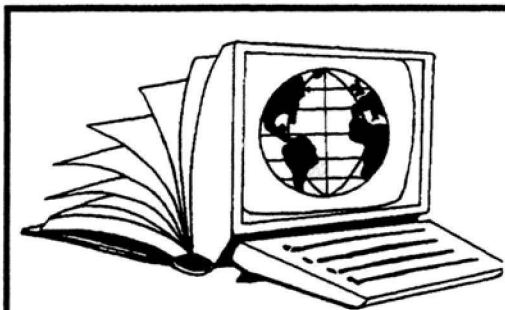
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(Giuliana A. Lavendel)
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"The Gutenberg Elegies," by Sven Birkerts. Boston, Faber, 1994.

There is a metaphysics of reading -- a meta-reading, if you will -- that involves" a change of state and inner orientation." Item: we endanger this blessed state of the soul as we rush to make the transition from page to screen. We sell the "free-floating self" which no Internet surfing can approximate for the price of online. It is the death of the printed word and its vestigial order; television has obliterated the "protoelectronic" past, and computers have finished the kill. Of course, it is not the first time in history such an upheaval has happened, since the Greeks lost the habit of Homer and oral poetry just as we are setting aside The Book.

This work is about the ecology of reading and the curse of digital pollution, which is made more menacing to the uninitiated by the appearance of tangible symbols like the cult journal *Wired* and the officials' National Information Infrastructure, a combination of terms which has been called by some "an infobahn pomposity." "We are living in the midst of a momentous paradigm shift," author Birkerts declares, after a failed experiment in which he exposes a class of undergraduates of the "I dunno" persuasion to the writings of Hawthorne, Poe, and Henry James. In an introduction, entitled "The Reading Wars," he meanders around the stable, wondering what dire fate will befall us, the hapless prisoners of the chip, while"the slower world that many of us grew up with dwindles in the rearview mirror." He is also hurting since his "Luddite" stance is not popular among progressive intellectuals, who "tend to equate technological primitivism, or recidivism, with conservatism of the N.R.A. stripe." Political correctness aside, he thinks it sad that "as the world hurtles on towards its mysterious rendezvous, the act of slowly reading a serious book become an elegiac exercise."

And here we are, by the way, reading a serious book which feels like a collection of unrelated essays -- except that the ensemble produces a long wailing sound. Apparently, we are witnessing the twilight of our world, plus the death of history, which is based not only on chronological sequence but also on the fixed coordinates of space and time. Computers are doing away with them. The time line which stands at the roots of all narrative efforts will vanish like the Ptolemaic reckoning, "for once the world goes fully on-line there will be no more history of the old kind." The digital world lives in an eternal present, off the space-time axis, ready to gobble up rugged individualists, poets, and all the right-thinking book lovers who see "the wholesale wiring of America" and dread it. Wired and its can-do boosterism is symbolic of the unique change we are witnessing, or rather of how we might all "plummet down the rabbit hole."

The Faustian motif -- or is it Frankenstein's? -- floats up on practically every page, for we have made ourselves a monster: "We have created the technology that not only enables us to change our basic nature, but that is making such change all but inevitable." Acceptance of electronic media is an act of treason for the true believer in the order of print, which is linear, while the electronic order is the opposite, since "information and contents do not simply move from one private space to another, but they travel along a network." A changing and ever heightened awareness of the present is the fate which befalls the computer user, lost to any sense of other times and spaces. Among the Attilas of our time, the author mentions Bob Zich of the American Memory Project at the Library of Congress. A scholarly, dedicated preserver of crumbling books and fading photographs, Zich uses scanners and other digital alchemist's tools to piece together memorabilia like the brief documentary Thomas Edison left of the 1906

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San Francisco earthquake. Zich's pride is the digital library demo he has put together in a courtyard of the Madison Building, with the help of friends from the electronic industry. "When men like Zich embrace the electronic future,"sighs Birkerts, "we can be sure it's well on its way." This means that language will become increasingly impoverished, and on and on.

"What is the place of reading, and of the reading sensibility, in our culture as it has become?" A Kerouac-nurtured "casualty of the culture wars of the 1960s," our author fears we will lose "the ability to communicate, symbolically, through language," because we communicate in bytes. (Similarly, the telephone may be accused of having killed the epistolary habit of so many literati of the past, but Birkert does not condemn that ubiquitous instrument.) Meetings of minds in global cyberspace and a merging of the printed and electronic *genres* are unthinkable. Just as alien is the thought that culture and reading may survive, as they have, in different forms, for thousands of years, and may be available, in digital form, to the many rather than the happy few. To the author, and his polymath friends, reading and thinking are very close operations. Both are "actually and historically invisible," although before the seventh century few people could read silently. St. Ambrose, the warlike Bishop of Milan and Father of the Church, astonished St. Augustine by reading in silence and without moving his lips, around a.D. 400 , or one whole millenium before Gutenberg. (Are there lip movers on the Internet?)

The question remains of whether the superabundance of reading material brought about by the computer's "cultural watershed" leads to reflection and creativity -- or just to sterile surfing. If people in past centuries read and reread their treasured printed matter, assimilated it, discussed it, "owned" it, could our new way of reading "impinge on our mental life?" Granted that "the hierarchies of the printed page" are not as immutable, or important, for the creative mind; after all, Plato, Horace and Cicero never saw a printed book -- neither did St. Ambrose, Chaucer or Dante. *Gutenberg Elegies*, however, reminds us that we may pay a price for "the sacrifice of depth to lateral range" when we browse extensively instead of reading intensively, or even ferociously as they did during the Age of Reason. The Information Highway has driven some bibliophiles to bang the spoon on their high chairs, but Birkerts cannot be dismissed when he sighs that "in our culture, access is not a problem, but proliferation is."
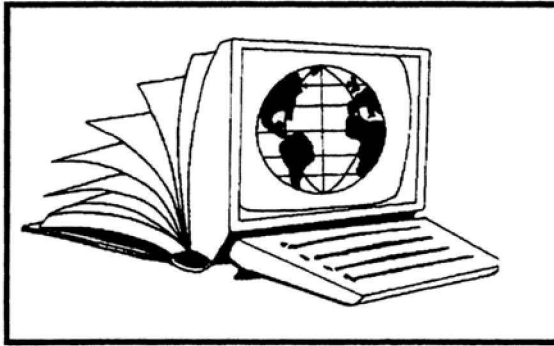
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(Giuliana A. Lavendel)
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MONDAY TELLER is published by the PARC Information Center.

Built to Last: Successful Habits of Visionary Companies, by James C. Collins and Jerry I. Porras.   New York, Harper, 1994.

Authors Collins and Porras, both Stanford Business School faculty, may pack a bigger ego than Peters himself: they think that "every CEO, manager, and entrepreneur in the world should read this book."   Fact is, by devising an intriguing research twist, they have distanced themselves from the rest of the guru crowd. They started with the usual quest for excellence, surveying the opinions of 700 CEOs selected from the *Fortune* and the *Inc* 500, and representing industrial, service, public and private companies. This is standard practice.

Collins and Porras went further.   They examined a bunch of oldtimer "best" companies, average founding date 1987, and studied them from day one to the present by comparing them to sister companies which had the same breaks but "didn't attain quite the same stature."   The eighteen role model firms are their Visionaries, the more than successful *Best of the Best* whose blue blood showed true in spite of blunders and difficulties which, in some cases, persist to this day.   Even Hewlett-Packard, Wall Street's darling in '95, fell below book value in 1990.   In 1970 Boeing had to downsize sixty thousand employees.   Who remembers that 3M began life as a failing corundum mine, and almost went bankrupt in the days when?   But let us consider the pallid counterparts to this durable triad: 3M is compared to Norton, Boeing to McDonnell Douglas, and H-P to Texas Instruments.   Same founding era, similar products and markets, not dogs by any definition, but just silver and bronze medalists, rather than gold.   See?   The authors have dubbed their investigative technique "Organization Stream Analysis," building it around nine categories of information gathered over the entire history of the model firms and their touchstones.   They are "hard" factors like organization charts, physical setting, technology, products and services, and financial analysis.   The "soft" factors are social conditions, leadership, vision and core values, markets and environment.

There is much more.   Strategic planning is a figment of corporate imagination.   Myths abound around the thoroughbreds, but in fact "starting a company with a great idea may be a bad idea."   The ferocious dedication Visionary Companies exact from their plebs is not for everybody; the Visionaries are not comfy places to work for the laid-back employee.   Home grown management is best, and the authors' research has "dashed to bits the conventional wisdom that significant change and fresh ideas cannot come from insiders."   Our VCs strive to surpass themselves before focusing on the competition, and worry over and over again "How can we do better?"   They are Darwinian in the sense that they progress by trial and error, experiment and accident, but do not make a fetish of change; core values "form a rock solid foundation, and do not drift with fashions and trends of the day."   No charismatic leaders, if you can steer clear of them.   William McKnight did not make it into *Fortune*'s National Business Hall of Fame, and *Hoover's Handbook of American Business* does not mention him, although he ran 3M successfully for 51 years (Joe Wilson is similarly ignored in the Xerox profile).   Change everything except the company's core values, and take risks, even if you are a blue chip. Rather than playing it safe, commit to BHAGs or Big Hairy Audacious Goals (the profs at times indulge in undergraduate humor).

Abandon "the tyranny of the OR:" either stability OR progress, home-grown managers OR fundamental change, making money OR living according to principles and values. Companies risk brutalizing themselves with ORs, and should instead embrace the Genie of AND.   As for vision statements, they can be a step in Visionary building, and were practiced by several of our role models before they

became fashionable among the hoi polloi -- but they are no miracle drug for the ailing firm. "Contrary to business school doctrine," the authors found that maximizing shareholders wealth is not "the dominant driving force or primary objective" of the VCs, where business is viewed as "more than just a way of making money." Core ideology, again, is the key.

Builders of visionary companies construct mechanisms and processes that can prosper through multiple product life cycles, beyond the years allotted to a single leader. They tend to be painstaking "clock builders" rather than *extempore* "time tellers" who intuitively guess the right time and place. They are architects, like Bill Hewlett and David Packard -- and George Merck, and Henry Ford and Thomas J. Watson and their peers. Merck expressed a classic principle in his core ideology: "We try to remember that medicine is for the patient. We try never to forget that medicine is for the people. It is not for the profits. The profits follow..." It is almost sacrilegious, but even Thomas Jefferson is mentioned in this context. He built a country and was therefore an "architect," not a charismatic visionary leader in the "it all depends on me" mode. The early VC architects remained in office for long periods of time (32 years on average); so, in his various roles, did Jefferson.

Diffuse, repetitious and contradictory but very enjoyable to read, "Built to Last" is about the paradox of pragmatic idealism, which can accommodate both Merck and Philip Morris, although they are "at opposite ends of the spectrum in terms of what their products do to people." (Yes, Philip Morris has an ideology, based on personal freedom of choice, and a strong *esprit de corps*). Like Peter Drucker, whose prescience the authors view with "immense respect," Collins and Porras offer a simplistic recipe to diagnose and cure the ills of great corporations. "Try a lot of stuff, and keep what works," because "the company itself is the ultimate creation," and the opportunistic outlook IS the vision statement.

Finally, "Built to Last" is remarkable as a repository of delightful historical gossip. Can you imagine Bill Hewlett and David Packard with about $500 in capital, trying to design a foul line indicator for a bowling alley, a flush toilet, and a shock machine to make people lose weight? Collins and Porras say they did.

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(Giuliana A. Lavendel)

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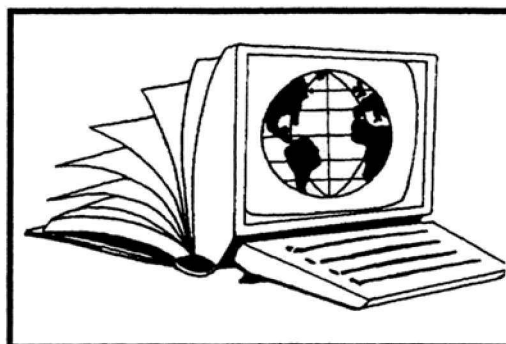
"The Language Instinct," by Steven Pinker. New York, Morrow, 1994.

"For you and I belong to a species with a remarkable ability: we can shape events in each other's brain with exquisite precision." Is this "making noises with our mouths" innate because it is universal among hominids? The same could be said of Coca Cola, but language is necessary, unless we subscribe to Lily Tomlin's view that man invented language just to satisfy a need to complain.

Dr. Pinker, whose fluent conversation and Shirley Temple locks can be encountered on educational TV, has no sympathy for those who decry the debasement of popular culture, and the "frightful decline in the ability of the average person to construct a grammatical sentence." "Axing a question" or "he don't" are ok, and so are split infinitives: let all language mavens keep their peace. Here is a 500-page crusade against beliefs commonly held by educated persons, who think, for instance, that language is a cultural invention rather than an instinct, and even believe that language shapes thought, so that different populations have different views of reality. Wrong: "People do not think in English, or Chinese, or Apache: they think in the language of thought." Misguided observers may believe that children learn language from their parents, but "motherese" is a melodic exercise, not a tool for teaching grammar, which is innate. English is not a zany tongue, albeit one "in which one drives on a parkway, parks on a driveway, plays at a recital and recites at a play." You may think that its spelling is wacky, as G.B. Shaw endeavored to prove by spelling fish as ghoti (gh as in tough, o as in women, ti as in nation). However, spelling does not represent the spoken word whose sound we catch; it comes from the "abstract units of language" we hear in our minds.

It is diverting to follow Dr. Pinker, who heads M.I.T.'s Center for Cognitive Neuroscience, in his crusades against philistines of various denominations. Language is not a cultural artifact, but "a distinct piece of the biological makeup of our brains," based on a quasi-platonic language of thought where ideas reside, and which shall be known as "mentalese." The expensive neural circuitry which allows small children to learn languages is recycled by nature after use; this is why it is difficult for adults to learn a new language. The faculty to articulate language resides in the brain's left hemisphere; left handers may be more gifted for math, spatial, and artistic activities, but also appear more prone to dyslexia and stuttering. Some very creative people like Einstein, Watson and Crick of the double helix, and Kekule' of the benzene rings were visual thinkers, and so was Faraday of electromagnetic induction, who had no training in mathematics, but modeled his law visually through space. Language is not the same thing as thought, but is still a complex and highly cerebral phenomenon. It embraces and manipulates syntax as a "discrete combinatorial system," shifts to morpholology for word building, and demands a rich lexicon to match. It subsumes a specialized or "revamped" vocal tract, phonological schemata, speech recognition of the first order, parsing and learning algorithms. Grammar is a sort of mental software, and syntax belongs to our unconscious mental life. Natural selection shaped all this, although Noam Chomsky, the god of generative linguistics, is skeptical of this evolution. But "what alternative does he have in mind?" our author wonders. The only remaining possibility is that God -- the other One -- had a hand in it.

Dr. Pinker prefers a grand design, and does not confine himself to linguistics; anthropology, biology, and genetics are part of the territory he roams with learned digressions, punctuated by jokes and historical anecdotes. As it

happens to raconteurs, sometimes his memory for detail falters, as when he describes novelist Joseph Conrad as Ukranian-born. (An elegant writer in English, he could barely be understood in conversation because of his heavy Polish accent.) Stanford geneticist Luca Cavalli-Sforza, from whom Pinker borrows the genetic tree of mankind and the three phila which settled America, is called Luigi.

Pinker dismantles some legends, e.g. that we only use five percent of our brain, and that the Eskimos do not have four hundred words for snow. They have only two, as anyone knows who has studied the Yupik and Inuit-Inupiaq families of polysynthetic (inflective) languages. In the Chomskian view of the world, a Martian coming to visit would conclude that Earthlings speak a single language, apart from the minutiae of vocabulary; the six thousand odd languages of the planet contain "striking universals." American English is homogeneous, compared with the tongues of equivalent territories. At present, only six hundred languages are reasonably safe from extinction, having at least one hundred thousand speakers each. The other five thousand or so languages of the world are on their way out. (After the one on "Mentalese," the "Tower of Babel" chapter is the most fascinating of the thirteen in this book.)

Language probably arose "by a revamping of primate brain circuits that originally had no role in verbal communication," per Darwin; these new circuits must have changed behavior, hence *h. sapiens sapiens*. The latest in genetics --there is no "grammar gene," after all--can be found in this compendium, along with words to inspire the canniest of Scrabble players: such as listeme (unit of a memorized list), barfulous, pessimal, and ambimoustrous, i.e. capable of operating a mouse with either hand. We say ping-pong and not pong-ping because vowels for which the tongue is higher and frontal always come first. A sentence cannot be built with word-chain devices like Markov models, but must be held together by a mental tree. An American high school graduate knows approximately sixty thousand words, four times as many as Shakespeare used, and could therefore be called a tetrabard (get it?). Linguistic genius, however, comes in all flavors, from Shakespeare to Yogi Berra. When a reporter sent Cary Grant a wire asking "How old Cary Grant?" the actor wired back "Old Cary Grant fine."

Most of all, the reader should be grateful to Prof. Pinker for having rendered in intelligible

if overly discursive English "the modern Chomskian theory of how language works;" even X bars (=consist of) are less threatening. Chomsky, probably the most cabalistic writer in the English tongue since John Maynard Keynes, belongs with the classics mentioned by Mark Twain: those that everybody wants to have read but nobody wants to read. "Language is the most accessible part of the mind," writes Pinker, and this is why people are so passionately interested in it. It figures: this far from painless tour of contemporary linguistics has become a best seller which can be found on the paperback rack of airport shops.

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(Giuliana A. Lavendel)

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Emerging Infrastructure: The Growth of Railroads, by Amy Friedlander. Reston, VA, CNRI, 1995.

CNRI's Bob Kahn, recently spotted on *Wired's* group picture of Internet mavens, scores again with this slender volume; it is the first of a series, to be issued by the Corporation for National Research Initiatives, on the development of infrastructures in America. Railroads are an apt model. How did they come about, critical mass and all? How did they integrate, with private and public sector each performing a role? Most trains still burned firewood in the 1860s, which makes one wonder how far our computer infrastructures have yet to progress on their Darwinian path.

This is what the monograph at hand laboriously suggests, analyzing how transportation technology was recast into far-flung transportation service. It also highlights the beneficial intervention of several forward thinkers, including a minor appearance by Abe Lincoln, then a rising lawyer who had served one term in Congress. In 1857 the Rock Island Railroad retained him for the defense in a classic tort case: just days after the first railroad bridge on the Mississippi was completed, the steamboat *Effie Afton* crashed into one of the bridge's piers with disastrous results. The boat owner sued, alleging that the bridge constituted an impediment to traffic, but Abe successfully demonstrated that the river's current could not have been responsible for the boat's fatal course. He implied, strongly, that the accident was staged, and the Rock Island Railroad won. As a consequence, rail traffic also won. For waterway commerce, that decision was the beginning of the end.

Historians delight in reminiscing that Lincoln collected $5,000 - a small fortune, in those days, and his largest fee as an attorney -- all in the railroad business. He had been involved, as a lobbyist, in the struggle for the six massive federal land grants to join by rail Chicago to the Mississippi -- 2.6 million acres in six sections of public land, building the first leg of the future Transcontinental. His support for the Transcontinental was instrumental in opening the door to the White House, and Lincoln did not forget. Two days before delivering the Gettysburg address, the harassed President issued an executive order authorizing the Union Pacific to extend service north of Omaha. It was the first land grant on the Pacific side.

The *Effie Afton* court case is memorable only because of the chance participation of one promising attorney, but there were innumerable such struggles, unknowns and surprises in the history of American railroads. Were the land grants necessary, or were they voluptuary federal expenditures for enriching special interests -- in contemporary parlance, pork? Railroad scandals abound in the nation's memory, but some historians believe that the "robber barons" -- the Vanderbilts, Harrimans and Morgans of railroad memory -- were a myth, invented by the Democrats and enshrined by the press during the election campaign of 1884, to burden the Republican incumbents with "squandering the national patrimony." (And here we can postulate: is the federal involvement, the NII bit, necessary or politically motivated? Should it be symbolic or substantive? And, perhaps more important, should it be *ex ante*, beforehand, or *ex post*, retroactive?) The author mentions how beleaguered historians have even attempted the arduous task of measuring the cost effectiveness of land grants, thus sinking into the *ex ante* quagmire; they say, for instance, that land grants for the Union Pacific enterprise represented 15.3 percent of the value of the investment. But how to measure the benefits, and in particular the social rate of return? Friedlander maintains that federal land grants were fundamental for attracting other investment money and providing startup

support. Will the Information Highway follow a similar model?

Let the reader be the judge. Railroad takeoff, starting in the 1850s, was marked by "tremendous expansion in the physical network rather than by technological innovation or physical standardization...it appears to have taken place without an explicit centralized public or private leadership." Serendipitous events helped: the rise of large law firms capable of conducting business on a transcontinental scale, the development of the federal court system, and the establishment in 1887 of the Interstate Commerce Commission. Sometimes the push came from survival instinct pure and simple. When the Erie Canal gave New York City access from the Hudson River to the Great Lakes, in 1825, the Baltimore city fathers panicked, and lost no time in supporting the construction of the Baltimore and Ohio, the first of the major American railroads. This is how George Stephenson's steam locomotive was imported from the British coal mines of Newcastle to America, but it took all of 25 years to complete the project, from Baltimore to the river.

From the beginning railroad companies wanted to control access to the rails and the rolling stock; this is how they became "common carriers" collecting fees and giving open welcome to all customers. The author notes that this was "a pyrrhic victory, since in the twentieth century common carrier status required the companies to assume broad liability, hastening their demise into bankruptcy." The rapidity with which the railroad system developed on the continent was fraught with the dangers of precipitous change. In another Lincoln example, the author mentions that when Abe returned to Springfield after his term in Congress, in March 1840, the trip by stagecoach, railroad and steamship took 12 days, while "barely a decade later, President-elect Lincoln might have made the same trip...wholly by rail in 2 days." The organizational changes were also swift, and massive, since railroad companies soon "dwarfed their contemporaries" by setting up business units, functional divisions, even middle management structures, let alone joint ventures and mergers. In a sense, they invented the modern corporation. "The railroads became an incubator for modern business practices," notes Friedlander. We do not know whether she means it as an accusation or a compliment.

So much detail is compressed in these 70 odd pages that the reader gets lost in a rapid fire of names and dates, reminiscent of cliff notes but fascinating nonetheless. Friedlander's passion for depicting the social scenario evokes an era with details which go much beyond railroad politics and their parallels to come. For instance, we learn that around 1800 a fashionable lady needed five square yards of fabric for a dress, but 50 years later, thanks to the advent of the industrial textile revolution and railroad commerce, a modish gown required from 30 to 40 square yards of materials, plus over 60 square yards for undergarments and petticoats.

