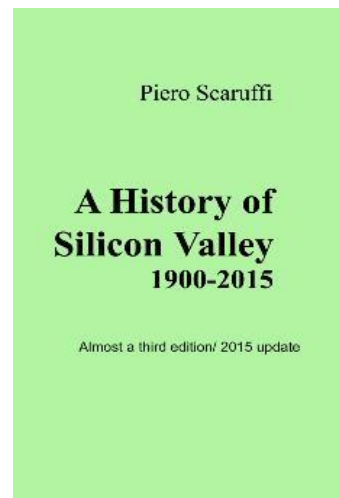


# A History of Silicon Valley

The Greatest Creation of Wealth in History  
(An immoral tale)

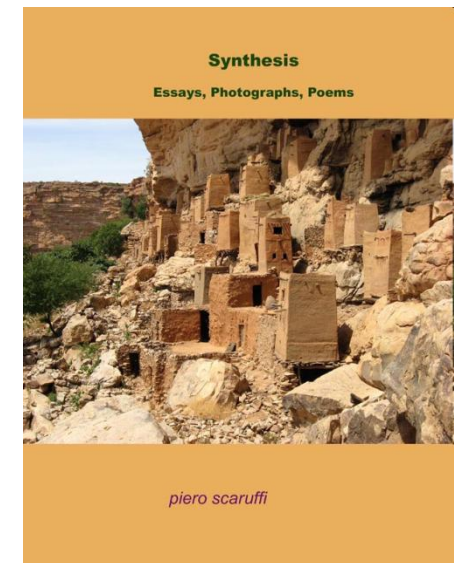
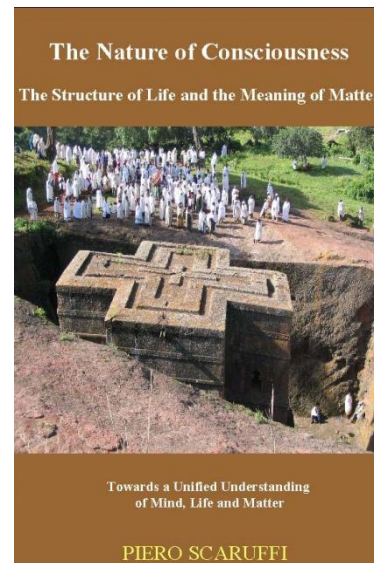
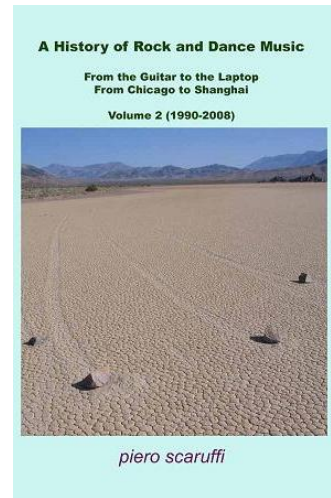
being a presentation by piero scaruffi  
[www.scaruffi.com](http://www.scaruffi.com)

adapted from the book “A History of Silicon Valley”



# Piero Scaruffi

- Cultural Historian
- Cognitive Scientist
- Blogger
- Poet
- [www.scaruffi.com](http://www.scaruffi.com)

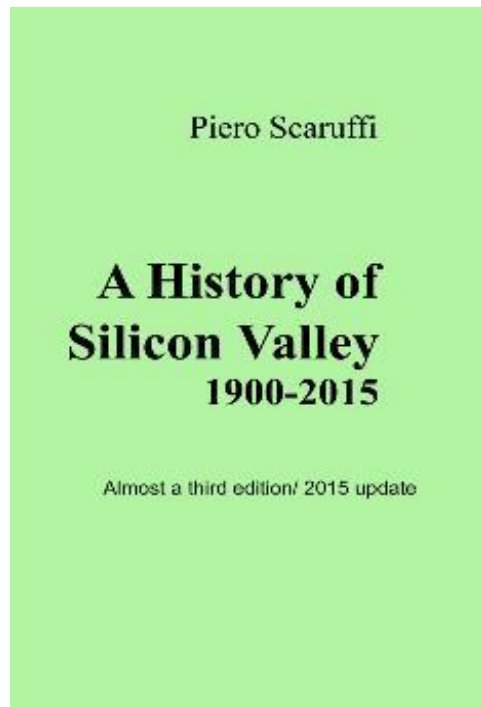


# This is Part 4

- See <http://www.scaruffi.com/svhistory> for the index of this Powerpoint presentation and links to the other parts
  - 1900-1960
  - The 1960s
  - The 1970s
  - The 1980s
  - The 1990s
  - The 2000s

# What the book is about...

- The book is a history of the high-tech industry in the San Francisco Bay Area (of which Silicon Valley is currently the most famous component)



# The Age of the Personal Computer

- The IBM PC (1981), a personal computer from off-the-shelf, widely available components based on the Intel 8088 microprocessor and running an operating system by Microsoft (derived from Unix)
- The “open” model of the PC creates an industry of "clones" (Compaq, Olivetti) and an industry of independent software companies
- Commodore 64 (1982) is sold in retail stores instead of electronics stores
- Osborne 1 (1981), a portable computer designed by hardware engineer Lee Felsenstein of the Homebrew Computer Club