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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.
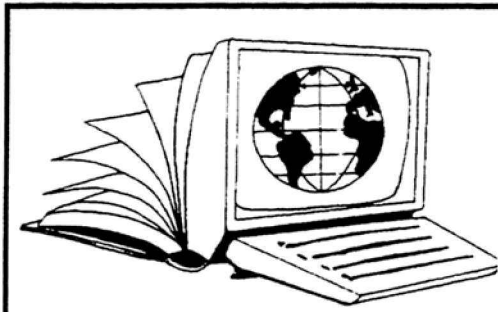
Monday Teller

The Beardstown Ladies' Commonsense Investment Guide, by the Beardstown Ladies' Investment Club. New York, Hyperion, 1994.

What would America do without little old ladies? They have always helped sell used cars by proxy, and now promote capitalism with a small c. The Beardstown Ladies have brought the principles of investing to the stockmarket's great unwashed -- the aspiring small investors. After a media blitz, the financial press, led by the Wall Street Journal, has begun to pillory the mettlesome women and their grassroots approach. Yet the Ladies are to be commended for their spadework.

The fun is not in the return from their labors, which, as any investor knows, is subject to peaks and valleys, but in the fact that such stock mavens as the Ladies and their club exist at all. The book's ghostwriter, a former Time magazine reporter, has wisely allowed for a good deal of naive self expression and repetition, evoking a kaffeeklatsch attended by sixteen grandmothers to savor an adventure they share. It is easy to forget that the Ladies, whose motto is "learn and earn," handle a portfolio of $100,000 and are rated by NAIC (National Association of Investors Corporation) among the top ten investment clubs in the country. Investors clubs Beardstown style, although hopefully imitated in 17 foreign countries, are really a piece of Americana.

Beardstown, is in the heart of America, a town of 6000 where you can still leave the keys in your car's ignition and forget about home alarm systems. It lies some 200 miles southwest of Chicago, on the banks of the Illinois River where settler Thomas Beard opened an Indian trading post in the early 1800s. Lincoln not only slept in town on a business trip from Springfield, but used Perry Mason showmanship to win a famous case in Beardstown. His client had been accused of murdering a man in a fight after a revival camp meeting, but Lincoln produced an almanac, showing that the key witness could not have seen the fight by the light of the moon because the moon had set, and the night had been pitch dark at the critical time.

The courtroom is still in use, unchanged from Lincoln's day, and so, apparently, are Beardstown's mores. Most of the Ladies have always lived in small towns and are are retired, although they are already admitting 2nd generation investors. They are active in religious and volunteer organizations; several are widows. Some Ladies worked for years, before career women became fashionable: they number a school principal, a hog farmer, a florist, a bank officer, and a real estate broker who writes, in the Ladies' biographical appendix: "My mother worked for my father for over 40 years, and never received her own paycheck. I think it is important for women to have their own money to invest, to spend, even to lose." She smiles on her posed photo (but then all Ladies do) with such good intentions that you almost forgive the · favorite recipe she offers (all Ladies produce one). Her Busy Woman's Dream of ground turkey, canned vegetables and soup, topped with Tater Tots, is a gastronomic nightmare of '50s vintage.

Much information is spun in the storytelling. Established in 1983, the Beardstown Business and Professional Women's Investment Club follows the norm: the average investment club has a $100,000 portfolio and is 11 years old, with yearly returns close to 15%, which is better than the Dow Jones 10% average. NAIC today counts almost 12,000 clubs in the United States alone, and their goals are, in the main, predictable: invest every month, reinvest all dividends, buy growth companies, and diversify. Club members contribute, on the average, $35 monthly, but a special effort (e.g. $100 per member) is indicated when starting a new club. The Ladies are emphatic in

recommending NAIC membership, which is inexpensive ($35 per annum, plus $11 per member). It entitles one to the security of family relationships, plus regional conferences, low cost investment plans, and plain-speaking literature like the *Better Investing* monthly. It does not, however, provide for a subscription to the sacred scriptures in which the Ladies and many other small investors believe, the revered *Value Line* and *Wall Street Journal*.

You can read this book for atmosphere, or you can regard it as a how-to manual full of practical tips, not all known even to experienced investors. Clubs are best set up as limited partnerships rather than corporations, to avoid corporate taxes and such terrors. Certificates should be kept in street name, care of a broker, who credits dividends to the club's account. There are samples of minutes to be approved, and information sheets, for all stocks held, to be updated at the monthly meeting, before the Stock Selection Committee proposes to Buy, Sell, or Hold. It helps when the stock being discussed is Hershey's, because then the opportunity for sampling the product arises, although the Ladies hold dear -- or held, when the book was written -- nonedible producers like Cooper Tire& Rubber and Verifone. When someone leaves the club or joins in midstream, the Ladies straighten the potential bookkeeping mess using NAIC's valuation Unit System, which can be applied with the help of hand calculator or even without one.

One third of the book, "Investing the Beardstown Ladies Way," is motivational: "During the Depression years, only 1% of the American population owned stock. Now nearly three quarters of the U.S. population owns shares of corporations, either directly or indirectly through pension plans, mutual savings, bank accounts, and life insurance policies that are invested in the market." So much for the myth that Americans do not save enough. All those investors should know what they are doing, and if they do not the Beardstown Ladies will explain that "Capitalism will work better if people: a. understand investing; b. are educated to do so successfully, and c. intelligently provide capital to expanding industries." This means getting every drop of juice from *Value Line*, scrutinizing annual reports, and focusing on the balance sheet and income statement; the Ladies like in particular the acid test, which "divides current assets excluding inventories by current liabilities. Because inventories are not easily converted into cash, this is a more realistic way to evaluate a company's ability to cover current debts." Fundamentalists rather than timers, the Ladies pick stocks by ten criteria, listed as industry ranking, timeliness, safety, debt considerations, beta (volatility), sales and earnings, stock price, P/E (Price/Earnings) ratio, management quality and a seldom mentioned "upside-down ratio" which measures the relative odds of potential gain vs. loss.

Friendly page design and welcoming side bars join the *dramatis personae* like Aunt Margaret, who started out knowing only about CDs, in creating a Rockwellian scenario of can do. It helps that "by the time she died, in 1985 at age 85, Aunt Margaret's estate was worth $470,000, almost double the amount she had brought to Beardstown." The Ladies miss her.
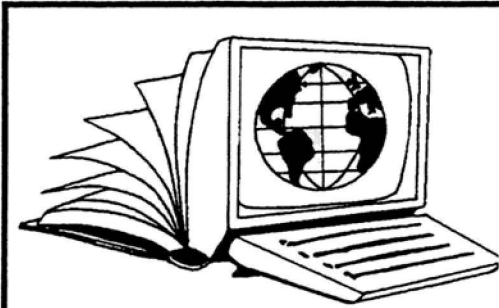
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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

The HP Way: How Bill Hewlett and I Built Our Company, by David Packard.   New York, Harper, 1995.

This book is about two Americans, both widowers in their eighties, who still drop in at the shop and worry about work in progress. "What are you doing? How is it going?" asks Bill Hewlett, who wants to know the what and the why, and whose business instincts are still as sharp as when he was working in the one-car garage at 367 Addison Avenue in Palo Alto, California.   Busloads of tourists stop there, Americans and Europeans and Japanese pointing their cameras towards a frame house with a bronze plaque which says "Historical Landmark...."   David Packard, who designed bathroom fixtures and cabbage harvesting machines for Santa Clara (now Silicon) Valley back when, still believes that "any job that makes us a nickel is o.k."   People smile in disbelief when casual customers are asked to pay a couple of bucks for every bag of fruit picked in Packard's orchard, a few miles above his sprawling industrial complex.   Dave, whose "give 'em hell" pep talks are fondly remembered, is keen on the two bucks and yet one of the most generous givers the world has ever known. He has endowed universities and hospitals, research centers, cities, and theaters; every penny of the Monterey Bay Aquarium was his gift. But the orchard? There are costs involved in the operation which must be covered: "It is impossible to operate a business for long unless it makes a profit."

This is the HP way.   An endearingly artless narrative in the first person singular creates an American primitif aura; rather than hiring a ghost writer, as any Iacocca would do, David Packard put together this memoir himself, recruiting as editors his PR director emeritus and his present corporate archivist, who was also archivist at Harvard and is accustomed to give great men some latitude.   "In the fall of 1930 I left my hometown of Pueblo, Colorado, to enroll at Stanford University.   There I met another freshman, Bill Hewlett."   Thus began Hewlett-Packard, a Fortune 100 with yearly revenues of 25 billion dollars, which "now produces and sells thousands of products in more than 650 plants and offices located in over 120 countries around the world."   Most important, in Packard's words, "during the first few years of operating the Hewlett-Packard Company, Bill and I developed a way of doing things, a management style, that included some features not common to management in those days."   An enthusiastic rancher, Packard ascribes his harmonious relationship with Bill Hewlett to the shared experience of their extensive land holdings in California and Idaho. But Packard also mentions having learned management insights from driving cattle on the ranch because, in both environments, "gentle pressure from the rear works best."

A sci-tech buff from the day he could toddle, Packard survived with minor damages the scrapes natural to the breed; having miraculously avoided blowing himself up, experiment-like, he soon turned to radio, which in the '20s was the word for electronics. About his other experiments, playing the fiddle and the tuba, he "never spent enough time with an instrument to become a very good player."   He almost went to the University of Colorado, but a visit to the Stanford campus changed his mind; luckily, in spite of the Depression, his lawyer father could afford the tuition of $114 per year.   Jock Dave Packard gained on the playing field another management lesson for the future: "Get the best people, stress the importance of teamwork, and get them fired up to win the game."   He found at Stanford his mentor and the deus ex machina of the future HP: "I did not know much about him, not even that his father was a famous educator and inventor of the well known Stanford-Binet intelligence test. I would occasionally spend time at the radio station, and Professor Terman would stop from

time to time to visit with me...(He) had the unique ability to make a very complex problem seem the essence of simplicity."

Bill Hewlett is dyslectic. It was lucky that his father had been a professor at the Stanford Medical School. Otherwise, he might have been rejected by the admissions office, since he had trouble reading and writing. He is a math and science virtuoso, though, and in childhood barely escaped blowing himself up with his chemistry experiments, like his *alter idem* David. He still says that he chose electrical engineering as a college major because he likes electric trains. Several of the future HP top executives came from Prof. Terman's class, among them Ed Porter, who for thirty years ran HP's production. The future R&D director was classmate Barney Oliver, a Jupiter-like mountain of a man who, in retirement, directs the national search for extraterrestrial intelligence.

The HP Way, which was distributed to all employees and retirees (this is the HP way), has two parts. The first is historical and anecdotal. The second, about the biographee's philosophy of management, is amazingly gimmickless. Typical pronouncements: "The key to HP's prospective involvement in any field of interest is *contribution*" or "At HP, as in other technical companies, there is no shortage of ideas. The problem is to select those likely to fill a *real need* in the marketplace." And "Bill and I determined that we would operate the company on a pay-as-you-go basis, financing our growth primarily out of earnings rather than by borrowing money." Commonsense in lieu of formulas. Deep down, Bill and Dave prefer to stick to their knitting, which has been engineering instrumentation since they started, in 1938, with the Model 200A audio oscillator. As for their "other" great successes, like the HP3000/MPS computer family and the HP display monitor, they often came through the back door. The monitor's champion, who had disobeyed management's order to stop developing the product, received from the hands of David Packard a medal for "extraordinary contempt and defiance beyond the normal call of engineering duty." Thirteen million units of the HP35 calculator and descendants were sold to an eager public. The little machine was widely imitated and undercut by vendors who had not contributed to the development or the quality. Bill and Dave, who were into printers by then, felt that the calculator was okay; it is, after all, an automated version of the engineer's slide rule.

The HP phenomenon has added a previously unknown dimension to multinational corporate history. Here are two industrialists (do we dare call them tycoons?) who have created jobs for some 100,000 people -- practically all of whom love and admire them.

This book is about integrity.

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(Giuliana A. Lavendel)

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Monday Teller

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PARC INFORMATION CENTER

Startup; a Silicon Valley Adventure, by Jerry Kaplan. Boston, Houghton Mifflin, 1995.

"Sometimes I feel like just running away and joining the circus," sighs a disenchanted mover and shaker at the epilogue of this Silicon Valley drama.   Bets are still out whether pen based computing will come back to center stage -- will medical schools have mandatory penmanship classes? -- but technology is not really the key to this story. People, their antics, greed and machiavellian machinations are. As the author reflects, this is "a cautionary tale about what can happen to a young company when its timing is wrong, its technology too speculative, and its market not yet ready." Here is a verbatim report of not only what but also who, when, where and why, written by a born raconteur with a knack for dialogue and portrait.   ("His two front teeth were slightly askew, giving him the faintest aspect of a woodchuck, which was seconded by his zeal and diligence.")   Readers could be lost in the flow, but the   author thoughtfully appends a chronology of events, from a fateful private jet flight in February '87 to a day in July '94, when startup Eo/Go was finally put to rest by an information industry juggernaut - or gorilla, in the *New York Times* vernacular.

"Early   in 1981 everyone in sight was starting companies,"   so   Jerry   Kaplan   joined Teknowledge, an artificial intelligence company fresh   out   of   Stanford   University,   where researchers worked on Lisp machines.   It was "a   classic   boondoggle,"   siphoning   off government   grants.   Kaplan   was   busy programming the same AI material on a lowly PC when he met the legendary Mitchell Kapor of Lotus, alias the woodchuck. The two started working on Lotus Agenda across the continent; Mitch lived in Cambridge, MA, while Jerry remained in San Francisco with his cat Critter F. Spats. Their "epiphany" happened during a meeting in Kapor's private jet; spurred by Mitch's compulsive note taking, both became

convinced   that "the next wave of computing was to create a device that worked like a notebook instead of a typewriter." The insight came to them as a quasi religious emotion, "startling in its raw power and purity."   Kaplan quotes Edna St. Vincent Millay, who wrote that "Euclid alone has looked on beauty bare."   But beauty   is difficult to create in an environment where   "the PC business is war, " and "the startup game is an elaborate contest created to accelerate   the   pace   at   which   corporations evolve,   played   continuously   by   an   endless parade of hopeful entrepreneurs."

"Startup"   reads   like   a   retrospective   gossip column, e.g. "Windows is a joke, "Gassee said, "They'll   never   catch   up."   It   was   Newton's time, and   Apple's   Great   White   Hope   was destined   to   have   a   profound   influence   on Kaplan's Go, doomed at birth as it crossed the paths   of   the   Newton   and   of   Microsoft's PenWindows, struggled with Lotus and   OS/2's pen-based ambitions, and sank in the end with AT&T's ill fated Eo.   Assembled first in San Francisco "south of Market " where the winos lurk, then in a middle class enclave in Foster City, a youthful crew   labored on the pen-based notebook, intent on establishing its own API, since pen computing was new and had none.   Go's mascot was the ant, but a packaged Uncle Milton's Ant Farm, bought by mail and delivered in a test tube, proved an ominous disappointment; after a few weeks, Uncle Milton's Ants were found all dead, belly up.

"Startup" flourishes dialogue worthy of a good movie   script,   and   cameos   and   full   length portraits   of   industry   *condottieri*   like   elusive Cannavino from IBM, the ubiquitous Bill Gates, and Liddle from Interval (and PARC) -- but Liddle   appears   lovable,   an   exception.   The Research Board's Naomi Seligman jumps out of a   page   fully   armored   like   a   modern-day Minerva: "When you present, skip the bull." The quintessential IBM can be found in "The

Partner" chapter, 30 pages to read with relish and store in memory. The author's sense of theater plays true also when introducing other characters besides the well known managers/ nerds like Manzi, Vinod Knosla, and the woodchuck; there is even a touch of "Life with Father," *in memoriam* and with love. Technically speaking, the juicy parts are those which read like primers on financing a new enterprise or preparing a proposal, rituals which differ from other life passages because "religious rites express the emotions of the participants, while business deals obscure them." VC stands not only for "Venture Capitalists" but also for "Vulture Capitalists."

After a while, hesitations and betrayals sound *deja vu,* and the reader finds refuge in the stark reality of money; not enough for the payroll, not enough for the dream. Yet this is a fun, exhausting book, recommended for computer naive readers who wish to assimilate technobabble and folklore in one gulp. How 80286 is pronounced "eighty, two eighty-six," why hardware people are tinkerers and gamblers while software people are poets, sort of -- some of the best programmers are English or philosophy majors, as Alan Kay always said. It all happened at the time when geeks became chic, but welcome to the club anyway.
The moral of the story, or one of them, is that a PhD in computational linguistics does not invest the candidate with business acumen; as Kaplan's thesis advisor observed, " Your ideas will go farther if you don't insist on going with them," which is a belief by now held among Silicon Valley historians. Another moral is that *menages a' trois* rarely work. The startup's stormy one, with IBM and AT&T coming and going, failed as it was fated to do; Apple Newton showed up as a promise yet unfulfilled, and Microsoft PenWindows appeared briefly as a me-too sacrificial offering which failed also. As for the principals, Go-side...not a single tea-leaf reader in the whole bunch.

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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

Thomas Jefferson and His Copying Machines, by Silvio Bedini. Charlottesville, University Press of Virginia, 1994.

"Every invention which adds to the convenience of life, deserves attention but more especially such as will economize our time." Thus read an "Advertisement to the Citizens of New York" to see a demo of the Polygraph or writing machine at the Tontine Coffee House, from 12 to 1 o'clock for a few days. This invitation is taken from the diary of one Charles Wilson Peale of Philadelphia, engineer, fossil collector, entrepreneur, and tinkerer, who for several years enjoyed an intense collaboration with another and supreme tinkerer, Thomas Jefferson.

Peale set off for New York on July 3, 1804, by stagecoach, paying five dollars for his seat and one for the box with his machine. An interesting glimpse of Jefferson's Polygraph -- or one version of it -- was shown recently in an otherwise excruciatingly inane attempt at filmed history by Merchant-Ivory. It was an instrument designed to write several copies of the same text at once, a much improved version of the pantograph, a "drawing" or "perspective" machine in which two pens move simultaneously by the action of the writer's hand; the architect of St. Paul's Cathedral in London, Christopher Wren, had one. British economist Sir William Petty had been granted a patent for that device in 1648; Peale and others, including Jefferson himself, were responsible for improved U.S. versions, although Peale wrote, "It appears to be the most difficult thing in the world to make People believe that any new invention can be useful."

Sounds familiar? This historical account by Silvio Bedini, Keeper of the Rare Books, National Museum of American History at the Smithsonian, reads remarkably like a contemporary chronicle of product development for a Silicon Valley startup. Even the concept of "suite" is present in the set of applications offered by Peale to his customers, what with several combinations of desktop designs, laptops, pens whether quill or steel or fountain to serve different purposes, let alone the attempt at encryption which Mr. Jefferson found so germane to his, and the country's, interest. David Allison, a Smithsonian historian with a contemporary turn of mind -- he heads the Information, Computers, and Society project -- remarks on the similarity between this narrative and the stylized case histories with which the Harvard Business School beguiles aspiring MBAs the world over. But the unique contribution of the Polygraph Case History, if we may thus call it, lies in the fact that Jefferson's dedicated use of the device and of the copying press, particularly from the years 1785 to his death in 1826, allowed for the preservation of the greater part of his records, in spite of fires, war, and the following generations' neglect.

Bedini uses the Jeffersonian framework to trace the general history of copying and writing methods from the 17th century to the present, including carbon paper and ending with the Xerox machine, which "soon eclipsed all other methods of copying and achieved popularity all over the world because of its speed and convenience of operation." Like the Xerox machine in its early years, the Polygraph was sold mostly to bureaucrats and officials, like the State Department's Chief Clerk and the U.S. Ambassador to France. This gave the device a Capitol Hill marketing focus, much of it because of the giant presence of Jefferson, who loved the machine, pushed its development, and personally tweaked the styli, latch and cover.

While Secretary of State, Jefferson had invented the "wheel cypher" which was probably too advanced for use by the diplomats of his times; reinvented in this century, and placed in use by the Signal Corps in 1922 as "U.S. Army Cipher Device M-94," it continued in use by the military through World War II.

Jefferson used the common quill for most of his life, although he owned advanced devices like the Polygraph and the "reservoir" or fountain pen. Writing was so important to him that he designed special furniture for this purpose, in particular a portable version of the copying press invented and patented in 1780 by James Watt, the Scottish-born engineer to whom we owe the steam engine. Watt had designed it to reduce the workload during his many travels, but Bedini theorizes that he was inspired by the "bigrapher," a pen equipped with two quills to produce both an original and a copy, invented by Watt's friend Dr. Erasmus Darwin (a physiologist and poet, grandfather of Charles). Watt concocted a special sugar-based ink which made it possible to reproduce writing on a dampened sheet of thin but durable tissue paper, after the original had dried. Benjamin Franklin, when U.S. minister to France, ordered several Watt presses to ship home, and even paid in advance, although he did not approve of the process. "For I think Credit is upon the whole of more Mischief than Benefit to Mankind," he wrote.

He brought his own press back to his library in Philadelphia, and this caused a visitor, the Reverend Manassah Cutler, to conclude that it was Franklin's invention, "undoubtedly because of his reputation for inventing laborsaving and useful devices." Faulty attributions and patent disputes are features Jefferson's copying machines share with twentieth century inventions, along with resistance from the populace. John Isaac Hawkins, a young engineer who toiled in Philadelphia on Peale's copying machines, was disheartened by the lack of responsiveness in his native England: "I have met with little else but disappointments since I arrived in this miserable country; the Stupidity and Muddleheadedness of Porter guzzling englishmen is such, that I can get no assistance..."

Jefferson, like Washington and Benjamin Franklin, used Watt's copier for a start. He even designed a portable model to fit the size of the traveling "lap desk" he had conceived in 1776 and on which he had drafted the Declaration of Independence, but then switched to the Polygraph, which he loved best. A week after the death in childbirth of his daughter Maria Jefferson Eppes, when he was severely depressed, Jefferson took time to thank Peale for his Polygraph, and to tinker with it, suggesting a light cover made of netting, an adjusting screw for the copying stylus, and three sheaths instead of two for the pens: "I thought it worth while to bestow some time in contriving one entirely suited to my convenience." This Presidential approval appeared in "Poulson's American Daily Advertiser," where the entrepreneurial Peale published an "Extract from a letter by Mr. Jefferson." The re-elected President (1804) states "On five months full tryal of the Polygraph with two pens, I can now only conscientiously declare it a most precious invention."

We can only deprecate the current penchant for product testimonials by lesser persons such as rock musicians or ball players. We can also compare (unfavorably) contemporary Madison Avenue rhymes with the following Peale's Polygraph ad, which described the product with elegant economy of words. It appeared in the Baltimore Gazette :

"Pois'd by the spiral chord above,
The obedient pens in concert move.
Triumph of art! amaz'd I view,
A transcript fair of all I drew."

(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

The Road Ahead, by Bill Gates. New York, Penguin, 1995.
Microsoft Secrets, by Michael Cusumano and Richard Selby. New York, Free Press, 1995.

By itself, the piggyback CD-ROM glued to the cover may be worth the price of *The Road Ahead*, with a virtual tour of the new *chez Gates* mansion, and the full text of Bill's book, Web-style. This seems exhibitionistic at first -- who would not rather read the hardbound copy? – but the *e-book* is studded with hypertext options. If you click on "Xerox's now famous Palo Alto Research Center" you will see PARC's photo with a brief profile and the caption "PARC exists to be the architect of the information age." Print the whole. You could not surf the paper copy that way -- could you?

"The bland leading the bland," scoffs Paul Saffo, but obviously Gates is not aiming to address the likes of the renowned futurist. Gates speaks to the great unwashed, supposedly eager to hear that "Informational tools are symbolic mediators that amplify the intellect rather than the muscles of their users. You're having a mediated experiment as you read this book; We're not actually in the same room, but you are still able to find out what's on my mind." Or "the [information] highway will come about because of a confluence of technological advances in both communications and computers." Midway between preaching to the novices and boring the computer literate, *The Road's* pablum just does not grab you, these days. Yet, it is sitting at no. 1 on the *New York Times'* Best Seller list.

Microsoft Secrets is the opposite. Here comes the right stuff, collected by expert witnesses and corroborated by knowing insiders; it is a voyage of discovery on what makes (possibly) the world's most successful company tick. The plot is contrived, in an East Coast/West Coast meeting of minds, by an MIT professor of Strategy and Technology Management and a colleague who teaches Information and Computer Sciences at the University of California, Irvine. As an author duo, they sound supremely methodical and dispassionate, with only occasional human touches. While MIT's Cusumano properly dedicates the 500-page tome to the people of Microsoft, whose "remarkable careers, openness and cooperation made this study possible, and fun," Selby, the Californian, offers his effort to his loving wife Kimberly Ann, who inspired him "to make the book more understandable." We too owe a debt of gratitude to Kimberly Ann.

Seven, like the fabulous Cities of Cibola and the Gifts of the Holy Spirit, are the chapters in which all is revealed, but then seven is a magic number. Microsoft's big secrets are also seven although, according to a skeptical *Wall Street Journal* reviewer, creating small teams whose expertise overlap is the only strategy listed which really counts. Chapter One, entitled "Find Smart People Who Know   the Technology and the Business," is divided into a number of Principles, e.g. Principle One, "Hire a CEO with a deep understanding of both the technology and the business." This leads to subsections "Gates the Person" and "Gates the Manager," followed by "Project Status Reports," "Program Reviews," and "Control over New   Product Development." Microsoft holds two-hour program review meetings for each project every three months or so, and these are usually attended by Gates, who "especially looks for schedule slips, cutting too many product features, or the need to change a specification." A key role he plays "is to view the entire product portfolio of the company in light of the future directions he sees, including competitor moves.   Then he makes the hard   decisions: the   technology-versus-business tradeoffs."   There is nothing sycophantic about Cusumano and Selby, although they betray some of the fondness for their subject which often develops over two years of observation at close quarters.   In Chapter Seven, "Attack the Future," at the "Key Weaknesses" section, they state that Microsoft's first possible liability is dependence on Bill Gates as its leader, even if "It is an understatement to say that Microsoft has done well by this weakness so far."

"Attack the Future" is optimistic in tone, and forecasts that Microsoft will do well in the next

decade, but makes a serious attempt at critique. The company has relied principally on incremental innovations to compete: "Though it should be enormously successful as a product, Windows 95 is similar to the ten-year-old Macintosh operating system." Microsoft may need to become more consumer-driven and content-driven, will have to give more attention to foreign language versions of products, and is already facing "the problem of overdiversification and declining market focus," with 200 products on the market and dozens more under development. A preoccupation with features "encourages products to underemphasize the importance of the underlying product architecture,"although some groups have instituted a milestone zero where they can do this work."

This book, while suffering with some annoying wordiness, is thick with information to be mined at leisure by technology managers with a software hat. Chapters on organizing "small teams of overlapping functional specialists," on how to "pioneer and orchestrate evolving mass markets" or "focus creativity by evolving features and 'fixing' resources, and "do everything in parallel with frequent synchronizations" while improving "through continuous self-critiquing, feedback, and sharing," could be everybody's business on the information highway. All this sums up to the Seven Secrets strategy, which Cusumano and Shelby confidently disclose, after intimate and lengthy observation of Microsoft decisions, people, and paperwork.

Many "best practice" tips camouflage under management vernacular, but there are revelations like Table 1.2 on the "Approximate Breakdown of Microsoft Employees," all 17,800 of them on 7/18/95. (4,000 are in sales, marketing, and consulting services; there are 1,850 software design engineers, and just as many software test engineers.) Of interest to competitors and historians are quaint customs like the Usability Lab where UI guys and developers debate one another: "Six out of ten couldn't do this!" "Where'd you find six dumb people?" *Secrets* also mentions a Hungarian Convention used mainly in application projects; its role is to make source code understandable to the Microsoft newcomer, who is mentored and tutored like a debutante. The Convention is inherited from Hungarian-born Charles Simonyi, who came to Microsoft from Xerox PARC to work on Multiplan in 1981. In Charlie's old country people write their last name first and the given name second, "just as Microsoft developers write the base type before the qualifier, in their Hungarian." Yet, caution the authors, "Microsoft Hungarian is unrelated to the Hungarian language spoken in Europe."
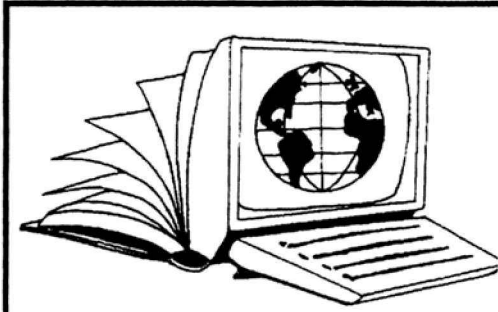
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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

The End of Work, by Jeremy Rifkin.   New York, Putnam, 1995.

A felicitous title has helped secure readership for this 350-page lamentation by Mr. Rifkin, a Washington, D.C. economist of the worry persuasion. "For the first time human labor is being systematically eliminated from the production process," he writes, and moreover, "The new computer-based technologies promise a replacement of the human mind itself, substituting thinking machines for human beings across the entire gamut of economic activity." Telephone operators departed the scene years ago, replaced by "silicon operators," just as "silicon sorters" are replacing postal employees. This is the stuff of which guest appearances on TV newschats and quotes in the press are made of.   "The quintessential symbol of corporate profits in the 90's (sic) is the pink slip," writes a *New York Times* columnist who shares Rifkin's distaste for the present status of the world.

Unfortunately, there is no serious attempt here to outline in a coherent fashion the historical developments that cause the work displacement phenomenon, its long-range consequences, the possible alternative outcomes.   Scant attention is given to new paradigms of work, unforeseen societal necessities, the multi-faceted manifestations of human ingenuity and adaptation which are already bubbling in the crucible.   "The new economic realities of the coming century make it far less likely that either the marketplace or public sector will once again be able to rescue the economy from increasing technological unemployment and weakened consumer demand," writes Rifkin, at his most ponderous -- and repetitious.   An interminable historical survey -- in non-sequential order -- begins with a dour chapter on "The End of Work" where the CEO of Asea Brown Boveri, the $29 billion Swiss/Swedish combine and darling of the *Harvard Business Review,* wonders where it will all end, after his company re-engineered 50,000 people into unemployment.   The future may be utopian or dystopian, depending on how the productivities of the Information Age trickle down -- but here again

come the shopworn nostrums of the shortened global workweek, aided by government-planned employment in the new "social economy."

Some early economists -- and Rifkin seems tempted, in retrospect -- echoed "in part" (i.e. with caution) Marx's tenet that manufacturing automation can "eliminate workers altogether."   However, phenomena like the Roaring Twenties, when American productivity rose 40 percent, and the advent of conspicuous consumption, a radical concept for Puritan America, kept the monster at bay. Marketing and advertising were born: Coca Cola was sold at first as a remedy for headache. (Many years later the first transistors were hailed as a useful invention to be used for hearing aids.)   Then came the Great Depression, which puts the author in mind of Engels' prophecy that "the extension of the markets cannot keep up with the extension of production."   Is Mr. Rifkin looking for another FDR to land on the banks of the Potomac?   Far from it; endemic weaknesses in the industrial system could only be remedied by strong measures. "It was global war that saved the American economy," and ultimately led to the "post-Fordism" of American industrial supremacy.   However, just a few pages over, the Clinton administration is taken to task for trying to re-engineer government; we are treated to an anthology of re-engineering horror stories, including the famous Wal-Mart and Pampers caper (at this writing, the bloom is off the rose at Wal-Mart).

In spite of his historical survey, which suggests that human affairs are governed by the imponderable, the author does not take into account the likelihood of such meta-human happenings. In a world of swift change, this book is dated, and real contemporary phenomena are not put under the microscope; for instance, companies which downsize and reward stockholders, but on the other hand could not survive without the "consultants" and "temp agencies" and the "outsources" where, inexorably, some of the pink-slip holders are reabsorbed. Or the protean quality of in-and-out and back-to-school worklife of many; the author is geared to the corporate, "organizational" notion of work, with a

steady longtime employer, benefits, 40 hours of weekly toil, and your soul to the company store. At least Robert Reich, writing recently in the *New York Times*, creatively postulated juicy carrots of his own devising for companies which refrain from pink slips. (Futurist Buckminster Fuller, three decades ago, prophesized that in the year 2000 "... amid general plenty, politics will simply fade away.")

This is like a Galbraith yarn minus the sense of humor and the drama. Exhausted readers may well become discouraged before reaching the discussion of a few employment energizers, mentioned by the author just where *The End of Work* at last comes to an end. Is salvation coming from somewhere, anywhere, or are we bollixing up the planet? A leaner, cogent story line, with handy statistics and a few workable ideas could hold one's attention longer, but *The End of Work* is focused on a global economic trough. It helps the reader to recollect that during the past few decades economists and management theoretidans have cultivated some exquisite scenarios for situations that ultimately did not happen. There was, for instance, the leisure time scare of the '60s, when the first inroads of automation caused columnists to prospect a world where most people work only a few hours, if at all, and are paid by a benevolent Big Brother for not working. "By 2000, machines will be producing so much that everyone in the U.S. will, in effect, be independently wealthy...How to use leisure meaningfully will be a major problem..." wrote *Time Magazine* on Feb. 25, 1966. *The End of Work* proposes to "globalize the social economy," and take refuge in "communities of self-interest" or "third sector," which bridge the gap between "the marketplace" of Mr. Rifkin's wrath and the public sector in which, too, there is no salvation. We should create "a social economy...centered on human relationship, on feelings of intimacy, companionship...." all the good stuff which, Rifkin trusts, cannot be taken over by mankind's dreaded "cultural icon," The Machine. (Third rate sci-fi flicks?)

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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

Trust: the Social Virtues and the Creation of Prosperity, by Francis Fukuyama.   New York, Free Press, 1995.

For many, history is like a ribbon, perpetually unfurling, but Francis Fukuyama, formerly of the State Department and now at Rand Corporation, challenges the traditional view. In *End of History* he explained how a universal democratic and capitalist order has been accepted, if not yet instituted, all over the globe.   Fascism, communism, most hereditary monarchies are memories, and so is the Berlin Wall. The liberal capitalist democracy is an ideal which is happening, and simply "cannot be improved on." As the philosopher Hegel saw, this is the end of history as we know it. Now economics is in the catbird seat.

In *Trust*, Fukuyama reviews the "after history" models for our post industrial society.   "Ambitious social engineering" based on massive government programs has proven unable to create a "great society," since national cultures, not good or bad per se, may stand in the way of achieving "social capital." A trust bond is needed on which prosperity can be built -- in the midst of the "creative destruction" which, in Schumpeter's definition, is the *m.o.* of capitalism.

It is tantalizing that two books which have recently caught the attention of the American elite have the word "virtue" in their titles, although in William Bennett's *Book of Virtues* personal rather than social virtues are the focus of attention. Fukuyama skillfully meanders in and out of world cultures, capturing their "heightened significance" for global economy and international order. Americans realize that Japan practices both democracy and capitalism according to different norms, while Asians are troubled by America's litigiousness.   "The French and Japanese have long statist traditions," while Americans are wary of the power of the state. In Europe and Latin America, sunset industries live forever, but Asian governments are capable of dismantling them. (Sunrise industries have a difficult time everywhere except perhaps in the various Silicon Valleys of the world.)

"The important variable is not industrial policy per se but culture," since "beyond subsistence levels, economic activities are frequently undertaken for the sake of recognition," rather than to fulfill the material needs which are, as Adam Smith pointed out, few and easily satisfied.   Maslow's hierarchy of needs comes to mind, but Fukuyama eschews psychologists; he seems happier in the company of philosophers, economists, historians. What counts is "the level of trust inherent in a society," an expectation of certain behavior, based on recognized norms; it operates best within a community where "social capital" arises from the prevalence of trust. It is the "spontaneous sociability" which has prompted Americans to create innumerable clubs and volunteer associations.   The modern corporation was born of this American sociability in the late 19th and 20th century; Germany came in somewhat later, and then the networked organization was explored by the sociable Japanese in the 20th.   (Fukuyama does not think much of rigid individualism, which puts him in mind of certain former   communist   countries   and   inner-city neighborhoods in the United States.   Criminals, by the way, are individualists, but gangs are rather "familial.") Three of the smallest European countries, Switzerland, Sweden and Holland, where trust is endemic, are hosts to industrial giants. Countries rich in "social capital" are good at creating large organizations like Kodak, Ford, Siemens, Mitsubishi; the Japanese in particular have "a group-oriented rather than a state-oriented society."   Conversely, we cannot recall a brand name from the small-scale firms of that "familial" colossus, China.

Trust is helpfully partitioned into five sections, so that anyone unwilling to face a tome of almost 500 pages (the bibliographic notes alone are 80 pages long) can benefit from selective perusal. Part One, "The Idea of Trust: The Improbable Power of Culture in the Making of Economic Society" and Part Five, "Enriching Trust: Combining Traditional Culture and Modern Institutions in the Twenty-First Century " are written in the guise of a historian/soothsayer who, like most evangelists, frequently goes back to square one. Fukuyama is forgiven because erudite argumentation presented in terse prose is a rare find.

A subtle sense of humor lurks behind the author's paradoxes, which enliven the three central sections of *Trust*, again ponderously titled as in "Low-Trust Societies and the Paradox of Family Values," starring China, Italy, France and Korea. "High Trust Societies and the Challenge of Sustaining Sociability" is dedicated to those siblings beneath the skin, Germany and Japan. The United States, populated by "rugged conformists" or "communitarian individualists" ("Eagles Don't Flock -- or Do They?") and minorities of all descriptions merits a separate section on "American Society and the Crisis of Trust;" it appears unique in its culture, as befits the melting pot where all the aforementioned cultures have converged. American Protestantism, with a touch of Puritanism for good measure, is the gold in our social capital. English settlers coming to the New World brought with them the habit of adjudicating their differences without recourse to central authority. The "general propensity of the working population to get up early in the morning and labor long hours at physically or mentally taxing pursuits," is now called "work ethic" (to avoid the sectarian P word?) A rising, upward bound population in Latin America is switching from the Catholic to the Pentecostal persuasion. Here at home "in recent years the state, often in the guise of the court system, has supported a rapidly expanding set of individual rights that have undermined the ability of larger communities to set standards for the behavior of their members." (Fukuyama does not waste sympathy on the behaviorally disadvantaged.)

"The family, too strong to nurture modern economic organizations and too weak to perform the basic task of socialization" produced the debacle of Wang Laboratories in Lowell, Mass., not China. Eighty percent of small U.S. businesses are family-owned, and only one third survive into the second generation; Jay Rockefeller does not work at the family store. China is affected (or afflicted) by Confucianism, or the apotheosis of family ties; it ignores the primogeniture, which created wealth in England and Japan. The Italian brand of Confucianism prevails in the chronically impoverished South because of policies originated by Frederick II, a 13th century King of Naples and Sicily, but in the industrial Northern triangle and *Terza Italia* of Tuscany and Emilia the social capital is robust. Here the juxtaposition of Italy and China makes good historical sense; a similar comparison between Japanese and German cultures is as fascinating but less novel. France is not Confucian, but the state there is overpowering - a heritage from the days when a strong monarch like Louis XIV needed a large army and another army of civil servants. Korea has a strong central government which promoted large conglomerates, but also supports a "familial" culture which does not quite fit the author's model; such is

the character of the Korean *chaebol*, a variant of the Japanese *keiretsu*. Not all is well in social capital land: "The dark side to the Japanese sense of nationalism and proclivity to trust one another is their lack of trust for people who are not Japanese."

Conscientious readers will be grateful to Fukuyama for having raised many questions and found some cautiously optimistic answers: "Now that the question of ideology and institutions has been settled, the preservation and accumulation of social capital will occupy center stage." Where has the blessing of social capital flourished, to date? Primarily in the United States, in Japan and Germany, the "nonkin" countries where "there was a high degree of trust between individuals who were not related to one another." Wrong again, Mr. Quayle.
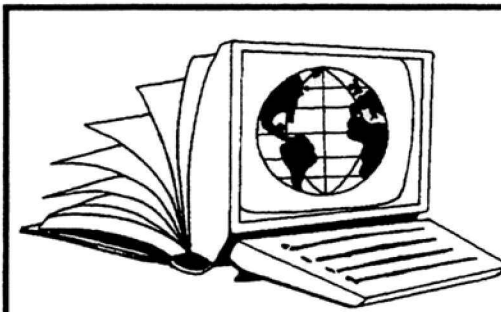
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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

Monday Teller

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PARC INFORMATION CENTER

Natural Monopoly and Universal Service; Telephones and Telegraphs in the U.S. Communications Infrastructure, by Amy Friedlander. Reston, VA: Corporation for National Research Initiatives, 1995.

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Was it indeed a natural monopoly, or was it intentional? The Bell System, or AT&T in its best known manifestation, did not conceive the grand design. The System was rather "pushed into expansion of service through a competitive process," which was perfected only around 1940, thanks to the heavy hand of the federal government. Here we learn how telephone and telegraph happened; the Bell System and Western Union and no end of of incestuous intrigues are the subject of this slender monograph, the second in CNRI's series on infrastructure. Amy Friedlander, the Corporation's historian in residence, covers one century, 1837-1940, in an annotated text so dense with information and analysis that readers can barely catch their breath. But it is all in a good cause because, as Bob Kahn states in the preface, "The past is, in many ways, a foreign country, but in other ways, it is surprisingly familiar."

Patents drove AT&T to focus on engineering development for long distance technology. The Bell System felt threatened, as key patents were expiring before the end of the last century and independent telephone companies started to proliferate, wooing consumers and their demands. Western Union, the telegraph maven, had shown the way in the 1860s, but technology had to be pushed farther, and so the telephone was invented in 1870, again with the chief intention of serving business interests. Nothing much happened until the invention of the loading coil in 1900-1901 gave a boost to long distance reliability. At that time, 97 percent of calls in America were local, but still corporate perception prevailed that the telephone was chiefly a tool for "commercial, financial, business, and political interests." Some intriguing parallels occur to the nowadays observer of the information scene. For one thing, there is the matter of standards, which were set by AT&T and strictly observed by the independent competitors. There is much more.

We know that in 1982 AT&T, the best telephone system in the world and, at that time, the largest corporation in the world, set free its twenty-two Bell Operating Companies following a celebrated court case (the first of several antitrust lawsuits against the telephone company had been filed back in 1910). These lawsuits, and especially the last, successful one, opened speculative vistas to historians like Friedlander. With the help of invasive and pervasive footnotes, she traces the history of the Bell System, a body which took a half century to coalesce before it was dismantled. It is coming together again, if current mergers, alliances, and joint ventures are an indication.

"Telephony, a late nineteenth century technology, became a twentieth century infrastructure." In original AT&T parlance, *universal service* meant interconnected local and long distance lines under central management. The concept of universal *public access* emerged much later, again with a strong push from the feds. In the beginning, everybody thought that the telegraph was designed for long distance communications. The price was right; Western Union only charged a dollar to send ten words of text from New York to San Francisco in 1915. The fledgling telephone service charged $20.70 for a three minute call over the same distance, and that was how much the average American family spent on housing in one month. It is sobering to realize that telegraphy, a digital technology, came first. As an electricity application, it anticipated the electric power systems Edison was then dreaming up.

The telephone, an analog artifact, came a few decades later, as an applet of sorts in support of the telegraph. Samuel Morse, who had registered his patent disclosure or *caveat* in 1837, believed that the federal government could be "the appropriate owner" of his technology. In fact, in 1843 Congress voted funds to establish a telegraph line between Washington and Baltimore (to favor Northern interests, raged some Representatives from the South), although the then postmaster General rejected the invention, which in his opinion would

never pay for itself. The resourceful Morse enlisted the help of a former Postmaster General, Amos Kendall, who became his business agent, thus foreshadowing the techie/marketer team prevalent in Silicon Valley boardrooms. After Morse and Kendall founded the Magnetic Telegraph Company in 1845, they saw more than fifty small firms arise to compete with theirs. Years of turmoil followed, and two companies emerged out of the melee. One was Western Union, the other the American Telegraph Company, which proceeded to lay the first transatlantic cable, with the grudging support of the British and the American governments.

"Capital that accumulated in railroads was invested in telegraphy and later in telephony," writes Friedlander; railroad barons and telegraph companies share a page in history. It was a time of big, bold pioneers like Jay Gould and Cornelius Vanderbilt, and of extraordinary economic and territorial expansion. The telegraph helped launch new markets and institutions like Macy's and the Associated Press. Gold and Stock, a startup created for sending ticker tapes to banks, brokers, and lawyers on lines leased from Western Union, became a virtual monopoly. Then another monopoly followed -- the Bell Company. Its origins were humble. Alexander Graham Bell, a teacher of the deaf, settled in Boston from his native Scotland and was financed, originally, by his father in-law for manufacturing the prototypes of the invention, which resembled a radio more than a modern telephone. Bell's company was plagued by insufficient capital until 1885, when American Telephone & Telegraph was created, aiming at long-distance service; it was reorganized in 1907 by J.P. Morgan. Western Electric had been acquired in 1881 as a manufacturing source, but Bell Labs came much later, in 1925. Together they were called "American Bell's Mechanical Department."