# The Apple Vision/ II

- Apple (1982) is the first personal-computer company to pass the \$1 billion mark in revenues
- Apple's model: a proprietary Apple operating system
- Apple Lisa (1983), the first personal computer with the GUI pioneered by the Xerox Alto
- Apple's added value: it looks cool

# Software

- Sales of personal computers skyrocket because they have become useful: Apple thanks to office programs (Visicalc, Context MBA) and the PC thanks to the DOS-compatible applications (Lotus 1-2-3, dBase (\$700))
- Activision (1979), Electronic Arts (1982): computer games
- Autodesk (1981): CAD
- Adobe (1982): desktop publishing
- Symantec (1982), Borland (1983): tools for software developers

# Software

- 1950s-1970s: the hardware represents most of the cost of a computer
- 1980s: the falling prices of hardware components enables ever more sophisticated software applications and triggers a growing demand for them; and the need to run more sophisticated applications motivates the hardware industry to produce more powerful chips



# Workstations

- Single-user graphic networked computer for engineering applications
- Mostly based on the Motorola 68000 (not on Intel) and running Unix (not DOS)
- Apollo (1980), SUN (1982), Silicon Graphics (1982), DEC and Hewlett-Packard (1983)
- Apollo (Boston): custom hardware and proprietary operating system
- SUN (Stanford): Berkeley's Unix running on standard off-the-shelf hardware components (the business model of the IBM PC)
- The SUN culture is to the Microsoft culture what the counterculture is to the mainstream

# Workstations

- Corporate networks of local networks
  - Cisco's commercial version of Stanford's router (1986)

# Diversifying

- Fairchild, Intel, Zilog created a genealogical tree: each one improved over the invention of the predecessors
- The inventions of Apple, Cisco, SUN and Oracle have little in common
- Neither of them gives rise to a (significant) genealogical tree
- No major company of the size of Intel emerges from any of these
- Each of them creates a chain of suppliers

# The Great Unix Wars

- The US government allows AT&T to sell its Unix, System V (1983)
- AT&T's corporate world versus the idealistic Bay Area hobbyists (SUN)
- Open Software Foundation (1988): IBM, DEC, Hewlett-Packard, etc
- Meanwhile Microsoft keeps increasing its market shares...

# The Internet

- Just like the personal computer and the Unix, the Internet too was largely shaped by a community of eccentric independents
- Decentralized model that involves the very users of the Internet to submit proposals for future directions
- A government-mandated grass-roots movement
- The consumer is the producer
- E-mail itself is a user invention, never planned by the Arpanet's bureaucracy

# The Internet

- The Arpanet as a project in progress, a concept that is more likely to be accepted in military projects than in commercial product development
- The Arpanet changes mission over time, transforming from a military project to survive a nuclear attack into a system for interpersonal communication and knowledge sharing
- The ethics of the Arpanet, just like the ethics of the Unix world and the ethics of the early personal-computer hobbyists, is not the brutal, heartless ethics of the corporate world nor the brutal, heartless ethics of Wall Street: it is the utopian ethics of the hippie communes transposed into a high-tech environment

# Society

- Spiritual revival of the New Age
  - Arguing for a return to a more natural way of life
  - Hostility towards science and rationalism
  - Luddites vs tecnophiles

# Society

- Chinese and Indian executives run 13% of Silicon Valley's high-tech companies founded between 1980 and 1984
- Silicon Valley is both a place of great ethnic diversity and a place of high technological saturation



# Society

- Chaotic creation and destruction of companies
- High labor mobility
- Anti-union spirit
- The decentralized and anarchic personal-computer world is a good fit for the spirit of the Bay Area

# Apple's Vision/III

- Apple's Macintosh (1984)
- The hardware is a means to appealing software
- Microsoft cannot match Apple's GUI because it cannot tweak the hardware of the PC
- Apple's HyperCard (1987)
- However, Microsoft can invest more in marketing its office automation suite (Word, Excel, Powerpoint)
- The futuristic Mac helps cement the community of Apple fans
- But Apple's closed architecture loses to the "open architecture" created by the IBM-Microsoft axis

# The GUI

- Virtual Reality
  - NASA's VIVED (1984) and VIEW (1985)
  - Jaron Lanier's VPL Research (1985)
  - Lucasfilm's virtual world "Habitat" (1986)

# The Semiconductor Wars

- Japanese firms introduce low-cost 256K DRAM chips (1984) and gain 70% of the market (1985)
- Intel, AMD and Fairchild exit the DRAM market
- Japan's share of the world's semiconductor market reaches 51% (1986)
- First large-scale layoffs in Silicon Valley
- What saved Intel is the microprocessor. The "computer on a chip" is too complex and

# Intel's Vision

- The real competitors are at home: VLSI Technology, Linear Technology, LSI Logic, Cypress Semiconductor, Maxim, Altera and Xilinx
- New corporate culture: a brutal philosophy of Darwinian competition ("Only the paranoid survive") and iron discipline