Oh, if only Ms. Friedlander had thought of a history dateline, or even an index! We drown in the particulars, and in the learned theories aired by recent historical literature. It appears that the jury is still out, and the professors are still debating whether the telephone system is a natural monopoly, a creation of top-down management, a triumph of technology over adverse events, or a result of supply and demand; others offer that "advanced technology pushes change, while demand pulls it." Friedlander cautions against falling into "the teleology of success," since AT&T was successful, eventually, and its leaders always believed in technology foremost, but the best guess may be from a 1989 PhD dissertation entitled *Telephone Wars* (Muller, U. of Pennsylvania). The key decision was interconnection, and the monopoly of integrated telephone services came about "because of the behavior of consumer demand, and the dynamics of network access." How familiar.
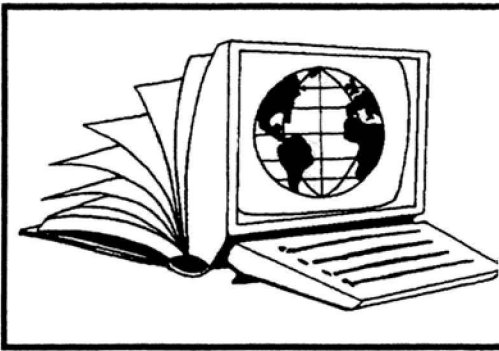
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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

"Crossing the Chasm," by Geoffrey A. Moore. New York, Harper, 1990.

"All organizations are market-driven, whether they acknowledge it or not," writes Geoffrey Moore.   And marketing must "refocus away from selling products towards creating relationships," to buffer the shock of change. Partnership with the customer is "marketing's first deliverable."   Words, words, words. The author himself does not put his faith in books, since he acknowledges that his fundamental research process is "to ask around;" all the information he finds useful for his consulting activities comes to him by word of mouth.   At face value, this five year old book -- possibly of inflated memory -- is a compendium of best practices at master imager Regis McKenna, as articulated by a former English professor.   Per Prof. Moore's analysis, the culprit is the bell curve in the popular Technology Adoption Life Cycle model.   Psychographic (i.e. psychological *cum* demographic)   profiles of customer groups follow one another seamlessly, from the sparse Innovators to the more visible   Early Adapters, on to the popular Early and Late Majorities and the tail ender Laggards.

Life in high tech is becoming more and more like an ASIC, writes The McKenna Himself in the introduction: it is   application-specific, with a customizable veneer applied over a common background.   This means change and growth, crossing The Chasm which looms large between Innovators and Early Adapters on one side and the rest of the populace on the other. Minor crevices appear along   the modified curve (the Revised Technology Adoption Life Cycle) which meets with Moore's approval; there are gaps from Innovators to Early Adopters, between the Early and the Late Majority, and so on to the skeptical Laggards. But it is a large Chasm from Early Adopters to Majority,   from   an   early   market   where visionaries predominate to   the mainstream where customers are unregenerated pragmatists, when order size and customer list remain   constant through the process. Where the Early Adopter aims to buy a change agent, the Early Majority looks for a productivity improvement. Yet the Chasm can be crossed -- many have crossed it,   and entered successfully into the mainstream marketplace. This privilege is not reserved for the Earl of Redmond.   "If Bill Gates can be a billionaire..," writes Moore, it means that other Chasm hoppers can get rich quickly too.

How do we market high tech, and how do we get it right? In the post-Chasm period, the organization will undergo a "molting process," having been "vaccinated" earlier against the "crippling decisions" which sink the future of so many high tech flyers.   Case in point: the innovator drives the enterprise to early success, and then hands over the whole thing to professional managers who expertly guide it to market leadership.   This is the scenario favored by the all-powerful VCs, the venture capitalist (aka "vulture capitalists") who covet the belt-and-suspenders   safety Wall Street loves.   Wily   entrepreneurs,   however, circumvent the financiers' caution   with the notorious "hockey stick" graph, where the revenue line shoots upward abruptly.   Moore finds that revenue grows more like a staircase than a hockey stick: one early growth spurt, then   The Chasm. Artificial Intelligence, now breathing *sub rosa* as object oriented programming, fell on the wrong side of the Chasm,   and so did the LAN, which was fortunately rescued   by   Novell and the IBM PC. In fact , "the consequences of being sales-driven during the chasm period are, to put it simply, fatal."

Entering the mainstream market requires an aggressive stance, which recalls the   D-Day Allied invasion of Normandy of June 6, 1944 -- the closest thing to a modern Crusade. Chapter titles proclaim "Target the Point of

Attack," "Assemble the Invasion Force," "Define the Battle," "Launch the Invasion." To "normandy," companies must focus all their strength onto a confined, tightly bound market niche: "Trying to cross the chasm without taking a niche market approach is like trying to light a fire without kindling," which no Girl Scout would ever attempt. Successful examples of niche focus are found in the case histories of Apple, Tandem, Oracle and Sun. If two of the models are faltering at this writing, it is perhaps because both Apple and Tandem favored "application niches," which are not willingly supported by the staff and are dependent on the health of the app market. The "thematic niche," which comes top down (read Larry Ellison and Scott McNealy) does not run the risk of an industry-specific debacle. At Chasm closing, though, it may leave you with no customer base to call your own, and vulnerable "to being coopted by an established competitor making a quick response. Oracle used to do this to Ingres all the time."

Market segmentation is a key ingredient for gathering data: estimating market niches' size, their accessibility, how well competitors are likely to defend them. You are to rely on "informed intuition," using data fragments or "memorable images" of "target customer characterization." Build a library of likely scenarios, and you will find that you are going back to only 8 to 10 distinct alternatives." And here is the Value Triad, in the form of a triangle whose vertices are the product, the target customer, the target app, all tuned so that the core of the triangle or "Value Proposition" becomes "the most compelling possible reason to buy." Heady stuff, and more lists and diagrams follow, including the doughnut model of the Whole Product, in concentric circles going from Generic to Respected to Augmented to Potential. Winning the Whole Product battle is winning the Normandy battle, and we are on to the Competitor Positioning Compass. It is perhaps unfortunate that so many of the examples cited relate to shaky products, faltering companies, enterprises which have been swallowed up by the competition. Read about pen-based computing, Novell, Quicken, Claris, Software Publishing Corporation...

Moore's prose becomes increasingly less friendly as he drifts away from the Chasm into a maze of technicalities which read like a Marketing I college text book. Some useful evaluations crop up here and there, like in the channels comparison -- direct and retail, VAR vs OEM, integrators ("not a channel, a project-oriented institution!" warns the author). Can your product pass the elevator test, i.e. be described in the time it takes to ride between floors? This is the strategic position from which you can launch the attack, bridge The Chasm, exit from niche, institutionalize the whole product, and let the pioneers homestead.

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(Giuliana A. Lavendel)

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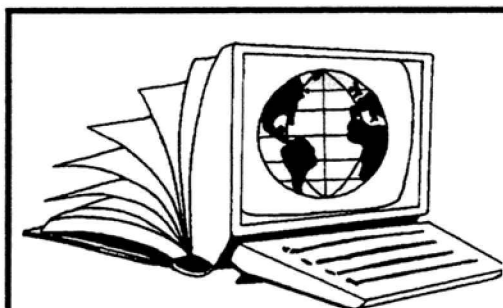
Monday Teller

No. 90 **August 26, 1996**

PARC INFORMATION CENTER

The End of Science, by John Horgan. Reading, MA, Addison-Wesley, 1996.

After the end of history (see Fukuyama, *Monday Teller* no. 87), the end of science could not lag far behind. Fortunately, it does not appear impending, and even Generation X is unlikely to achieve such consummation. The exceedingly articulate author suggests that science seems to have approached a *cul de sac*: "If one believes in science, one must accept the possibility -- even the probability -- that the great era of scientific discoveries is over." Horgan, a *Scientific American* old hand, has thrown this teaser to a few dozen among the reigning scientific brains of the century, from Noam Chomsky to Stephen Hawking, and Fukuyama himself, who was interviewed "at the Rand Corporation, where he had obtained a job after *The End of History* became a best seller. He answered with the wariness of someone accustomed to, and not amused by, kooks."

Horgan is a gossip, and this makes for a good read. It is fun to intrude into the eagles' private nests; to visualize Harvard ecologist Edward Wilson drawing ants ("one of the most satisfying activities imaginable,") or philosopher Sir Karl Popper of the London School of Economics, short of stature but "as kinetic as a bantamweight boxer," pounding the table and shouting that he is NOT dogmatic. Physics Nobel Laureate Steven Weinberg of Supercollider memory has "crab apple cheeks, vaguely Asian eyes," wisps of red hair, and looks like a large, dignified elf -- no, like Oberon, king of the fairies in *Midsummer Night's Dream*. Russian cosmologist Linde can snap a rock in half with a karate chop. Lynn Margulis, star biologist at Amherst, resembles an aging tomboy, and worries about the heretic earth worshipers who think Gaia is a living being. The anecdotes have it, and readers will savor memories of many eminent characters of our times -- Minsky recollecting

that his friend Isaac Azimov always refused to come and see MIT's robots, for fear that his imagination would be bogged down by that "boring realism." Like Azimov's, Horgan's quest is metaphysical, not for applied technologies but for "the primordial human quest to understand the universe and our place in it."

Each new generation wants to leave its mark on the world, but like poets, who have to endure the presence of Dante and Shakespeare, modern scientists carry the burden of Galileo, Newton, Darwin and Einstein. The author reviews their plight in ten chapters which the *New York Times* praises as "a wonderfully concise introduction to the greatest scientific hits of the last 15 or 20 years." "The End of Progress" is followed by "The End of Philosophy" which is really about physics, according to Popper: "The lesson of quantum mechanics and even of classical physics is that nothing is determined, nothing is certain, nothing is completely predictable: there are only propensities for certain things to occur." Thomas Kuhn of *The Structure of Scientific Revolutions* thought that some sciences converge on a paradigm while others are in continuous flux, like the arts. There is no logic to science, said the author of *Against Method*, Paul Feyarabend, who at Berkeley had a telephone installed which allowed him to make calls but not to receive them.

In "The End of Physics," particle physicists are cast as obsessive seekers of the Answer's unified theory. They glory in concepts like the elusive superstring, which is "neither matter nor energy; it is some kind of mathematical ur-stuff (G.'s note: elemental stuff) that generates matter and energy and space and time but does not itself correspond to anything in our world." Physics and philosophy intersect where reality is not primarily physical: "in some sense, our cosmos might be a participatory phenomenon, requiring the act of observation

— and thus, consciousness itself." Some visionaries, like expatriate physicist David Bohm, think that science and art will merge some day. The vast majority of physicists, however, "employed in industry and even academia, will continue to apply the knowledge they already have in hand — inventing more versatile lasers and superconductors and computing devices — without worrying about underlying philosophical issues." (We must be thankful for them.)

"The End of Cosmology" is about the big bang and alternatives. The most mysterious of all stars is our own sun, and astronomy is "an essentially passive activity;" Stephen Hawking, elucubrating in semifetal position, could be the ultimate "cosmic joker." "The End of Evolutionary Biology" betrays the burden of its past, or "the anxiety of influence." Harvard's Stephen Jay Gould maintains that "evolution does not demonstrate any coherent direction;" if you play the tape of life again and again, *homo sapiens* may never come to pass. Serious flaws imperil Darwin's theory of linear evolution, but a "punctuated equilibrium" exists, leading to an unpredictable future without natural selection. "The End of Social Science" presents a fascinating portrait of Noam Chomsky, one of the most contrarian intellectuals the author has met. "He is compelled to put all authority figures in their place, even himself." Totally incapable of learning languages, the great linguist believes that the structure of our minds limits our understanding. In fact, Nobel Laureate Francis Crick, in "The End of Neuroscience," speculates that we may be nothing but a pack of neurons. Chaos and complexity combined in "The End of Chaoplexity" resemble pop culture phenomena; they are doomed, with no help from Mitchell Feigenbaum. Computer simulation may go the way of cybernetics, skeptics say at Santa Fe, and there is more Santa Fe soul searching in the "End of Limitology"; "We go from complexity to perplexity," says one perturbed scientist. The final chapters betray the author's mental fatigue, evident where he abandons detachment and wrathfully upbraids the machine intelligence set in the persons of Carnegie Mellon's roboticist Hans Moravec, Princeton's Freeman Dyson, and MIT's Marvin Minsky: "they are all theological Darwinians, capitalists, Republicans at heart." (sic)

Because of the intellectual life it documents, one puts down this book more convinced than ever that progress cannot stop dead in its tracks, leaving the world in the motionless status molecular biologist Gunther Stent called "the New Polynesia." (Stent saw its beginnings in the advent of beatniks and hippies, but then he taught at Berkeley, where personal experience may have influenced his views.) "The End of Science" is a personal, smoothly written memoir of encounters with Great White Men (some Women), many of them dead, and of their ideas, conflicts and idiosyncrasies; it prompts the reader to heated mental arguments on every page. How fitting, after all, that doubts have again infiltrated the scientific priesthood, since science is born of both the desire to find a better answer, and of the anxiety of the unknown.

Is science, "true, pure empirical science," dead because it has worked so well? It is frightening to imagine that our sense of wonder and anticipation may be a victim of our own knowlege, but this could simply be God chewing His fingernails in silence, Horgan hopes. Even so, after empirical science ends, "ironic science" must raise questions too difficult to answer, like What is the nature of consciousness? and keep the pot boiling. As for applied science, it "will continue for a long time to come." There was no U.S. Patent Officer in the mid 1800s who quit his job and went home because there was nothing left to invent. That story, thank goodness, is apocryphal.

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(Giuliana A. Lavendel)

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MONDAY TELLER is published by the PARC Information Center.

Engines of Innovation: U.S. Industrial Research at the End of an Era, edited by Richard S. Rosenbloom and William J. Spencer. Boston: Harvard University Press, 1996.

In worried accents, they discourse about "technology's vanishing wellspring," noting that "in a world of accelerating change, the research organization is uniquely positioned to identify the salient forces of change and to help shape the firm's strategies in anticipation of their consequences." This statement sounds both partisan and professorial, as it should; it was written by Mark Myers of Xerox and Harvard's Richard Rosenbloom. It is also likely to be true. Worries have even filtered down to the media. On a nationally televised program, a pundit recently bemoaned the diminished status of basic research, which threatens the only proven terrain for the long-range growing of new enterprises, big and small.

These days, results are stressed in lieu of basic research: "We are eating our seed corn," intones the *New York Times*, through Stanford economist Paul Romer. Just look at Merck, the pharmaceutical giant, which in any given year will spend well over one billion dollars on products, but only a mite will be destined to pursue viruses, enzymes and such research chimeras. Microsoft has made some concession to pioneering research, one of them a niche in the San Francisco area, but still spends 99 percent of its two billion dollar research kitty on mundane software testing and priming. So the dilemma remains: should the unsung heroes -- the AT&Ts, the IBMs, the Xerox PARCs of this world -- continue to support the pioneering research which has created new technologies and enterprises, jobs and wealth for this country and the world? Large firms are shifting away from the central showplaces to favor small divisional labs, or even the novel incubators which grow in the shadow of a research university, under a star of sorts. In fact, the research scene may have

declined further since the time in '93 when a group of research managers and innovation theorists met at Harvard "to discuss the future of industrial research." Hence this book, which has acquired some alarming immediacy now that we are speeding towards the millennium. Fecund research and brilliant science are rarely reflected on the corporate bottom line, and the changes and mergers and joint ventures of today do not allow keeping research's victories within one's kimono. In other words, when research results spill over for the common good, what shall we tell the shareholders?

Sandwiched between an outline and a "new era" conclusion, three orderly sections witness to the academic rigor of this anthology. A historical line comes first, from the origins of the R&D lab as we know it -- the first one, dated 1870, was a chemical research laboratory for the Pennsylvania Railroad -- to the symbiotic growth in industry and academia, and the recent passion for the collaborative and extended communities of practice. Section two is reminiscent and personal. Senior research managers at IBM and Xerox tell their stories as true believers, but there is also Gordon Moore explaining why Intel never had a research lab. Alcoa's Bridenbaugh agonizes on the theme of survival skills in "The Future of Industrial R&D, or Postcards from the Edge of the Abyss." The blessings -- or curses? -- of accountability are explored in the final third of the book, where Hewlett-Packard lectures on selecting technologies for satisfied customers, Xerox rethinks, and a distinguished triad representing Columbia, Harvard and Sematech ponders how to get out unscathed from the Armageddon.

Food for thought? The demarcation lines between scientist and inventor are getting blurred, like a century ago when Edison of the "invention factory" and George Westinghouse of the fabulous patents were seen by the

public as indistinguishable from the products of German "research universities." It was Alfred Whitehead who said that "the greatest invention of the nineteenth century was the invention of the method of invention." But AT&T launched its research early in this century, around 1909, mostly to thwart the threat of radio, and by 1925, when Bell Labs were incorporated formally, the company employed 3,600 people in the labs, with a budget of $12 million; Dupont also established its General Experimental Laboratory in 1903 to have a better grasp of explosives. It appears that competition, and the threat of having key technologies made obsolete were the great motivators for early industrial research labs. Then came World War I and the necessity of cutting the umbilical cord with the German establishment. Edison was very instrumental in convincing Congress to fund what became the Naval Research Laboratory.

"The growth of industrial research has been one of the distinguishing features of the twentieth century," writes David Hounshell, who teaches Technology and Social Change at Carnegie Mellon. For a long period industrial research was skewed towards basic R, in the belief that "blockbuster products" would follow. Current disappointments prompt a diversity of choices. We even purchase research from the Russians, moving "towards markets in which science and technology can be bought, seemingly with few or no penalties or transaction costs."

Although the Department of Defense, the National Institutes of Health and the National Science Foundation have supported a division of labor, universities know that D represents about two thirds of R&D spending – and it is hardly carried out in academia. "Usually, most of the science employed in achieving the objective of a marketable new technology is rather old science," write authors Rosenberg and Nelson, representing Stanford and Columbia. In the case of biotechnology, which is new, industry looks to universities for sustenance; it also uses their input in a limited range of other fields like electronics, chemical products, agriculture, and health in general. In fact, there was no natural, effortless convergence of the R&D effort and the firm even during the "golden years" of the Seventies and early Eighties, since "anecdotal histories of such facilities as the Xerox Corporation's Palo Alto Research Center" suggest that their research was not linked effectively to corporate strategy for its exploitation." Now collaborative research due

to the decline of antitrust enforcement, to globalization and the rise of consortia like EPRI, MCC and Sematech point to a wider use of outsourcing. Internationally speaking, joint ventures depreciate the value of a single partner's contribution – *ceteris paribus*, observe Mowery and Teece, of the University of California at Berkeley.

"Innovation must be a total business process," reflects Mark Myers in reviewing the corporation's R&D lights and shadows. IBM's spokesman reports that his firm "has been consciously reinventing research for the last twenty-five years, "blurring the distances "between research and development and manufacturing," and shying away from the Grand Design. Alcoa was aiming to "aluminize the world" but has found that "those in industrial R&D need the instincts, the acuity, and the appetites for knowledge that hungry wolves have for their prey;" no indication on how to develop wolves among the rabbits... Hewlett-Packard, proud of its continuous flow of successful products, believes in cumulated knowledge, which is "diffused throughout the organization, not only in the research laboratory."

In conclusion, the recommended model resembles a "chain-link " of innovation which begins and ends with the market, science and technology aside. Design is what counts. "Innovation is a complex and disorderly process," which at best requires the partnership of industry, government, and the professors – in creative tension, as President Clinton would say.

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(Giuliana A. Lavendel)

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Monday Teller

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PARC INFORMATION CENTER

Talking About Machines, by Julian A. Orr. Ithaca, NY: IRL Cornell University Press, 1996.

"They are focused on work, not the organization," and they talk about machines all the time, of course. They are the errant knights of automation who fix machines for Xerox. "Tech reps," in the ethnographer's eye, perform a quintessentially modern, independent and challenging job, which yet benefits from the presence of a supportive group of peers, the much invoked "community of practice." Esoteric information and *ad hoc* solutions are the staple of the rep's daily round, since "it is never possible to have a complete set of parts or information, so the technicians depend on each other to fill these gaps."

Orr's study focuses on the triangular relationship of technician, customers, and machines, which are all quite idiosyncratic; this combination makes control fragile and the necessary expertise "difficult to codify." Machines are part of society, in the modern ethnographer's lore, and a form of "bricolage" -- tinkering, taking advantage of whatever is at hand -- intervenes in the relationship between people and machines. The rep's job, straddling the blue and white collar categories, is a classic service occupation because it maintains the infrastructure which sustains the work of others. Rep practice is also similar to police work, reflects the author, since both jobs "start with a period of mandatory training that is generally discounted on the street or in the field." In the end, only practice counts. The working day is always unpredictable for both callings, which embrace boring to dangerously challenging tasks. First line managers to whom policemen or field service representatives report find it necessary to strike a balance between autonomy and control, although they know that the subordinate's self reliance is key to getting the job done. Both groups, again,

are the target of well-meaning senior management programs which cannot survive the realities of field work, and are therefore ignored. But while police work is about people, field work is really about machines. It is impossible here to escape the animistic bent. The machines are "them."

Beyond the level of machine rapport, this book becomes an eyewitness statement about work as such, "the bedrock of any socioeconomic system" from the dawn of the industrial revolution. Now computers have changed the nature of work, but organizations have tried to cope and regroup without bothering to comprehend what people really do day in, day out. Work is, in a certain sense, invisible; it has become "an abstraction, a generalized input into a production function" for theorists and academics who abandoned the study of real work long ago. This first volume in Cornell's "Collection on Technology and Work" was chosen by the editors as a mission statement because Julian Orr's study of copier repair technicians at Xerox has for years been circulated as an "underground classic" among ethnographers and other social scientists. PARC's anthropologist Orr, who was himself a "tech rep" in his student days, is particularly well suited to rescue tech reps and what they do from invisibility, thereby showing us "an image of what we are and where we are going."

In this compact volume, "Vignettes of Work in the Field" is the longest chapter, composed of five scenarios taken from life; each is followed by a "commentary" which swiftly transitions from companionable to analytic observer. The style is personal, echoing the author's characteristic presentation style, which is discursive yet focused, and low-key in delivery. A breakfast meeting takes place at a small chain restaurant near the "tract factories" of Silicon Valley. Tom, Jim and Joan discuss how best to use the help of a troubleshooter who has been

assigned to their subteam. In the second vignette Tom and author Orr visit an ailing older machine whose "hallmark is dirt" and whose behavior is hard to control by the book. In the third vignette, Bob pays a courtesy call on one of his accounts where several machines are installed, in an environment where "the engineers believe they have a right to fiddle with any machine they encounter, whether they know anything about it or not." Xerox technicians see the machines as their own, and the ideal customer is one who does nothing to the machines other than replenishing the consumables. In the fourth scenario, Alice lunches with tech reps who could help her with a recalcitrant machine, but Fred, her senior, is concerned with "trying to restore Alice's faith in herself and in her resources....she has to believe that she can take care of things on her own, or she will be a drain on the team." Fortunately, the problem seems to be simply bad toner, which the customer has purchased from a "toner-phoner" racket operator, the equivalent of a fraudulent bookie. The last vignette is dedicated to the vanilla RSC or Routine Service Call, paid to a forlorn RDH or Routine Document Handler which has not been serviced in six weeks. It is an unremarkable call, which, however, originates an interesting layered narrative with stories about stories. Orr at his most academic comments that Frank's opinions are "reflections on the social distribution of knowledge and how it is accomplished."

The territory "is a fundamental category of concern for the technicians," who, like many in the rest of the corporate world, are both members of a team with wide responsibilities, and individuals with specific assignments of their own -- a stress-breeding dichotomy. Other chapters focus on the triangular relationship of technicians, machines, and customers, where the techs constitute as an "occupational community" in which tinkerers with a farm background are surprisingly numerous -- both men and women. Fiercely independent and almost indifferent to career opportunities, they put one in mind of a surviving bit of Americana. Their performance is graded "through surveys distributed by the technicians' management," which are often filled out by machine-naive people, and a source of general dissatisfaction -- while management counters that there are no "wrong people" at the customer's site. "Customer perception problems" require social skills to cultivate and adjust customer attitudes, even if these originate among

decision makers who do not really understand what's what.

The use of the service documentation is controversial: "Directive documentation belongs to the scientific management tradition of attempting to rationalize the work process," but among tech reps "the general opinion seems to be that if a technician does not know what to do, they (sic) should follow the procedures." This is a nice bridge between individual and team responsibilities, and also "a slightly subversive act" both in spirit and grammar. Social dimensions rely on systematic behavior and technical prowess, which are admired and imitated; creative fixes may be owned by the tech reps who invented them, and are associated from then on with their names -- like de facto patents granted by one's peers.

Orr condemns "the black box treatment of modern occupations" prevailing in current management literature, which "denies that there is anything interesting or problematic about the work itself." As for tech reps, for whom diagnostics and documentation cannot anticipate what happens, "the real benefit of this situation is that they are needed."

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(Giuliana A. Lavendel)

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Wired Style; Principles of English Usage In the Digital Age, from the Editors of *Wired.* Edited by Constance Hale. San Francisco: HardWired, 1996.

With a two column format and illustrations for a digital age, the prestigious *CACM* (ACM *Communications*) has imaging problems. The whole ACM literature is being transformed into Web browsable matter; why is the flagship monthly creating headaches for the digerati at the Association for Computing Machinery's headquarters? "Because they want the *CACM* to look like Wired, dammit!" says an imaging maven who has given the matter some thought. And how about the *New York Times Magazine*? The august weekly recently sported *Wired*-style text and visuals that seem designed to startle before they inform -- a primordial brew formerly cultivated by magazines with a teen age readership deep into video games and skateboards.

But at last the mountain has spoken, letting loose a wannabe style manual, ring-bound in black and bilious green, which challenges the venerable Chicago and its peers. It has already earned the barely disguised scorn of crusty purist William Safire, who in his column casually refers to "a monthly named Wired," mentioned because editor Constance Hale sent him a copy of her manual "priced at a high $17.95." Safire is on *Wired*'s case, among other things, because its editors recommend "zine" to indicate "a small, cheap, self-published work: an underground anarchistic version of a magazine." The columnist prefers "zeen," since written form must agree with pronunciation, but in the end "I may be a global village idiot," he ventures.

What, indeed, is the global village idiom? "How can we write about machines without losing a sense of humanity and poetry?" Wired style guidelines are dictated "by actual usage, not rigid rules," and the presumption is that such daring feats have never been attempted before. The introduction promises that the manual "is not intended to replace other style and grammar guides," but, on the other hand, "it does dig into questions that Chicago and AP -- and for that matter Strunk and White -- don't even imagine." The reader is left with a sense of gratitude that the Strunk and White classic is even mentioned. We are also grateful for an Index, which lists Xerox PARC seven times but is otherwise sadly temperamental; and also for a beguiling table of contents covering ten creatively named chapters: Voice Is Paramount, Be Elite, Transcend the Technical, Capture the Colloquial, Anticipate the Future, Screw the Rules, Grok the Media, Go Global, Acronyms/FWW, Style FAQ.

Since writing is not data, "at *Wired* we celebrate writing that jacks us in to (sic) the soul of a new society." Voice is what counts, and it better be full of verve like *Wired*'s sample profile of the Gateway 2000 company, a place which, according to a factory worker, smells a lot better than the nearby hog-processing plant -- the locale is North Sioux City, South Dakota. A bridge of shared cultural literacy connects *Wired* writers and their readers, but it is not a narrow bridge: "Design your own. Create your own context. Narrowcast. Speak the culture." Sometimes the editors wax intuitive, as under the Alto entry, "The Alto was to Steve Jobs what the Altair was to Bill Gates," or pedantic as in "When writing about it, use the @ sign, when talking about it, call it the "at" sign." The phrase "Brave New World," after Shakespeare and Aldous Huxley, is now borrowed by writers to reinforce the metaphor of a society based on technology and social engineering, as in "brave new workplace." The Butterfly Effect refers to the chaos theory principle that the flap of a butterfly wing in Beijing, for instance, could through a chain of events cause a hurricane in Florida. There are Luddites of old who smashed textile machines in England 200 years ago, and

neo Luddites or technoresisters like Clifford Stoll of *The Cuckoo's Egg* fame.

Epitaph for the Macintosh: it will be remembered "as the product that brought just plain people...into the trenches of the information age, and that did it with unforgettable artistic flourish." This is a quote from Steven Levy of *Hackers*, an authority but not a "tech god" like *Wired*'s own columnist Steve Steinberg. Authors of reliable persuasion deserve special entries; for example, Richard Dawkin of "The Selfish Gene" intent on replication -- and also inventor of the neologism meme, "a self replicating idea that functions like a gene." *Wired* is in favor of tech jargon, which "gets a bad rap among literary types." When parsed out in proportion to the text, "the argot of a special trade or community is lucid language, and can be elegant as it is meaningful." Woe to those who do not know that "grok" means " to scan all available information regarding a situation, digest it, and form a distilled opinion."

The manual is on target when tracing the evolution of a term from two words to hyphenated and, eventually, one word, as in desktop, email, homepage, palmtop. E-zine, for electronic fanzine(?), is still in transition. Language is to be grown, welcoming the likes of microserf, one of "the young coders who slave away for Bill Gates" and cybrarian, i.e. "data surfer, super searcher. One who makes a living doing online research and information retrieval." Digerati, for "literati of the digital age" is old hat.

Among the useful features is a list of acronyms, many of which serve as refreshers. Who remembers that Basic stands for Beginner's All-Purpose Symbolic Instruction Code? Or the profane RFTM signifies "read the f----- manual," online shorthand for the tamer RTM? CCing means sending an email carbon copy, and CC'd for the past participle is an accepted fact. The plural of GUI is GUIs. Of course, we refer to a Small Computer System Interface as "scuzzy" in conversation, SCSI in writing, and so on.

In sum, lots of fun, factoids, and personality. Some readers are going to be confirmed in their vices, e.g. using data for the singular since, for the *Wired* editors, "datum is beyond vestigial." But just think. Thanks to the manual, we now have the answer for one of the great dilemmas of the age: the plural of mouse is mouses, not mice.

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(Giuliana A. Lavendel)

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What Will Be, by Michael Dertouzos. New York, Harper Collins, 1997.

Not a mind-bender, but not a sleeping potion either, even if you know the story first hand (in comparison, the other MIT memoir, Negroponte's *Being Digital*, has been called "disjointed and bloodless"). Born in Athens, Greece, Mike Dertouzos of the Zeus-like presence is both "techie" and "humie" (his words) because the human condition is central to his concerns. Refreshingly, he is also impervious to fads and the lure of managementspeak, and even talks about "tomorrow's Information Age," a well worn phrase now reengineered by others as the Knowledge Age. Upon learning that "Dertouzos gets mad at his computer," as MIT's *Technology Review* indicates in a cover story, we can rest assured it is just a love spat, as he nags to fix it: "Imagine requiring people to digest an 850-page manual to operate a pencil. We laugh at the thought, but accept it readily in the case of a word-processing program." The inability of computers to understand one another and carry out shared transactions, even menial ones, is "one of the biggest roadblocks to building an Information Market." Let's have a measure of "automatization," so machines can work together. But don't even think of organizing the Web because "the resistance to front-end taxonomies is a consequence of human nature... a valued characteristic of the Internet, and the Web's unordered egalitarianism."

This book is designed around FAQs, which the author answers with engaging abandon in three parts: Shaping the Future, about the new technologies and how they came about; How Your Life Will Change, with scenarios for all seasons, and Reuniting Technology and Humanity, on the societal consequences of technology -- disconcerting at times, like the growing worldwide gap between the haves and the have nots. The author's life experiences animate the first part, readers are the protagonists in the second, and society at large dominates the future, as it should, with the help of Bodynets and Smart Rooms. Infrastructure is the key to the Information Market place, which reminds the author of the Athens flea market of his youth -- "only instead of physical goods the commodities would be information goods," to be traded in "a twenty-first century village market place where people and computers buy, sell, and freely exchange information and information services." We examine with a jaundiced eye the abuses of the computer age, e.g. automated phone answering systems (for statements press 1, for changes of address press 2, to leave voice mail press 3, and so on). "The image that we are supposed to carry from this technological advance is that machines are doing our work. Baloney! Civilized humans are expending valuable portions of their lives executing instructions issued by a hundred dollar computer!" It may be cheaper for the companies that use the system, but such solutions disregard the waste of the customer's own time and fortitude.

How the computer community was born, the story of Arpanet, the Web, the new culture are narrated in autobiographical, anecdotal detail where legendary names pop up at every page (and cannot always be found in the unsatisfactory index). In retrospective, there was "a gradual but relentless shift from sharing the high cost of a computer to sharing information," where games like Maze Wars, Perquackey and Horse Race acquired significance as community builders. Then Arpanet "would lead to Internet and the Web, setting a course for tomorrow" through three main events: Bob Kahn of Arpa and Vint Cerf of Stanford wrote a paper which became the TCP-IP protocol; grass root groups started working on Internet standards and, finally, LANs materialized. Key actors in shaping the Information Marketplace are the "spiders,"

media companies like Disney, software powerhouses like Microsoft, telephone companies like AT&T. The same bodies are engaged in the Battle of the Pipes, whether telephone lines, satellites, coaxial cable, fiber, or wireless.

Some specimens of the first, autobiographical section, are presently at work at MIT's Media Lab or Dertouzos' own Laboratory for Computer Science, and they are the foundations of the daily life scenarios in Part 2. There is a fierce mingling of audio, video, bodyo, and especially speech-understanding systems like the translating telephone, augmented for teleconferencing. In an impish mood, Dertouzos tried once to fool such a system with "a long chain of Greek curses, the way we used to launch them at each other in the streets of Athens." The system, obviously mystified, translated: "With reference to your memo of..."

Mark Weiser's Ubiquitous Computing, from research started at PARC in 1988, "grew to include the 'living room of the future' and the 'smart room' and was expanded into 'things that think' when the work became a focus of the MIT Media Lab run by my colleague Nicholas Negroponte." Electronic noses and haptic interfaces which "combine manipulation with touch sensing," as in the virtual glove, sound routine if compared with the prospect of sanding one's stomach (lightly!) to sensitize it, and placing on it a pad with electronic actuators. The skin on your stomach can learn to "see" by deciphering the tickling sensations that depend "on what a camera installed in a helmet you are wearing sees."

"Companies, churches, universities and armies" are all going to be different in the future because of what is happening at MIT, at NTT, at PARC and other such incubators. Dertouzos worries about the future of these human organizations, and supports John Seely Brown in thinking that "we must shift the focus of human computer interaction to designing the social and informational periphery, as opposed to just its center." "Middleware modules" will be used like building blocks to construct a daily life in which we will have mood-matching music and even sink doctors which detect bleeding gums and warn about periodontal disease. An auto-cook and another human-looking robot will take care of meals and housecleaning, including laundry. In fact, a continuous sheet machine which "goes around your bed and down below it to a dedicated cylindrical shaped washer/dryer and returns un

the other side" has already been invented by one of Dertouzos' enterprising friends. Custom Publishers, Informed Automobiles, Augmented Reality Surgery, Automated Tutors, Noble Quests of faith and inspiration, and Services, Services, Services are among the pleasures -- some of them questionable -- presented as vignettes to be.

Part 3 is a bit preachy, and less fun, its *leitmotif* being that "The Information Marketplace with its electronic bulldozers will bring unprecedented electronic leverage to people, organizations, and countries." We may achieve a Universal Culture, and for sure will see the Rise of the Urban Villager, thanks to telework and groupwork. Possibly we will have more pressure and exposure than we can handle, and go into overload -- but are we unduly stressed today by the "potential pressures exerted by the world's 700 million telephones?" Electronic bulldozers will increase productivity, and electronic proximity will put everybody within reach of everybody else. Balancing these "major new forces" will challenge those living in the Age of Unification.

In the end, our computer guru turns to poetry like an English lit type. It is touching, and just a tad Olympian:

> "Techies,
> Mind your prescription for the world.
> Humies, Tone down your fears of
>   technochange...
> Technology is humanity's child
> As is our quest for human purpose.
> To love them is to love ourselves..."

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(Giuliana A. Lavendel)

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Monday Teller

Net gain: expanding markets through virtual communities, by John Hagel III and Arthur G. Armstrong.   Boston, Harvard Business School Press, 1997.

You can always tell a McKinsey. book by the "business model" imperative.

Not for the faint hearted, relentless *Net Gain* is about Virtual Communities, the other VCs -- as distinguished from the "Vulture Capitalists" with whom Silicon Valley enjoys a love-hate relationship. Evangelists Hegel and Armstrong almost imply they wrote this book as a public service, having survived the bulletin board culture, and seen clients "wrestle with the business implications of multimedia technologies." Their intent is not to interpret the new world, but to change it according to McK.   Virtual Communities are business enterprises like any other, except that they are rooted in that "primordial brew known as cyberspace."   We are cautioned beforehand that the direction changes cannot be anticipated, that some generalizations were necessary, that virtual communities are not an island on the network, which is populated by corporate sites, "zines," directories and other fauna.

Net Gain is built in three concentric rings, one on top of the other. From the bottom, first comes "The Real Value of Virtual Communities," a compendium of VC virtues and advantages. Part two, "Building a Virtual Community," is prescriptive, while the third and final part, "Positioning to Win the Broader Game," is visionary, about "the fundamental ways in which the emergence and spread of virtual communities will alter traditional business" and even benefit "souls in search of relationship."   Meet the law of increasing returns, Microsoft's "the more you sell, the more you sell," but mind to be first in line, because "speed is God and time is the devil," and latecomers rarely catch up with a runawaymarket.   Both customers, seeking

power, and vendors in search of profits benefit from VCs.   If you don't corral your clientele into one, someone else will, and you will be left empty handed. A complete rethink is in order: "virtual communities create reverse markets, where customers seek out vendors," and are given "the chance to maximize the value they receive from information about themselves," which is a powerful asset. Thus armed, savvy customers will ferret out the best price/quality deal for the job at hand; in general, though, customers will flock to VCs because "they provide an engaging environment in which to connect with other people."

Senior Net, for instance, is the sum of several idiosyncratic families of people with similar interests, such as Christian Corner, Divorced Pals, and Federal Retirees, while the Motley Fool and Cancer Forum are examples of combination social and action-oriented communities. Four basic needs come into play: interests or hobbies, the desire to come together in relationships, the opportunity to explore fantasy worlds such as MUDs, and the need to transact, exchanging information and business deals. This is "a powerful brew." The authors consider the aggregation of purchasing power, and its three characteristics: defining focus as to membership, integration of content with communication, emphasis on member-generated content. Dense with schemata, which give the work its distinctive (indigestible?) style, *Net Gain* is not easy to assimilate or remember, but appears designed to keep readers dependent on the textbook as their source of wisdom.   For instance, the economics of increasing returns, exemplified again by Microsoft and also by FedEx, are dissected painstakingly (minimal incremental production cost, learning curve, diffusion as per the ubiquitous fax machine), and with heady charts. Readers confused by the jargon should go back to Samuelson's *Economics* or the equivalent.

Subscriptions and usage rights are out, advertising and business transactions are in, and the whole is depicted in the Four Virtuous (not virtual!) Loops, representing a dynamic process from Content Attractiveness to Member Loyalty, Member Profiles and Transaction Offerings. The key growth factor is critical mass: of members, of usage profiles, of advertisers/vendors, of transaction profiles, and of the transactions themselves. We are playing with a VC of 400,000 travel oriented members, serenely unaffected by external conditions such as war, peace, pestilence, and the stock market's boom or bust. Bless the marketer's facility for term manipulation. The VC's four stages of evolution, where concentration must happen, are Virtual Villages, Concentrated Constellations, Cosmic Coalitions, and Integrated Infomediaries. "Owners of the customers will be champions of the customer." To compete, start by identifying a community's "fractal depth," i.e. the degree to which it can be fragmented; "fractal breadth" refers to expansion capabilities. The community must already be in place before commerce begins, after which skill will tell.

This book will find -- is finding -- a loving readership among Net mandarins, but even interested outsiders and newcomers will discover stimulating possibilities. As an attempt at organizing Net chaos, its timeliness is impeccable. Even ho-hum suggestions like "Strengthen your company's informal communities by transforming them into virtual communities" should be taken to heart because they are, after all, doable. The Lone Ranger era is dead. One final bit of good news: Virtual Communities "of practice and process" reshape the corporation by eliminating lots of meetings, that too familiar symptom and result of organizational paralysis.

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(Giuliana A. Lavendel)
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PARC INFORMATION CENTER

Intellectual Capital: The New Wealth of Organizations, by Thomas A. Stewart. New York, Doubleday/Currency, 1997.

Those seeking proof that the topic of intangible assets is "hot" need look no further than any of three books published in the past few months, all titled *Intellectual Capital*. Each covers the same terrain and cast of characters. Although Leif Edvinsson and Annie Brooking produced worthy reading, Thomas Stewart's is the most enjoyable. What places this work far above its namesakes is not so much the content itself as its context.

Much of the material will be familiar to readers of Stewart's columns in *Fortune* and especially so to the Xerox public well-versed in the writing of Kearns/Nadler, PARC authors, the people at the Institute for Research on Learning, Shoshanah Zuboff, et al.

The first edition has no index but the writing style makes this work such quick reading that this deficiency nearly goes unnoticed. The material is rich in wisdom, spanning Plato to John-Paul II, and humor from such diverse sources as Sid Caesar, Abraham Lincoln, Robert Frost, Charles Darwin and Thomas Edison.

The book is divided into three major parts. First is the "Information Age: Context" which is followed by "Intellectual Capital: Content," "The Net: Connection" and, finally, an appendix which, although replete with formulæ, is anything but dry. An exchange between King Louis XIV: "Is it a revolt?" and Rochefoucauld — "No, Sire, it is a revolution." — begins the first part, a discourse on the knowledge revolution and its second-order effects. Olds, Ford, the Dodge brothers and their rivals "thought they had improved the horse

... [never] knowing that the automobile would fill the countryside with suburbs — which, in turn, created thousands of jobs building roads and houses, making lawn mowers, selling tulip bulbs, and delivering pizza." Similarly we can now scarcely begin to see how "informating" alters organizations.

A discussion of Deming's methodologies which developed into "just-in-time delivery," traces the logical economic evolution into such "virtual reality inventory" enterprises as CUC International. Their CEO, Walter Forbes, explains: "We stock nothing, but we sell everything." All this sets the stage for the end of obsolete corporate pyramids of control whose management is superseded by those taking ownership of their destinies.

The second part on intellectual capital is an extended examination of the quest for the "hidden treasure": human capital, structural capital (optimizing knowledge while being aware of the dangers of overinvesting in it) and customer capital the pursuit of which leads to information wars and alliances. Here the tone is set with an analogy: Plato, likening knowledge, learning and discovery "in the mind of each man" to "an aviary of all sorts of birds — some flocking together apart from the rest, others solitary, flying anywhere and everywhere ..." in what almost becomes a "pedal-point."

We are led through a system of quantifying "passive assets" starting with patents. Dow Chemical Corp. figures that over ten years it will save about $50 million in tax, filing and other maintenance costs alone and, far

better, increase annual revenue from licensing patents from $25 million in 1994 to $125 million by the year 2000. Along with this come concrete definitions of "intellectual capital" and its constituent components. John Seely Brown tells how "communities of practice" and the so-called "distributed coffee pot" exposed the "false correlation of learning with training or education" as "one of the most common and costly errors in corporate management today."

The largest portion of this section on intellectual capital — structural capital — rounds out this main body of the book. Both Peter Drucker and Leif Edvinsson concur in the view that structural assets may be more important than the intellectual assets. "The organization, like a blast furnace that converts iron and coke into steel, concentrates, processes and reifies knowledge work. The entrepreneur and inventor are pure human capital whereas the business person is something else. Thus Thomas Edison, when he founded the company that became General Electric, turned human capital into something structural." The experience of Hewlett-Packard shows how a profound understanding of "market-driven knowledge management" and the "physics" of pushing and pulling information are leveraged through an internal charge-back system to make those benefiting from the value of knowledge pay for the costs. For H-P, the most powerful of all bureaucracy busters is the market.

The final part of this section centers on the "intangible value chain" and the dynamics of innovating with customers. Collaborations between Alcoa and Audi and especially between 3M and their customers' customers demonstrate the rewards of knowing the customers' business. A vital passage underscoring this reality concerns internally preoccupied organizations speaking of "internal customers." Stewart points out there "is no substitute for the real thing. Rather than encourage colleagues to treat each other like customers, get them out to mingle with the genuine article."

The final section, "The Net" considers the likely effects of the Internet and Web on commerce, education, communications and everything in between. The earlier "bird pedal-point" of Plato has now transformed into a *leitmotif* — reminiscent of Escher's "Liberation" (which can be seen at http://www.cs.unc.edu/~davemc/Pic/Escher/birdscroll.gif) — as Stewart recalls Victor Hugo's observation that the printing press freed mankind of the burden of inscribing "the great book of humanity" in stone. "In the days of architecture thought became a mountain and boldly possessed itself of an age or a place. Now it becomes a flock of birds that scatter themselves unto the four winds of heaven and occupy at once every point of air and space ... It is possible to demolish a pile; but how can we destroy omnipresence?"