# Outsourcing the Fab

- 1985: The government of Taiwan hires Morris Chang who promotes the outsourcing of semiconductor manufacturing by US companies to Taiwan
- “Fab-less” semiconductor companies of Silicon Valley: Chips and Technologies, Xilinx, Cirrus Logic, Adaptec...
- Whenever a Silicon Valley manufacturer outsources a project to a Taiwanese fab, it directly improves the Taiwanese plant both by injecting capital and by the project's new requirements and therefore does a favor to its

# SUN's Vision

- SUN erodes DEC's supremacy in the academia and then in the engineering market
- The DEC generation believed that a company needed to personally make the key components
- The SUN generation believes that key components ought to be delegated to specialty shops
- In-house development is unlikely to match "best of breed" quality across the board by specialized shops

# Meanwhile elsewhere...

- Dell (1984): custom PC-compatible computers sold directly to the customer by mail order (almost a return to the business model of the early hobbyists) thanks to an automated supply-chain system that removes the need for inventories ("made to order")
- Both Dell and Compaq owe their success more to a distribution strategy than to a technological breakthrough



# Meanwhile elsewhere...

- Japan
  - Nintendo launches the videogame console Nintendo Entertainment System (1983)
  - Sony introduces the CD-ROM for data and music storage (1984)
  - Toshiba invents flash memory (1984)
  - Toshiba (1985) enters the market of the IBM-compatible laptops

# Meanwhile elsewhere...

- Distributed computing
  - The client-server architecture as a cheaper alternative to the monolithic mainframe
  - Groupware to make personal-computer users to work as a team
    - Novell's network operating system NetWare for DOS was the first stepping-stone
  - Dedicated online services for personal computers
    - CompuServe, America Online (1985)

# The Peacetime Dividend

- End of the Cold War: Silicon Valley does not depend anymore on the military industry
- Building chips is a high-risk business: huge capital investment, very short lifespan of the product, price wars
- The reward: the survivors dominate the most important industry of the era
- The semiconductor industry creates a culture of risk that spreads to the software industry

# The Peacetime Dividend

- The culture of risk is a whole infrastructure designed to promote, assist and reward risk-takers in new technologies (laboratories, plants, offices, corporate lawyers, marketing agencies, venture capitalists, universities, immigrants)
- The main change: need to generate a profit as quickly as possible (the great investor of the 1950s and 1960s, the military, thought long-term, with no interest in return on investment)

• The venture capital firms create a ghost

# The Peacetime Dividend

- The short-term approach helps communicate effectively with the market.
- The Silicon Valley start-up is both "visionary" AND grounded in the reality of technological feasibility and of market readiness
- The Darwinian system of small start-ups as a whole is more likely to find a solution to a problem than a large bureaucratic company
- Progress is incremental, but rapid

# The Peacetime Dividend

- Europe and East Coast: the goal is a lifetime career in a large, safe company
- Silicon Valley: a company's life expectancy is low
- The goal is to change jobs hoping to hit the jackpot
- Silicon Valley's dream is a linear progression from engineer in a start-up to founder of a start-up to investor in a start-up
- This dream encourages people to take chances working for a start-up, to take chances creating start-ups, and to take chances investing in start-ups

# The Peacetime Dividend

- Venture capitalists employ or are themselves technology specialists
- The venture capitalist becomes a knowledge broker, helping shape companies and their businesses through her/his network of contacts

# The Peacetime Dividend

- The leaders of Apple, Oracle, Intel and SUN acquire semi-god status
- They fight epic battles (e.g. against Microsoft)
- Their charisma replaces the charisma of the engineers who had truly invented their technologies (Faggin, Wozniak, Bechtolsheim...)
- The trend shifts from inventing a product to starting a company



# Geopolitical Implications

- Historical shift in political and economic power from the old industrial and financial capitals of the Northeast and Midwest towards a new pole of industry and finance based on the West Coast
- The biggest competitor of California is Japan, not Western Europe
- The old "Atlantic" economy is being replaced by a new "Pacific" economy

# Society

- Search For ExtraTerrestrial Intelligence Institute (1984)
- The WELL (1985), a virtual community of computer users structured in bulletin boards for online discussions (social networking ante-litteram)
- The "Whole Earth Review" (1985) introduces Virtual Reality, the Internet and Artificial Intelligence to the masses of Silicon Valley hackers
- "Burning Man" (1986)
- "Burning Man", born out of a counterculture that reacted against what Silicon Valley represents, is an appropriate metaphor for what Silicon Valley is

# Society

- The population of San Jose passes San Francisco's
- Menlo Park replaces San Francisco as the financial center for the high-tech industry
- The new billionaires build mansions in the Peninsula instead of San Francisco

# Meanwhile elsewhere...

- 1988: Bellcore invents DSL that allows every household to use the existing phone line to establish a high-speed connection with a computer
- 1987: U.S. Robotics unveils a 9600-baud modem (\$1,000)
- 1987: Uunet, the first independent ISP
- Anybody willing to purchase a modem can get on the Internet
- 1989: CompuServe enables its customers to exchange e-mail with Internet users

# Next...

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