The central chapter of this part starts with the question "What is the management structure of a flock of birds?" The answer, from scientific studies of geese in V formation, is that "the leader has no special authority ceding his place if he tires or the flight changes direction." In response to a stimulus — a breeze, a gunshot — "birds in a flock turn within one-seventieth of a second of one another — faster than their individual reaction time." There is "no leader, no chain of command, no span of control. There is instead a sort of shared brain, a loosely conjoined network of relationships and impulses." Similarly, in companies whose wealth is intellectual capital, networks replace hierarchies. Now webs, nodes, clusters and flocks supplant pyramids, bosses, departments and troops. The happy ending is that the "old boy network" of yesteryear is finally extinct.

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Richard Kade, Guest Teller

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Monday Teller is a publication of the PARC Information Center.

Information and Organization: a New Perspective On the Theory of the Firm. by Mark Casson. Oxford. Clarendon University Press. 1997.

Professor Casson. a distinguished Brit. spent fifteen years on the theory of the firm. After dissecting it from the points of view of entrepreneurship. business culture. multinational enterprise. joint ventures and the like. he decided to "assign to the use of information by the firm a more central role." He wrote this book. he states. with general audiences in mind. but shows no mercy for the neophyte — at crucial passages alluding. for instance. to an idealistic Walrasian model to which he gives no clue. either in the text or in the bibliography. We understand. however. that in Walrasian terms everything in an economic system depends on everything else. (Leon Walras is quoted fleetingly. like Keynes and Schumpeter.)

The economy. our writer believes. is based on a system of structured information flow. opportunely called upon and utilized to create what could be fashionably called a "knowledge ecology." The basic principles of this theory — which is apparently not brand new but novel enough — are discussed in six robust chapters. which go from the opener "Information cost and economic organization" on to "The process of coordination." then "The nature of the firm." "Business networks." "Imitation and instability." and "Information — factual and moral." So much for theory. Apps show up in the second part of the book. which covers "Industrial districts." "Free standing firms." "Chartered trading companies." and. finally. "The historical significance of information costs." This chapter is a compendium of the previous discourse. since it is where the author addresses "how far institutional evolution can be explained in terms of changes in information costs." Having kept his readers in suspense all through the book. in the finale Prof. Casson abandons dialectic bravura for a focus on the

components of information costs. which are surprisingly mundane. There is the cost of collecting information. that of communicating it and using it for decision making; storing and retrieving come next.

All such costs decline at different speeds. which complicate matters and originate changes in the structure of the organization. On the heels of cost declines. "relative movements in different components of information costs" influence the nature of the firm. The organizational structure is particularly affected by falling information costs; firms and. indeed. societies that can respond with appropriate "values and beliefs" will prosper. but woe to those which are left behind. The efficiency-driven response of the economy will shatter them to smithereens. In fact. lower information costs have increased global competition of late. and made life easier "for firms and societies with functionally useful cultures."

A tight. relevant baker's dozen of pages. this coda may suffice to get the flavor of Casson's arguments. Of course. an abbreviated reading would miss the astounding amount of detailed knowledge bubbling up on every page and on every subject even remotely related to the status of the global economy — like the "precautionary stock of inventory" to be stored against the perils of "flexible response" and "just in time;" or the role of intermediation as nexus of contracts for the market-making firm. This is what "market-making" consists of: most firms will be marketing-led rather than production-led. Information flow permeates it all. The division of labor in information processing constitutes a sort of labor chain with hierarchical significance. A convenient metaphor can be found in medical diagnostics. where

successive layers of information lead to sophisticated diagnoses by expensive specialists, supported by costly instrumentation.

"The vision of the economy as an information system is in sharp contrast to the materialistic vision of the economy found in standard economic textbooks." (Gotcha. Samuelson!) For the philistines who write textbooks, the essence of intermediation is production, while for the enlightened the answer lies in the information-based "organization of trade" which "requires people to make contact with each other, to communicate their wants and explain what they offer in return, to negotiate a price and to monitor the fulfillment of their contract." This implies costs, but intermediation, a value-added activity, can reduce them. There is too much concern among economics practitioners for material flow, not enough for the vital flux of information. In fact, trade-related information is more important than technological know-how as a source of competitive advantage. And let's not forget that "a common culture of the kind that underpins high trust tends to improve the clarity of communication." while breakdowns "threaten the homeostasis of the firm." down to everyday decisions, for instance,

renting equipment versus owning it. (The knowledgeable and sophisticated should own, the rest should rent and ramp up the learning curve.)

This is a very different book on economics because of the ethical dimension it pursues, with minimal preaching. Prof. Casson likes to repeat himself, to make sure that his audience understands the basics: allocation of resources requires information, and information costs money. It is refreshing that through his hard nosed analysis a sterling concern seeps through for "moral leadership," which "requires leaders who are personally committed to the traditional values that promote coordination, honesty, loyalty, and hard work." Touch of wit *noir*. "The problem of where the supply of such leaders is to come from remains unsolved."

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Giuliana A. Lavendel

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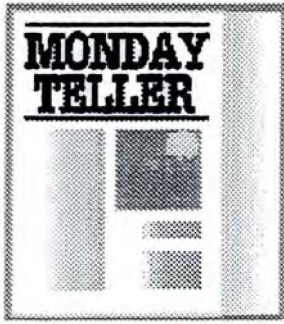
Monday Teller is a publication of the PARC Information Center.

Beyond Certainty: the Changing World of Organizations, by Charles Handy. Boston. Harvard University Press. 1996.

"The world is not an unsolved puzzle, waiting for the occasional genius to unlock its secrets. The world, or most of it, is an empty space waiting to be filled." Here again is everyone's favorite futurist from the London Business School, the maestro who can read into human behavior, even walking down the street: "The urban Japanese moves fastest." he notes, "followed by the Americans. English. Taiwanese and Italians." Those nations all work longer, strive harder, suffer more stress and even, in the case of the Japanese, fear death by overwork, or *karoshi*. The world we are now entering shows darkness at noon, and the British soothsayer offers "a sighting shot at the truth." warning the reader that he is gleaning from his personal file of essays, gathering this little book "to dip into, rather than to read through at a sitting." Why the title?' Uncertainty permeates the thinking man's world, as already noted around 500 BC. by Heraclitus, who observed that you cannot step into the same river twice.

There are 35 brief chapters about all sorts of contemporary uncertainties, which the author lists pell-mell, in thoughtful profusion. Readers are tantalized by titles like "Make Your Business a Monastery" — about non-profit organizations — or "The Birth of the Conceptual College." i.e. "Learning is suddenly fashionable." Although Handy fans, legion all over the world, find his prophecies right on target, the author apologizes for never taking the temperature of the water before jumping in. He has forgiven himself for mistakes of the past (?): "a bad memory. I read to my delight, often goes with creativity." He is "very forgetful and intellectually lazy." but retains enough to remind us that Adam

Smith wrote not only "The Wealth of Nations" but also "A Theory of Moral Sentiment." in which he argues that a proper regard for others is the basis of civilized society. In fact, says Handy, "Markets, for wealth and efficiency, need to be balanced by sympathy, for civilization's sake" so that "... there is a necessary compromise between 'I' and 'they' to make 'we' in every sphere of life."

We are living in an exciting era which could be tentatively compared to the Renaissance, a time of "great opportunities for those who can see and seize them, but of great threat and fear for many." TV has spread decision-making around to all of us, eroding the authority of prime ministers and CEOs alike, and the Internet and CD-ROMs have deprived teachers of their "competitive advantage." The result of this information-led upheaval, as fierce an equalizer as the invention of the printing press, is turning organizations into communities rather than properties, and employees into members. Is this a fit scenario for the triumph of capitalism? In his "Post Capitalist Society" Peter Drucker remarked how the "means of production," traditional basis of capitalism, are now in the hands of the workers, and in their heads most of all.

"What Marx once dreamed of has happened, though not in a way he could ever have imagined." Handy quips. The world of work is being reconfigured in what he calls "the great squeeze-out: " first, a core of corporate insiders, technicians, strategists, benefiting from the 1/2-by-2-by-3 rule: half as many people on the payroll, paid twice as well, producing three times as much. In the middle, "portfolio people" who

market their assets and specialties, and in the outer region the "somebody has to do it" people, who are largely interchangeable. More and more of us, especially women, are becoming "self managers of our own assets." For almost half of our working life — there is a First Age of Learning, a Second Age of Working, and a Third Age of Living which includes work of our choice — "virtually everyone will do portfolio work," minding customers, not jobs. In fact, "the employee society is on the wane."

Charles Handy is a Federalist, like the CEO of Asea Brown Bovery, ABB of Switzerland/Sweden and other countries, a much admired, sprawling multidomestic enterprise of hundreds of companies. The large multinationals like Coca-Cola, GE, Shell (and Xerox) are pulling in the same direction; "the paradox is that organizations need to be both big and small at the same time, be they corporations or nations." There is a second paradox, for business shows a "declared preference" for free and open markets ... even as its managers instinctively organize their own operation for centralized control." Headquarters means Kremlin, almost, in this context. The most important principle of federalism — which will be business's new religion — is subsidiarity, and Handy the stylist, regretting that the concept is burdened by such an ungainly word, prefers to call it "reverse delegation." It is the exact opposite of empowerment. "It is not the center giving away or delegating power ... Power is assumed to lie at the lowest point in the organization," as in ABB and the Catholic Church, where every pastor is Pope in his own parish. Pluralism is a necessary adjunct because it distributes power, fostering the "dispersed center" of federalism at its best — a network rather than a single locus.

For the business federation, the mission or vision statement is the equivalent of the national anthem, but commitment goes deeper than that; "professionals require management by consent if they are to give their best." In the new federalism we assume that

"most of the energy is out there, away from the center," since "monarchy is risky, acceptable only in times of crisis, as once at Chrysler." The myth that profit is the purpose dies hard, like the other myth that those who pay the money own the company. Companies used to be physical assets, but now they are mostly people, who increasingly represent "intellectual property" to be put on the balance sheet as assets, not on the P&L as costs.

Some passages in "Beyond Certainty" sound familiar, since we have found them in Handy's previous books and may recognize them in his next — for instance, the suggestion that the best text on the management of strategic alliances could very well be Churchill's biography of his ancestor's, the Duke of Marlborough (others have felt that a relevant manual on corporate politics can be found in *Les Liaisons Dangereuses*.) Familiarity, though, does not seem to diminish the reader's sense of delighted discovery on every page, for instance when we are reminded that companies are not properties to be traded but communities in need of "rules of governance." This applies also to the United States, a rich country where "the fridges are big enough to sit in," but no longer a country where everyone can be rich. Europe and America have two traditions, two cultures, and we need both: "The hope is that we can have the best of both. The fear must be for the worst of both."

Sometimes even the most optimistic of futurists falters. In essay 35, about virtual organizations and telecommuters: "How do you manage when you can't see the people?" It depends on how many people you can know well enough to trust, sighs Handy, "probably no more than 50 at most ... Trust is tough."

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Giuliana A. Lavendel
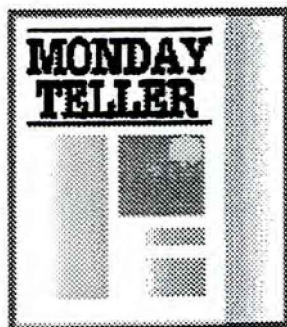
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The Knowledge-Creating Company. by Ikujiro Nonaka and Hirotaka Takeuchi. New York. Oxford University Press. 1995.

In the wake of the Asian swoon. *The Knowledge-Creating Company* poses a challenge to the reader. This already worried the authors in December '94. when they wrote in the preface that "...some may contend that the recent setbacks of Japanese companies in international competition could undermine our model." Nonaka and Takeuchi take comfort in the observation that Japanese companies. working against great odds in the present contingency. are trying to break away from past paradigms. and turning "to a more advanced form of knowledge creation" — as described in a book yet to materialize.

There are two kinds of corporate knowledge to be harvested: one is explicit. and dear to Western minds. It consists mostly of financial data. charts. numbers. all sorts of quantification which can be rationally assembled with or without the aid of the computer. Tacit knowledge. i.e. the Japanese kind. is more personal. painstakingly gained through experience and observation. and difficult to share. An inherent. yet unnoticed contradiction could be that the US individualist type gets his knowledge from the outside. while the Asian organization man cultivates it in his inner sanctum. but together. these opposites can turn the company into an efficient knowledge machine. Even formerly imperiled middle managers are seen as knowledge messengers linking the factory floor to mahogany row. In this Mercury-like role they get a second chance for involvement and survival. which is labeled "middle up-down management process."

As the authors explain it. the fundamental knowledge-creation event takes place when implicit knowledge becomes explicit. at the moment when "our hunches. perceptions. mental models. beliefs. and experiences are converted to something that can be communicated and transmitted in formal and systematic language." There is plenty of formal and systematic language in this opus. where every consideration and observed phenomenon is analyzed. dissected. categorized. numbered and cataloged. While reading this book in a fell swoop is a daunting proposition. the task is made lighter by the presence of a nifty introduction and an even meatier final chapter titled "Managerial and Theoretical Implications." which is as close as the two academics. both originally teaching at Hitotsubashi University. can come in concocting a cookbook for the would-be knowledge manager. (Author Nonaka is now Xerox Professor of Knowledge Management at the Haas Graduate School of Business. University of California at Berkeley).

Nonaka and Takeuchi are activists who insist on knowledge creation. as distinguished from the crowd of practitioners who content themselves with harnessing and disseminating what is already present in the nooks and crannies of the firm. By "organizational knowledge creation" the authors mean "the capability of a company as a whole to create new knowledge. disseminate it throughout the organization. and embody it in products. services. and systems." Japanese firms were led to this modus operandi by the uphill battle they fought. as latecomers. against formidable competitors which had already achieved dominance and global success — read IBM. General Motors. Sears (and Xerox). The focus is on knowledge because it is seen as the optimal competitive weapon. Concepts like

benchmarking and "best in class" are not admired by the two Japanese theorists: neither is the Western practice of extending the corporation's field of vision to the "virtual" or "modular" by accepting knowledge from suppliers, customers, rivals, consultants and other intruders. The spiral, self-replicating process of knowledge creation is an internal affair in which self image and identity are paramount. Other heresies to guard against are such usually noncontroversial paradigms as "the learning organization" and "systems thinking," where Peter Senge and disciples identify the mind as the supreme learning instrument; this is just not Zen. Peter Drucker, who first wrote and lectured about "the knowledge society" gets kinder treatment, and so do Alvin Toffler and James Brian Quinn of Harvard. The Harvard connection is strong because this book and its complex constructs go back to tenets which can be recognized in a 1986 paper, published by the authors in the *Harvard Business Review*, under the title "The New New Product Development Game."

The book is riveting because of its philosophical and ethnic-flavored background, and for encyclopedic coverage of thought currents through history, "from Plato to Zen Buddhism." Research goes back some fifteen years, during which about twenty companies and their cultures were studied from the point of view of their knowledge habits: we encounter mostly Japanese firms, but the notable exceptions are General Electric, 3M and the US Marines. The Marines are pictured in their WWII days as the classic, task-force oriented "hypertext organization," which is contrasted with an elaborate and charted "bureaucracy under the Japanese imperial military." Like a document, the hypertext organization is made of three connected layers: it has a "project-team" layer on top, where multiple teams could be involved in developing new products. The central layer consists of a "business system" for day to day operations, but at the bottom we find the "knowledge base layer ... where organizational knowledge generated in the above two layers is recategorized and recontextualized." Leave it to the Marines! Or rather to Nonaka himself, whose imaginative, airy charting of the hypertext process

reminds one of an *ikebana* arrangement. The authors admire craftsmanship, whether is it a punchy slogan like Honda's "man-maximum, machine-minimum," Canon's exquisite engineering diagrams, or Matsushita's three tiers of the Home Bakery process spiral. The authors' own sequential versions of the "knowledge spiral" are so graceful that occasional histograms appear visually crass in comparison.

It is all a bit contradictory. Western managers, the professors advise, must "get out of the old mode of thinking that knowledge can be acquired, taught, and trained through manuals, books, and lectures." In other words, the process must be internalized, and supplemented with intuitive props like "metaphors, pictures, and experiences." Yet, Nonaka and Takeuchi have chosen to write a didactic work in which the acquisition of knowledge appears constrained by the weight of organization and process. There are two dimensions of knowledge creation (ontological and epistemological), four modes of knowledge conversion, five enabling conditions, all of which flow into a Five-Phase Model of the Organizational Knowledge-Creation Process. Beginners can find refuge in the seven practical guidelines for knowledge creation, which are: 1. Create knowledge vision; 2. Develop a knowledge crew; 3. Build a high-density field of interaction at the front line; 4. Piggyback on the new product-development process; 5. Adopt middle up-down management; 6. Switch to a hypertext organization. 7. Construct a knowledge network with the outside world. Any shortcuts? Simple: we have to resolve and integrate the following "false dichotomies": tacit/explicit, body/mind, top-down/bottom-up, bureaucracy/task force, relay/rugby, East/West. Definitely not for the faint-hearted.

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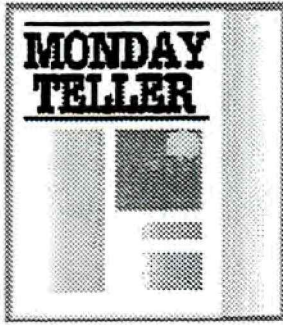
Monday Teller is a publication of the PARC Information Center.

The Death of Distance; How the Communications Revolution Will Change Our Lives, by Frances Cairncross. Boston, Harvard Business School Press, 1997.

"In the electronic village, there will be little privacy — and little unsolved crime." Frances Cairncross of *The Economist*, like many crystal ball gazers, is an optimist, but hers is a solid excursion into what in all probability will happen. Long suffering readers of other tomes will be pleasantly surprised by the author's facility in reconnoitering some of the most important forces which will shape society and its economy for the foreseeable future. Others have pointed out that information is at the base of all economy, but the message is served here in more digestible form than when we heard it from the profs. There is a little irony, Cairncross notes, in describing "the electronic miracles of our age in the old-fashioned format of ink on wood pulp." We are glad she did, from the unique perspective of *The Economist*, which is not American — although two thirds of its readership is in the US — nor British, since the rest of the magazine's circulation spans all over the world. This allows for a truly multinational outlook.

There are ten chapters, focusing first on "The Communications Revolution" and its building blocks, such as the telephone, TV, the Internet. We learn that China's telephone company, DGT, employs almost half a million people, that the average cost of an international call is $0.25 per minute, that toll-free calls amount to 100 million calls per day in the US. In 1939 the *New York Times* predicted that TV would never be serious competition for radio "because people must sit and keep their eyes glued on the screen." Today, however, TV watching takes up more of the average vulgarian's time than anything except for sleeping and working. Local programming is alive and well; in Tel Aviv, you can view a "Sesame Street" with Israeli and Palestinian Muppets. While interactive TV is a flop, Web TV and Internet will marry, if Microsoft is right. However French President Chirac, on his first confrontation with a "mouse," dismissed the Internet as an "Anglo-Saxon" network. Cairncross thinks that the

"Internet has become the most powerful driver for innovation that the world has ever seen."

Social and political factors, with the economy as foundation, are the subject of the second section of the book, dedicated to "Commerce and Companies," "The Economy," "Government and the Nation State." Preceding it all, a "Trendspotter Guide to New Communications" serves as executive summary and memory prompter for the phenomena under observation, from the already commonplace to the stupefying. Although the thirty "developments to watch" seem a bit many (have heard "communities of practice" a lot, lately, but liked Cairncross' concept of "horizontal bonds"), this compendium is handy. *Death of Distance* is so packed with facts, entertaining factoids and digressions into history that the reader could easily lose sight of the grand design.

Location won't matter; any screen-based activity can be located wherever on earth skill and productivity bargains can be found. Proving that "services can increasingly be produced at a distance from their final market," on the island of North Ui, thirty miles off Scotland, thirty people prepare abstracts from papers like the *Salt Lake Tribune* or the *Denver Post* on behalf of Information Access, a database producer in California. The typical large firm will have no frontiers; bad news for top executives, for whom living near a good airport will be more important than presence at headquarters. The office "will become the place for the social aspects of work, such as networking, lunch, and catching up on office gossip," but on the other hand the office as club will house and replenish corporate culture. Companies will organize work in three shifts, according to the main time zones: the Americas, East Asia/Australia, and Europe. Small companies and countries will have more to offer, and will bravely compete with the giants, as size loses the relevance it carries today. People will be connected, both receiving and sending customized

information, and complain there is too much of the stuff, so that the need to "sift, process, and edit" will be acutely felt.

The value of brand name will increase, creating super rich musicians, actors, athletes — and investors. Price information will be easy to get, and so will be buyers, but fat profits will be hard to grab. As for mobility: the difference between fixed and mobile computers or phones will blur, with the help of satellites which can reach every corner of the globe. Companies will tend to be "loose-knit networks of independent specialists," with employees working "in small units or alone." "More minnows, more giants;" even when industry concentration increases, the prevailing format will favor associations under a brand name or quality banner. Products will be designed around customer requirements. Some manufacturers — in the automotive industry, for instance — may track electronically the life cycle of the product, and even be responsible for laying it to rest at the end.

Life, in sum, will be more fluid, blurring the demarcation line between office and home life, so that home design will change, and the home office will become as common as the second bathroom. People will be "the ultimate scarce resource" to hire and retain. We will experience more individual responsibility, more responsive service providers, less government intervention everywhere. "As in the village of past centuries, protecting privacy will be difficult ... machines will recognize physical attributes like a voice or fingerprint. People thus will come to embody their identity." There will be widespread redistribution of wages among the skilled and unskilled, "so income differences within countries will grow ... and income differences between countries will narrow." Will emigration and immigration increase? It depends: poor countries with good communication technology will retain the skilled workers who often prefer to make "rich-world wages" at home, where the cost of living is lower. In fact, "the greater freedom to locate anywhere and earn a living will hinder taxation ... Countries will compete to bid down tax rates, and attract business, savers, and wealthy residents."

Cities, at last, will experience rebirth. Abandoning the role of centers of employment, they will become "places where people go to stay in hotels, visit museums and galleries,

dine in restaurants, participate in civic events, and attend live performances of all kinds." And English will be recognized as the common standard for telecommunicating in business and commerce — it will be the world's "subsidiary language" (not just the second!). Clever of Ms Cairncross, who also mentions that telecommunication will allow for the rise of "communities of culture" based on less widespread languages and cultures, "not replace them with Anglo-Saxon and Hollywood." French films will prosper.

These themes, and the belief that death of distance and global peace go hand in hand, animate this page turner, which is sprinkled with vignettes of leaders like Paul Getty, who already in the '30s could run his California oil empire from swank hotels on the Continent because the switchboard operators could make all the connections. We revisit IBM founder Thomas Watson, who in 1943 felt that the world could accommodate five computers at most. Analyses of new business models, fresh charts and a longer perspective on the time necessary for full technological developments are fitting props for this study of economic growth whose "basic building blocks" are information and knowledge.

We, the U.S. digerati, are out in front of the pack. In communications, we developed competition, multi-channel TV, the Internet, low telephone tariffs, for an audience which is increasingly familiar with computers and the death of distance. Our intellectual property industries, like movies, software and pop music, have an important role in the life of the country. Americans are risk takers, and early adopters of innovation. Moreover, they speak English, the *lingua franca* of the world. "As a result," writes Cairncross, "the first half of the next century...will be dominated — economically, politically, and culturally, by the United States." This means no dozing off, no respite allowed, for the country and its corporations. As the Scouts say, "be prepared."

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Giuliana A. Lavendel

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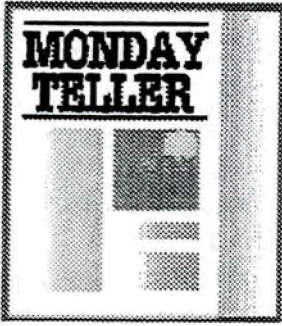
Monday Teller is a publication of the PARC Information Center.

Hidden Histories of Science, by Robert Silvers, ed. New York, New York Review Book, 1995.

This is a little gem, and I was captivated by the broad scope of the scientific questions at issue. The book contains five essays, by five prominent scientists, and each essay is a history, opening up several new perspectives on a major branch of the life sciences. There are various lessons to be learned: science does not progress in a straight line; the public perception of science results can be badly distorted and scientists are often at fault; it takes courage to pursue unpopular lines of research; scientists often reject new ideas because the arguments are either complicated or unfamiliar or, in the case of medicine, not helpful to the patient.

In the aptly-named "Going Unconscious", Jonathan Miller traces the development of psychology over the last two centuries. The theme is the observation and recognition that much of what our brains do is neither entirely voluntary nor automatic. Mesmer of "animal magnetism" was a fraud, but trained disciples who left their mark; his occult practices spread across Europe, died out around the time of the French Revolution, and were revived again in the 1830s, causing further sensation. Claims for miraculous cures captivated the public, yet out of the pseudoscience of imaginary magnetic fluids, in the 1840s, James Braid came up with an explanation of hypnotism which emphasized the patient's nervous system rather than the supernatural powers of the practitioner.

Others recognized that hypnosis was an important probe into the "vaguely defined area of both action and cognition," midway between the purely automatic and the purely voluntary. It was theorized that hypnosis, by paralyzing the will, exposed the action of unconscious processes that are crucial for memory and perception. Freud took psychology on a wide detour, since his unconscious has a rather repressive function. By 1900 scientists were uncomfortable with explanations of unobservable mental processes, and this led to behaviorism and its long run. Chomsky played a large role in the revival of the non-Freudian unconscious by arguing for the linguistic Unconscious. Today, we accept the thesis that "what we are conscious of is a relatively small proportion of what we know and that we are the unwitting beneficiaries of a mind that is, in a sense, only partly our own."

Then in "Ladders and Cones: Constraining Evolution by Canonical Icons", Stephen Gould describes the power of iconography with two examples derived from the theory of evolution: the ladder of progress and the cone tree of diversity. Gould shows how the accepted representation of evolutionary progress is incorrect, and indicts biologists for their role in spreading a distorted view of life on earth through scientific publications. Their inverted icon starts with the common ancestor trunk and grows up and out with ever-increasing morphological diversity. The vertical axis — a conflation of time and "progress" — overlaps the ladder of progress icon, but Gould offers an alternate icon of diversification and decimation, generated from studies of fossils in the Burgess Shale.

Daniel Kevles traces the vicissitudes of the theory that cancer is caused by a virus. Rous was able to demonstrate in 1909 the existence of an invisible infectious agent, smaller than a bacterium, that caused

cancer within a particular breed of chickens, but in the succeeding years most experiments failed to find an infectious agent. An interesting aside is that Fibiger was awarded the Nobel prize in 1926 for inducing cancer in rats fed with nematode-infested cockroaches, a result that others couldn't replicate. By the '30s, the belief that viruses cause cancer in mammals was on the wane. For 20 years, despite mounting evidence that a milk-transmitted virus caused cancer in mice, researchers spoke of a "milk factor" rather than a virus origin. Finally, in the '60s, studies of virus-induced tumors became fashionable, leading to further surprises, each one accompanied by heavy resistance. Oncogenes have been found to be ubiquitous, and their presence in chromosomes is correlated with susceptibility to cancer. Most of the genetic material in human chromosomes doesn't code for protein and has no known function. Is it possible that we're loaded down with retrovirus DNA, inserted over the millennia?

Oliver Sacks, in "Scotoma: Forgetting and Neglect In Science", describes several instances of discovery, loss and rediscovery. In the first case, his patients in a headache clinic had scintillating auras of complex geometrical patterns. When Sacks found a description of this phenomenon in print, written in 1860, it referenced an earlier paper by the astronomer Herschel, whose work had been forgotten for 120 years. Sacks postulates that interest in scotomas was revived in the '70s when they were theoretically characterized as a chaotic storm of impulses, similar to Tourette's syndrome (tic). Tourette was recognized as a chemical disease (hypersensitivity to dopamine) and a drug was found in the '60s to control its effects.

Color perception also provides interesting historical material. It leads us to trust in our intuition that the image we see is based on real data "out there" — observations to the contrary being almost willfully forgotten. In reality, the colors we see are constructed by the brain, as shown by Land's amazing demonstration in 1957. Land took two gray images (not three!) through yellow and orange color filters. When projected together through the same filters, we see all colors of the rainbow, and why? The brain is not merely recording actual color as determined by the wavelength of light — there is no blue or green light. Rather, the brain constructs the colors from the different inputs reaching the three internal color receptors. The construction is not point-by-point, and it is accomplished by aggregating non-local information.

There is much more, of course, but I hope this gives a flavor of the ideas encountered by the reader of this short but fascinating book.

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Dan Bloomberg, Guest Teller
Information Sciences and Technology Laboratory
Xerox PARC
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Monday Teller is a publication of the PARC Information Center.

Comparing Three on Intellectual Capital:

Intellectual Capital; the new wealth of organizations
by Thomas A. Stewart. New York, Doubleday, 1997.
(See in-depth review in: Monday Teller Issue 96)

Intellectual Capital; realizing your company's true value by finding its hidden brainpower
by Leif Edvinsson and Michael Malone. New York, Harper, 1997.

Profiting from Intellectual Capital; extracting value from innovation
by Patrick Sullivan. New York, Wiley, 1998.

Now that the world of atoms is giving way to the world of bits, we welcome this triad about intangible assets, which are still valued at zero on the balance sheet. True, in the Information Age, book value should be as dead as the proverbial doornail, but "the idea that a new, knowledge-based economy is like a new tennis ball; fuzzy, but with a lot of bounce," has not yet taken root in the consciousness of America's boardrooms. The authors agree that "intellectual capital is intellectual material — knowledge, information, intellectual property, experience — that can be put to use to create wealth." As expected, Tom Stewart, of *Fortune* magazine fame has produced the only page turner of the triad, with a savvy turn of phrase and cutting quotes like Henry Luce's, "It is easier to teach a poet to read a balance sheet than it is to teach an accountant how to write." In fact, Stewart's sequence of Part One on Information Age Context, Part Two on Intellectual Capital, and Part Three on the Net Connection provides a natural buildup of interest. (No index? The editor at Doubleday deserves the pillory.)

Knowledge changes the economy. It is causing the down sizing of America, a country where only 2.8 percent of the population works in agriculture and yet manages to feed us all. But knowledge is difficult to measure in actual numbers, or, "If you can express it in dollars, it is good enough." Dissertations by Fred Macklup and Mark Uri Porat notwithstanding, it is Sisyphus' work to grasp the expanding knowledge content of everyday goods and services. "Manufacturing is dematerializing," and money in hand is too. In retail, information takes the place of inventory. "Pacioli's scheme won't cut it anymore," writes Stewart, thinking of the Venetian's 1494 *Summa*, which endures as the foundation of today's double-entry bookkeeping. The real components of cost, today, are R&D, intellectual assets, services, and other elements difficult to quantify; "yet what's uncounted counts plenty." Human capital is where all the ladders start, the wellspring of innovation, the home page of insight. The Institute for Research on Learning "a sort of eleemosynary spin-off of the Xerox Palo Alto Research Center," gets the credit for best work on communities of practice, and for studying how people learn. IRL finds that learning is, above all, a social activity.

War stories like Merck's are instructive. Criticized for purchasing the Medco distribution arm, Merck acquired a large database and a range of customer service capabilities; it was buying intangible key assets — zero on the balance sheet and visible only to the

ones in the know. It was a wise move. A time constrained reader may skip the anecdotal and jump to the appendix where various methods — nay, ideas, are suggested for measuring the intangible. The difference between market value (shares × share price) and book value (equity minus debt) represents intangible assets at their simplest. Nobelist Tobin's Q ratio compares the market value of an asset with its replacement cost; Greenspan likes it. Elegant Calculated Intangible Value, out of Northwestern, requires more mathematical fiddling. Human capital measures are a thing apart, a combination of employee attitudes plus tenure, turnover, experience, and learning.

The flavor is different in *Intellectual Capital* by Edvinsson and Malone, almost a memoir of what transpired at Skandia, the Swedish financial concern which in 1995 issued the world's first Intellectual Capital Annual Report. Skandia is another Scandinavian management marvel reminiscent of the Asea Brown Boveri (ABB) of *Harvard Business Review* fame. Its approach fits corporate guardians of the status quo; it is accounting-based and measures factors like "administrative expenses/managed assets" (G&A ratio, in common parlance), "processing time/outpayments" (accounts payable) and the number of laptops and PCs per employee. Skandia's IC report is composed of no less than one hundred and eleven indices, divided into six segments: Financial Focus, Customer Focus, Process Focus, Renewal and Development Focus and Human Focus (e.g., number of "managers assigned to full time permanent employees who spend less than 50 percent of work hours at a corporate facility.") This smacks of a bureaucratic Shangri-la, and think of the G&A headcounts burrowed in all those indices...

Readers who are not comfortable with Tom Stewart's gestalt or the Luca Pacioli revival from Scandinavia will find a haven in Sullivan's *Profiting From Intellectual Capital*, a collection of papers about value extraction, and the three levels of related management: legally protected intellectual property, intellectual assets, and intellectual capital, which also includes human and structural capital (the infrastructure). The companies that make their profits by converting knowledge into value are known as "knowledge companies," and the key examples are Xerox, Dow, Hewlett-Packard, Eastman Chemical and Rockwell International. Obviously, a thriving community of practice for IC already exists because in this most recent compilation the authors listed above are all present, and busy patting each other on the back for having proceeded from value creation to value extraction. Joe Daniele from Xerox, focusing on competitive advantage, introduces the concept of specific knowledge for strategic planning and applies it to product development; Pam Jajko of Roche, with Eugenie Prime of Hewlett-Packard, worries about maintaining the Intellectual Capital stock and sharing it; Hewlett-Packard comes forward again to promote R&D and the art of patent portfolio management. There are charts, lists and definitions to dazzle anyone.

Is the Intellectual Capital movement for real? Or will it go the way of Business Process Re-engineering and other passé diversions? More bloatware? This is good stuff, if only the "value strings" from human to economic values manage to work their way into the corporate consciousness.

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Giuliana Avanzini Lavendel

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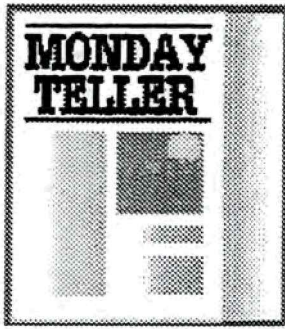
On the Firing Line: My 500 Days at Apple by Gil Amelio and William L. Simon. New York, Harper, 1998.

This season, Apple is the real come back kid. It has even survived Gil Amelio, whose querulous soap opera rambles through 300 pages of supposedly traumatic events. The only shock to the system is how Steve Jobs, combining his customary luck with deviltry, has managed to recapture the beloved firm he founded over two decades ago in his father's garage. "Steve has a very different chemistry than I do," writes Amelio, "he has the ability to charm people...I had a feeling I had not made a friend of Steve Jobs." This is really all you need to know.

The rest is painful, like the Bard's echoes which chafe the reader through eighteen chapters, plus an epilogue entitled "Tomorrow and Tomorrow, and Alas Poor Apple." We go from "A Winter Tale: I Am Hired" to "A Tempest and a Brave New World: Some Bad Times and Good" and "A Tragedy of Errors: My Mistakes Begin to Pile Up." We encounter "Nerd's Labor Lost and Found," " Much Ado-," and "A Pound of Flash", reaching a climax with "To be or Not to Be" which cognoscenti will recognize as "Whether Tis Nobler to Choose Be or NeXT." The most appropriate quote comes from wife Charlene, she of the washing machine that leaked. After Amelio has been interviewed by Apple's spent CEO Spindler she asked: "Are you sure you want this?" "Later I would light on this question as prophetic," comments Amelio, who fails to note the parallel with Portia.

Spindler, CFO Graziano, Chairman Markkula and a host of minor figures float though the alternatives of selling to IBM or Sun, fixing the ailing company, and killing product lines, while managers at the periphery are selling Macs at a loss, unauthorized, to boost sales. After Spindler's ouster, the shortest honeymoon in Amelio's career begins to unfold. Although "the media prefers to treat the CEO of Apple like a film star," he gets no respect at the home office, since discipline at Apple is lax and orders are routinely ignored: "Apparently," comments the author, "it just wasn't inherent (sic) in an Apple executive to leave a meeting with the CEO, immediately gather his/her direct reports, and tell them: 'This is what we need to do.'"

The "unbudging recalcitrance" of Apple executives stretched the author's patience to the point of abuse; his lashing out at the President of Apple Americas -- "That man is brain dead" -- made the rounds, and so did his counterculture habit of taking the stairs rather than the elevator to combat a tendency to pudginess. The executive corps exhibited an advanced case of the "silo mentality," where decisions are made based on the interest of one's own faction, "and the company be damned." Marketing VP Satjiv Chahil, a Xerox veteran friendly to Amelio, did not help with good advice, although an advertising campaign based on the movie "Mission Impossible" proved somewhat successful. Hostility from the press, obviously recovering from the movie star syndrome, aggravated a picture of disarray and doom, contrasted with an earlier welcome for a Japanese version of MacWorld in Tokyo, after Amelio had been only three weeks on the job. But the situation was untenable, writes Amelio, because "Apple is: all today, no yesterday, no tomorrow." Small and large gaffes complicated the picture: when Amelio leased his private plane to Apple, apparently to reduce travel

costs, although, he writes, "I needed to subsidize the operating expense heavily out of my own pocket," both media and his employees were incensed. The same indignant chorus was heard when Amelio finally left Apple with a diamond handshake, at the end of his 500 days. (Even Napoleon only had 100.) The story line wanders through people encounters and images, most of them negative and at times trenchant. Here is Bill Gates: "Once he's explained his position, Bill sincerely can't understand why you don't want to do what he wants you to do." In this case, Apple was asked to embrace Microsoft's Internet Explorer without receiving in exchange the release of Office for the Mac when the Windows version came out.

Obviously out of his element, Amelio does not unfurl a flag of his own but takes refuge in saying, like the late Robert Gozueta of Coca Cola:, "I'm sleeping like a baby: I wake up every two hours crying." And yet, he fancies he has dealt with severe problems by executive fiat: "I recognized the breakdown between R&D and sales, but once recognized, it was not hard to fix," that is, by 'appointing divisional General Managers -- and that was that. Amelio might still think that his biggest problem was to predict profitability too soon, but buying Steve Jobs' NeXT was his downfall. Some people, including a top technical talent at PARC, believe that Amelio's ignorance of computer technology contributed to the fatal decision. After discontinuing work on the homegrown Copland operating system and its successor Gershwin, Amelio looked outside because, in his words, "All high tech groupies know that the biggest operating system evolution of recent years was the introduction of Windows 95 by Microsoft." He seemed unable, at the time, to grasp the difference between operating system and user interface, which was the real Windows 95 bonanza; he thus rejected all Unix-based solutions like Solaris, whose "customers are still burdened by arcane, complicated commands." Apples and oranges! Although he was right in refusing to pay $275 million for Louis Gassee's rudimentary Be, Amelio succumbed to Jobs' legerdemain, and bought NeXT for $400 million. About three month later, he was fired and de facto replaced by Jobs, who subsequently intimated that the NeXT's OS is not a practical alternative for the Mac operating system. Apple will not use it, after all!

Best thought in the book? Amelio quotes G.B.Shaw, according to whom the secret of being miserable is having enough leisure time to bother whether you are happy or not. He was definitely unhappy at Apple, where "each manager had run up a pirate flag that was flapping in the breeze." Ah, for a large, successful company that operates as it should, like "a Hewlett-Packard or a Xerox." Pipe dreams: as Amelio himself intimated in his 100-day speech, "This is Apple. Expect the impossible."

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Giuliana Avanzini Lavendel

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Monday Teller

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PARC INFORMATION CENTER

Network Orange. by Richard Crandall and Martin Levich. New York, NY: Springer Verlag, 1998.

"What you might call a 'network orange' is a prime example of the intrinsic potential for chaos in technological growth," the book says. Yet, it is not quite a throwback to the horror story by Burgess about humanity gone amok. "Queer like a clockwork orange," a Cockney expression, points to something which appears under control, but is really all mixed up inside. Authors Crandall of Apple and Levich of Portland's Reed College - a former and current prof. duo - offer a batch of six essays which only certified nerds could find irksome. Argumentative and witty, studded with long quotes from favorite authors, *Network Orange* shows its academic colors while stirring the pot. Man has ceased to trust in his autonomy, shudder the authors, "he has begun to rely on autonomous machines," which keep working "on the basis of their own internal realities." Is this the product of despair, blind faith, or knowledge? *Network Orange* sets up to scrutinize, from a vantage point, computer design and architecture, artificial intelligence and the myth of machine consciousness, and the puzzling multimedia scenario here frenchified as "a menage obscur."

The first three papers come from the technologist's side; the remaining three essays are from the angle of the philosopher, casting a jaundiced eye on networks, Virtual Reality, and education, to whom the computer is proving to be a dubious enabler. Bad writing as "an articulated social practice" does not become acceptable if accompanied by a sprinkling of graphics. "Render unto man the things that are man's, and unto the computer the things that are the computer's," as Norbert Wiener left written. With millions of transistors per earthling, software increments and hardware growth are playing an endless leapfrog game. We have color-splashed Web sites and full length digital movies like *Toy Story*. But hardware and software designers have not exploited the principles of co-tasking and redundancy present in biological systems, where the eye and the ear, for instance, have co-evolved a precise sharing of responsibilities which could be a paradigm for the digital camera and microphone peripheral. Neural networks have potential for recognition and processing tasks, such as catching minuscule perturbations in a set of x-rays; fashionable genetic algorithms are capable of employing "natural selection and mutation to evolve a solution." Nanotechnology could lead to nanoprinting with recyclable ink, and help the immune system repair our bodies. The still visionary Quantum Turing Machine could produce massive parallel processing of a scale never seen. But we labor under "the conspiracy of parts," where computer makers, using "more, faster and smaller parts are absorbed in design rather than purpose," not realizing that a nano-QTM marriage could do the programmer's bidding and at the same time follow the laws of the universe.

The phrase "Artificial Intelligence" is guilty of double obfuscation. It represents a boondoggle where three areas in particular have not fulfilled their promise: chess is one, where the computer often grabs a victory by brute force, "with enough MIPS and megaflops" to sample a whole world of alternatives at every move. Speech recognition is another AI outpost of intense difficulty, and so is weather prediction, burdened by sheer "physical chaos" and the problem of "insufficient data input" it shares with the science of earthquake prediction. Our input peripherals are puny, especially if compared with "the great dynamic range of co-tasking human peripherals" - an exquisite array which evolved as a response to a highly variable environment. The *Gedankenexperiment* which so delighted Einstein and Bohr "is the canonical example of how the human brain can react to unpredictable input." We are reminded of the problem of the swimmer's legs, whose solver was another physicist, Richard Feynman. Should swimmers shave all hair from their legs to gain speed in competition? The computer answered by prescribing a

comparison of two routine procedures: HAIR: = No and HAIR: = YES, but symmetry expert Feynman, in classic *Gedanken* style, came up with "Shave just one leg, and see if the swimmer moves in a circular pattern!" (You can't beat a Nobelist brain.) For computer consciousness to emerge, "there would have to be a revolution in the matter of output processing," although the machine "has only a limited number of degrees of freedom." Thus the authors wish for "a Cartesian theory of consciousness."

"The current woeful status of multimedia is about the best that can be," since memory and bandwidth are still limited, and little work is being done on the mathematical constructs "which underlie the very CPU operations." Besides, a text-media crisis is taking place on the threshold to the new millennium. As Landauer observed in *The Trouble with Computers*, "Electronic documents would have since arrived if it were not for a stumbling block: people hate them." Human-computer interaction is complex, and little understood; for instance, it takes longer to read a right-justified page than a jagged-right one. The advent of multimedia will depend on how closely we expect machines to approximate physical reality. It may even happen that success "will ultimately bring about the demolition of science" by a surfeit of simulation and visualization, which threatens basic scientific fields with "multimedia backlash." Don't physicists today spend more time on the computer than working in the lab?

Hypertext is a positive, and teleconferencing seems the canonical testbed for multimedia's "obscure blend." But "the 'network orange' has not grown in the simple way a tree grows, by sub branching upon branches." Vascular systems transmit energy; neural systems, like the Web, transmit information; "ergs and bits might as well be apples and oranges." At this point, the difference between vascular and neuronal topologies "implies a difference in responsibilities." The network's neural topology can only breed chaotic growth, and the reader is invited to "at least momentarily leave utopian interpretations of the computer revolution to news weeklies and the latest crop of futurists." (The

temptation is to become so involved in leading the revolution or retreating from it that you stop thinking.) On the Web, ignorance can parade as knowledge, but democratization of access should not be confused with putting knowledge itself at the lowest common denominator, where a catch phrase can be an advertising slogan, a comic strip, or a quotation from Shakespeare. Catastrophes like Artificial Intelligence and Virtual Reality, the authors believe, harbor "a strong component of wishful thinking." It just ain't natural; VR "presents illusions that are perceived by the user as though they were not illusions." This is for recreational relief, "a kind of electronic hot tub," with an anti-intellectual quality which prizes experiencing versus abstract reasoning and concept elaboration. Contrast it with Grounded Virtual Reality, or GVR, an invention of our authors at their most messianic: virtual surgery when a real patient is at hand, a virtual wind tunnel where the operator dons a cyber-helmet and undergoes pilot training. "The operative word is 'honest.'"

Does "computerdom" have a role in liberal education? The answer is: "should Teddy Roosevelt have called for a telephone on every school desk?" Technological progress is the handmaiden of educational progress, not vice versa. And a liberal education is different from training; "We train acrobats, but do not have to educate them." Like the unstructured curriculum of the Sixties, educational TV and computer assisted instruction are recognized as failures. Will computer literacy follow the same course? The verdict is "not proven," but "the advent of computer technology challenges educators to rethink their business," as the nature of education itself is at stake.

In sum, *Network Orange* is an emotional, preachy, at times naïvely "honest" wish list. Worth a read, if nothing else, for leading to this conclusion: "It is time for the cheerleading to stop and the hard work to begin."

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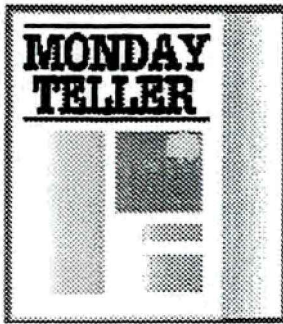
Monday Teller

Issue 105 - 14 December 1998

PARC INFORMATION CENTER

Institute For the Future (Corporate Associate Program) 1998 Ten Year Forecast. Menlo Park, CA, 1998.

Computers are going underground and at the same time becoming more pervasive, placing us humans "in almost continuous contact with machine intelligence." This is why we give them nicknames and talk to them as if they were people, says a group of investigators at Stanford University. Medical research, with innovations such as rational drug design, minimally invasive surgery, and genetic therapy suggests implications for R&D in other fields, such as the blurring of boundaries between industry and academia and the powerful role of information technology. U.S. earners are "income mobile," with 50% of adults moving up to a different income quintile within 5 years, and Germans are not that different.

These are the kind of issues in which the Institute for the Future revels, and expertly pulls together for the consumption of its industrial associates at year end; with Y2K on the horizon, crystal-balling is bigger and better than ever. We are cautioned that the ten-year forecast "is not intended to predict the future in general or even business outcomes in particular," but rather as "a clients' tool" to expand strategic business. This year's edition is the twentieth and generous, with an assessment of the Institute's prophetic track record on selected issues — a record of which anyone would be proud, since globalization, the significance of demographics, flatter org charts and the impact of deregulation were all previously identified as societal cornerstones. Looking back a few years, however, the Institute's soothsayers were lukewarm on other important factors, such as environmental concerns, the "radical advances" of Internet, and the identification of China "as the real winner among the emerging market countries" in the '80s. In the '90s, writes the Institute's Ian Morrison, "the country's double digit growth rates, along with its sheer size, caught everyone's attention, including ours."

There are four parts to the survey, with the core dedicated to the "Key Forecasts of the Business Landscape." An assessment of past performances follows, with the *mea culpa* about ignoring China and snubbing the Internet (How good were we? Let's say A-minus), then a summation of major issues, such as "the business threats and opportunities emerging from the changes brought about by the key driving forces." A final section on "Strategy Directions" gives a bird's eye view (an eagle's?) of adaptations implemented by successful companies which were able to turn their products, literally, into services for the customers. This short list includes Hewlett-Packard, German publisher Bertelsmann, Fidelity Investors, and the UK's Virgin, designed for baby boomers intent on living it up.

A fascination with numbers, very plain language, and avoidance of anecdotes, metaphors and other embellishments prevail: this indeed is not a page turner. The faint-of-heart reader could be content with the executive summary, aka "The Ten Year Forecast At a Glance," summing up the Institute's ponderous bundle of knowledge. Selected issues for 1998 are divided into the three major areas of Economy, Demographics/Labor, and Technology. The global economy keeps on coasting with a new, non-threatening business cycle that has "longer expansion periods, more moderate downturns." We are led to expect "a 2.5 per cent annual growth over the next decade." Renewal and ferment pervade "the new telecoms, the infrastructure of the information age," whose role is to act as the vital link for the global economy, but it is up to the new entrants to provide interest in what is mainly a battle of giants. Brazil, the key to Latin America's future, suffers from maladies like corruption and gross income disparity — a phenomenon called by statisticians "the gini factor," which quantifies a country's distribution of wealth. In Brazil, the average income of the wealthiest 20% is 30 times that of the poorest 20%. Gini ratio for the U.S.: 10 times, or

middling. The Japanese have achieved an outstanding distribution of wealth, with a "gini" ratio of 4 dividing the incomes of the richest and poorest citizens.

Demographics lead, since the impact of baby boomers and of plain old people is strongly emphasized. Boomers are becoming risk averse, and "their dynamic push for education, jobs, and houses, which created huge demands on the infrastructure in the '60s and '70s, is over." Boomers are interested in "longer term financial investments" and a longer work life. "At the turn of the century, the aging of the baby boomers will cause an explosion of older workers in the labor force." Many will be women. Organizations will have to respond to changes of a magnitude reminiscent of the 1970s, when women entered the labor force in great numbers. Boomers will continue their influence "by pioneering new alternatives for working beyond retirement age," since "work expectancy increases with life expectancy," and "more education means more years of work," especially if coupled with training and maintenance of skills. The potential for generational tensions will increase. The young — from 11 to 17 years old today — are growing up in a media-rich environment and have "the ability to create worlds and environments, to construct identities and personalities" for their group, which will be 20 million strong in 2005. "Companies must think now about developing interactive worlds and simulated environments."

Among other factors to watch: the impact of immigration which (surprise?) is concentrated in only four states: California, Florida, New York, and Texas. It brings "a diverse set of skills and attitudes," and "enthusiasm and desire to partake in the U.S. experience." On the other hand, global work will become local, when "globally distributed teams will share electronic work space." Looking into the next decade, the Institute expects "ten more years of torrid infotech growth," since Moore's Law will continue to hold awhile, and after that PARC (Rotating Nanomechanical Devices) and a host of university and industrial labs will keep stepping lively, and innovating away.

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Giuliana Avanzini Lavendel

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Monday Teller is a publication of the PARC Information Center.

On Competition. by Michael E. Porter. Boston, MA: Harvard Business Review, 1998.

Beware explosive growth and imitation, which follows benchmarking, especially in the high tech area, where the siren song of technology is heard. Companies pile too many features in too wide a product area, while slashing prices to remain on the competitive edge. A few succeed thanks to "fundamental advantages," i.e. some uniqueness factors; the others are caught in a rat race. "Ironically, the popular business press, focused on hot, emerging industries, is prone to presenting these special cases as proof that we have entered a new era of competition in which none of the old rules is valid. In fact, the opposite is true."

Thus, the Harvard-bred alpha male who stares compellingly at the reader from the dust jacket of this anthology. Here Porter's thoughts and positions span a good twenty years, with the obviously old and the freshly innovative intermixed, but pronouncements are never ambiguous, they are indeed linear. Ipse dixit: "A firm achieves superior profitability by attaining either higher price or lower costs than rivals." President Truman, stung by the economists' professional "On one hand ... but on the other," hoped to find a one-handed economist. Michael Porter is that other rarity, a one-handed strategist, with a reputation for infallibility like a Pope of yore. These readings recall the collections of seminal papers in honor of an older person on the twilight of a career, while Michael Porter for sure has plenty of mileage ahead. It is somewhat anticlimactic, though, to read a chapter entitled "How Information Gives You Competitive Advantage" where the words Internet or Web do not appear even once — the paper, left pristine, was published in *Harvard Business Review* (HBR) for July-August 1985. Were we ever that young and naïve, or is it another manifestation of that phenomenon, Internet time? Fourteen years are indeed an eternity, these days.

On Competition, in three parts, flows smoothly from core concepts (I) to globalization (II) and social concerns (III). Michael Porter's name is synonymous with the theory of competitive strategies, a lifelong mission /obsession of this academic who sits on Boards of Directors and advises companies on positioning, defense, and attack. "Every company, and every country, must try to understand and master competition," he writes. Competition unleashes innovation and promotes "unheard of rates of progress" especially in the US, where telecommunications, transportation, energy and other sectors have shown what deregulation can do for the economy and, ultimately, for society. It may come as a surprise that Porter harbors the intense feelings of obligations towards mankind which are brought forth in the final section of this book dedicated to "Competitive Solutions to Societal Problems." A 1995 paper on "Green and Competitive," focused on the environment, is followed by "The Competitive Advantage of the Inner City." (There are four such blessings, actually: strategic location, local market demand, integration with regional clusters, and human resources.) Then comes "Making Competition in Health Care Work:" while innovation is the driver, bringing "continuous quality improvement and cost reduction," physicians are tempted to increase service, make expensive referrals, increase fees, and practice defensive medicine.

Porter finds that the US suffers from a "failing capital investment system" which is widely practiced "both within and across companies." There are self-created problems, such as insufficient investments in "those intangible assets and capabilities required for competitiveness — R&D, employee training and skill development, information systems, organizational development, and supplier relations." He continues with a detailed list of factors, insisting that the "R&D portfolios of American companies include a smaller share of long term projects than those of European and

Japanese competitors." (This HBR paper, a solo Porter performance, is dated 1992.) Several of the papers gathered in *On Competition* list co-authors from well known universities and other institutions of learning, but they are all within the scope and style of Porter beliefs.

There are two new papers, written especially for this collection by Himself, and they are memorable, especially Chapter 7 on "Clusters and Competition," which is placed right after the masterful and already widely known "Competitive Advantage of Nations" (HBR, March-April 1990). A cluster is "a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities." Clusters "align better with the nature of competition and the sources of competitive advantage." Location affects advantage in the light of "productivity growth," which is influenced, among other factors, by access to information, institutions, and public goods. Porter's "location paradox" suggests that distant sourcing is "only second best compared to accessing a competitive local cluster." This smacks of economic geography, a discipline in the making which is fundamental to "Competing Across Locations," the other new study, according to which "globalization has not eliminated the importance of location in competition," as demonstrated by "the geographic concentration of leading firms within nations themselves."

In the midst of so much lofty wisdom, it almost comes as a relief that the Brahmin Professor has an occasional blind spot. In Chapter 7 on "Clusters and Competition," for instance, he extols the microclusters of Spanish Catalonia, the Italian Footwear and Fashion Cluster, and even the California Wine Cluster, which a group of Harvard MBA students was induced to investigate. But he dismisses with a single sentence the most visible and probably influential cluster of them all. He writes: "Silicon Valley and Austin-based computer companies, for example, plug into customers needs and trends quickly and effectively, with an ease impossible to match elsewhere." Is that all? How niggardly of the Professor.

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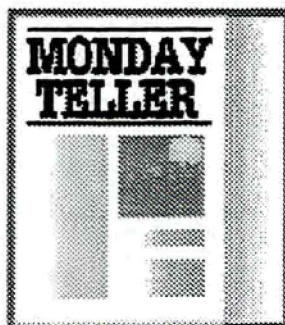
Monday Teller
Issue 107 - 19 April 1999

PARC INFORMATION CENTER

Dealers of Lightning; Xerox PARC and the Dawn of the Computer Age. by Michael Hiltzik.
New York, Harper Collins, 1999.

We never really thought of ourselves as dealers of lightning, although Dave Boggs remembers being asked to create a cursor with the legend "PARC deals lightning with both hands" — cursors, today, are mostly blah. This is not a blah book; it is an exciting, unformatted, roaming dump of memories which sounds transcribed directly from tape, a cavalcade of stars chosen partly because of relevance and partly for their willingness to talk; a tour de force, historically speaking, which is much more to the point than the fumble book*, whose authors were obviously never "there." Neither was Mike Hiltzik, and that's what's missing: the team experience, the magic of all those people coming together at the right moment, and producing what seems, in retrospect, a miracle or rather a full complement of miracles. This book is a remarkable effort, in spite of redundancies - the same sentences are scattered here and there, but this may contribute to the authentic feel of the interviews. Less felicitous are Hiltzik's frequent similes, as in "This tactic could not disguise the losses in computing any more than a farmer can obliterate the stench of manure by spreading it over more acreage." (p. 255) Even Bob Taylor's Texan metaphors had more *je ne sais quoi.*

Mike Hiltzik, a well-known business reporter with the *Los Angeles Times* (his investigative techniques earned him a Web cameo from *Netiquette*), focuses his attention on office politics as the key to understanding the PARC saga; it is back to the fumble. The battles he lovingly dwells on inescapably lead to the Epilogue chapter: "Did Xerox Blow It?" Was Xerox "uniquely maladroit," and was the saga more like a comic opera? The author finds comfort in the fact that "No corporate lab exists today that resembles the PARC of the 1970s and 1980s, not even the PARC of the 1990s, where great advances are made in physics, information sciences, and graphic technologies." Microsoft, IBM and Apple — with the Macintosh as "the most successful commercial expression of PARC's design principles" — are invoked as companies where "the technology foils its tamers." Commercializing innovative technologies is a hard task, and a corporation cannot count on recouping its R&D investment, a goal that is becoming peremptory today. "Corporations are seldom able to remake themselves as thoroughly as Xerox trying to turn into a computer company," admonishes Hiltzik, who finds only one exception to the rule, General Electric, "and, possibly, Hewlett-Packard." In sum, it was too much too soon, and if the market had remained faithful to "$16,000 system oriented workstations, the Star might well have dominated." Xerox could not compete with standalone desktop workstations costing only $2,000, especially in the "lost decade" when the company was confronted by a "merciless business environment." This point could be debated by some of the *dramatis personæ*. But it is undeniable that Xerox management supported its lightning-dealing research lab even all through the hard times when Japan threatened and the future looked bleak and was rewarded by billions for its laser printing venture. Hiltzik mentions the "generous funding of PARC to this day" in his exculpatory conclusion.

The reading is lively, structured to please by a practiced hand with a bent for the theatrical. There is a Cast of Characters, a condensed Timeline, and an Introduction, which focuses on the birth of the Alto in chuckthackerspeak — or Hiltzik's own: "Such was the operating standard in the lab where Alto was born. At Xerox PARC, the home of one of the most exceptional teams of inventing talent ever assembled in one place, prodigious feats of invention and engineering sprouted as commonly as daisies in an open field." Like NASA's Mercury capsule, the Alto was just a research prototype, with no marketing implications. People who were fortunate enough to be at PARC in those days remember them as "the most exciting and fulfilling of their lives,"

and this includes solid state physicists and material scientists, great guys all but whose work "lies outside the scope of this book for several reasons." David Biegelsen, one of the first physicists to arrive at PARC and still one of the its leading lights, speaks up as is his custom. He remembers a bleak introduction to a small, empty, rented building with a lone olive tree in the atrium, a sight which, in Hiltzik's words, "almost made him sick to his stomach...It was the trepidation sensed by any pioneer in the split second before he takes his very first step into the unknown."

Three parts follow, with portraits or personal histories predominating. Part I is called "Prodigies," and starts with "The Impresario," indeed a feeble moniker (leader of prima donnas?) for Bob Taylor, whose duties rather resembled those of a lion tamer; "Geniuses, prodigies, owners of doctorates from the leading halls of learning, they lived in the thrall of this psychologist from the University of Texas," although some "damned him as one of the most arrogant, elitist, and unprincipled persons on the planet." Savory chunks of corporate history are expertly exposed to the public eye, starting with the rivalry for the R&D domain between the aging Dessauer, one of the Xerox founding fathers, and the newly arrived Goldman (the Frog). Following are the ill-fated acquisition of Scientific Data Systems or SDS (did Max Palevsky cook the books?), and the fortunate rescue of George Pake — he of the "clipped and slightly distracted manner of speaking" — from the fractious halls of Washington University in the '69 of youth revolution.

Pake came, chose Palo Alto instead of Princeton, and the House on Porter Drive was populated, with the robust addition of refugees from the Berkeley Computer Company in the persons of Deutsch, Thacker and Lampson, larger than life characters about whom much has been written and remembered, even by those who were pelted by the flying objects with which Lampson kept pesky interlocutors at bay. In this parade of personalities among the PARC founders, Smalltalk's (and now Disney's) Alan Kay merits a chapter plus as "Not Your Normal Person." The plot keeps unfolding in PART II, "Inventors," where the first chapter is dedicated to Gary Starkweather, "The Refugee" from

Rochester who invented laser printing with help from Lampson and future DocuTech designer Ron Rider, then a stripling. Ethernet's Metcalfe and Boggs star in "The Bobbsey Twins." The "Pariahs" are the color wizards, especially Dick Shoup of Superpaint, which was prototyped near Alto but was never part of the PARC equation, not even in Taylor's mind ("It's a corporate decision," Xerox said). Clever of Hiltzik to have uncovered in the Superpaint affair the seeds which grew to be Lucasfilm and Pixar.

Clever of Hiltzik also to have obtained, according to the scuttlebutt, a lunch interview with Steve Jobs during which Jobs spilled his version of the fateful 1979 visits to PARC which led to Lisa, the Macintosh, and opened the gates (pun intentional). This is in PART III, "The Messengers," where PARC experiences some management stars like Liddle of Star and later Interval fame, a risk taker but also adept at keeping his head down; then Shugart's Don Massaro, "the first Xerox executive they had met to display any business acumen at all," who later headed a slot machine startup; and also the brief reign of Bob Spinrad from SDS times, who is described as "rigorously analytical" (which is true) and "a gentleman of the old school with a round face marked by eyebrows as dark and emphatic as exclamation points" (which is not). "Exit the Impresario" features the ultimate 1983 *duello* between management heavies, Taylor and Bill Spencer, the future rescuer of Sematech. It deserves another chronicle because, far from tackling it in pithy if not Homeric tones, Hiltzik opts for the farcical.

All told, PARC dwellers, expatriates, admirers, and historians owe a debt of gratitude to Mike Hiltzik for eminently functional craftsmanship in presenting this material on the treasures Xerox PARC gave to the nation and the world. That he did not bother to capture the magic is another matter.

Fumbling the Future; the Story of Xerox and Personal Computing by Robert C. Alexander and Douglas K. Smith (NY: Morrow, 1988)

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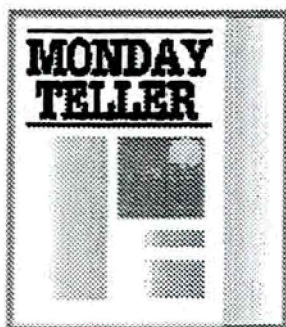
Pasteur's Quadrant: basic science and technology innovation, by Donald E. Stokes.
Washington, DC: Brookings Institution, 1997.

"A fresh look at the goals of science and their relation to technology is what this book is about." In 1997, when Donald Stokes, Professor of Politics and Public Affairs at Princeton, succumbed to acute leukemia, he had just completed a manuscript that contains the summation of his life's work. It is a significant legacy to leave behind. This slender volume, edited posthumously at Brookings, presents a well-articulated "interactive view of science and technology," with a new approach to "use-based research" of the kind that appealed to Louis Pasteur.

Throughout his life, Dr. Pasteur was prompted to action by practical motives, from the plea of a mother whose child had been bitten by a rabid dog to the distress of French growers who cold not keep beet juice from spoiling. He had almost a modern concept of his "customers," and numbered among them industrialists, farmers, even Napoleon III. Galileo worked on the same principles, and so did GE's Irving Langmuir, the 1932 Nobel prize winner, who believed that understanding the principles of the physical world and innovating technology are "part of the same venture." It gives the reader great pleasure to follow Stokes' cavalcade through history, where he finds imaginative association and parallels, each one a discovery, with a verve that often escapes the historian mandarinate.

Unexpectedly, right at the start, the venerated figure of Vannevar Bush of Memex fame appears almost as the villain of the piece. Half a century ago, Bush released a watershed report titled *Science, the Endless Frontier*, which launched the post-war golden age of government-backed scientific research and created the dichotomy of pure and applied science as two neatly divergent, almost irreconcilable siblings. Now, on the threshold to the Millennium, the compact between the feds and the scientific community is imperiled by the end of the Cold War, and must be rebuilt. The Vannevar Bush paradigm, the linear progression from basic research to applied research and then to development is misleading. Let's instead consider the old/new concept of use-inspired basic research. Let Pasteur, the practical research genius, be our model. Try locating him on the quadrants familiar to marketing studies: on the vertical axis we have fundamental understanding, and on the horizontal we place considerations of use. Pasteur said yes to both, and his quadrant places midway between those of Niels Bohr of the model atomic structure (a pure scientist in the German connotation), and Thomas Edison of the light bulb and the gramophone, an American pragmatist who gave little thought to "fundamental understanding."

"The forces unleashed by the scientific revolution of the seventeenth century and the industrial revolution of the nineteenth century helped create the modern world." Thus begins Prof. Stokes, who builds his case in five forceful chapters. Chapter One of *Pasteur's Quadrant*, "The Problem," looks at the interplay between fundamental understanding and applied use; it advocates a fresh view of the field which could suggest a return to Francis Bacon's "view of the close link between science and practical technology [which] outpaced reality by three hundred years." Chapter Two, "The Rise of the Modern Paradigm," tries to discover the reasons for the widespread acceptance of the basic/applied dichotomy. It had its roots in Europe, while "from colonial times America's scientists had found it natural to mix the quest for understanding and use." Ben Franklin, for instance, invented a stove and left us the legacy of "the supremely practical lightning rod, as well as a quantum leap in fundamental knowledge." This healthy

American attitude was later challenged by the rise of the research universities, which the author, a Princeton dean, takes to task for having developed "a view of pure science quite different from the American outlook earlier in the nineteenth century."

The pivotal Chapter Three, "Transforming the Paradigm," strives for "a revised view of the relationship between understanding and use as goals of research," where unsuspected links between basic science and technological innovations emerge. The civic-minded Chapter Four, "Renewing the Compact between Science and Government," talks about renewal of a, by now, threadbare collaboration between science and government, while Chapter Five, on "Basic Science and American Democracy," finds that the latter "can build agendas of use-inspired basic research by bringing together judgments of research promise and societal need." This program is closely tied to the here and now of the time when the author met his untimely death.

Basic, programmatic, fundamental, pioneering, committed... There are definitions to please everybody, including "purposive basic research," as in biogenetics or in the discovery of the maser at Bell Labs, meaning "research of a fundamental nature that is done with a general application in mind." It is a relief that Prof. Stokes ends up by absolving Vannevar Bush of wrongdoing — although Bush, working for President Roosevelt, coined the embattled term "basic research" and went on to state that it is performed "without thought of practical ends," for the sake of "general knowledge and an understanding of nature and its laws." These are ideas which have deep resonance in Western thought, back to classical Greece. Vannevar Bush, however, chose his moment well, nursing "the kinetic energy of science's wartime success" into "the potential energy of the government's standing commitment to science in peacetime." He was quick to catch the opportunities he saw in his window in history — and we all have benefited from his vision.

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