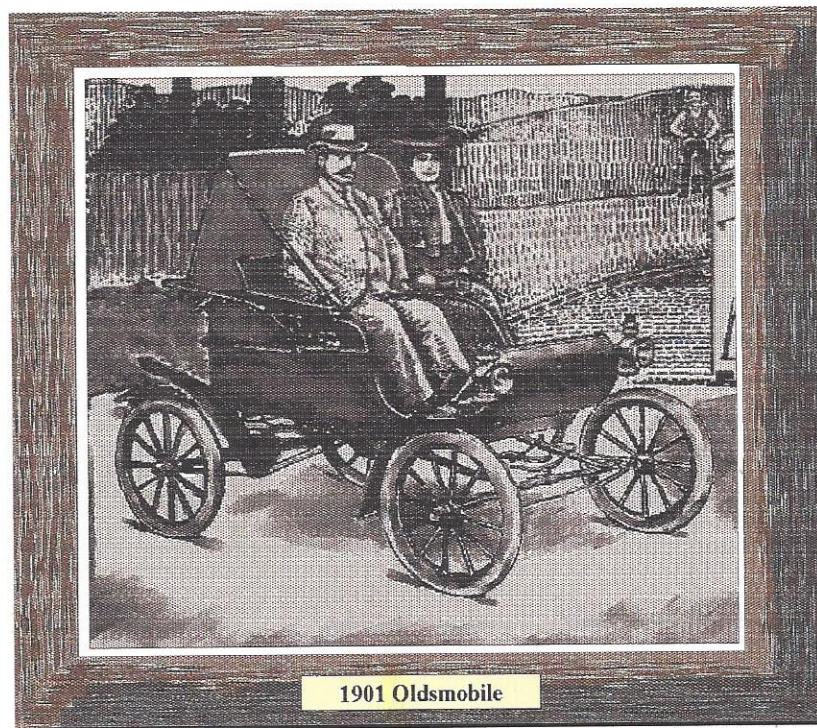


Winds of Change

Thinking about

or

The Future Isn't What It Used To Be



1901 Oldsmobile

Presented to
TEC 109
by Bill Poppei
Associate Professor of Finance at DePaul University
July 10, 1996

A weekday edition of The New York Times contains more information than the average person was likely to come across in a lifetime during 17th century England.

Computer power is now 8,000 times less expensive than it was 30 years ago. If we had the same progress in automotive technology, a Lexus would cost \$2 and go 600 miles on a thimble of gas.


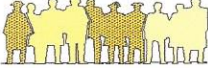
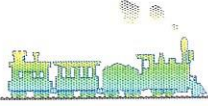













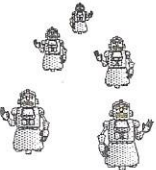
The little birthday card you give to a friend that says "Happy Birthday" when it is opened has more computing power than existed in the entire world before 1950. Your quartz wrist watch has more computing power existed in the entire world in 1960.

During the 1980's, almost half of the companies in the Fortune 500 at the start of the decade disappeared by the decade's end.

A transistor is so small that it would take 500 of them to form a circle around a human hair.

One fiber optic wire can potentially carry all the phone calls in America on the peak moment of Mother's day (and we can pack 1 million of these threads in a tube 2" in diameter).

A Walk Through History

Period	Macroinnovation	Basic Category
1770 - 1790	Textile Machinery Leads to the Industrial Revolution...Cotton Spinning (Still using wind and water for power)	 
1825 - 1845	Steam Engine Steel Making Railroads	 Power Material Transportation
1880 - 1900	Industrial Research Lab Typewriter and Typesetting Telephone (1877) Phonograph (1877) Motion Picture (1893) Paper Film for Cameras (1884) Wireless Telegraph (1895) Electricity for Homes Chemicals (Germany) Automobiles (Germany 1885) Airplane (1903)	Information Information Information Information Information Information Power Material Transportation Transportation   
1930 - 1950	T.V. and Hi Fi Sound Space and Satellites (1934) Computers (1939) Transistor (1947) Antibiotics (1940) Effective Birth Control Labor Saving Home Devices Nuclear Energy (1942) Superhighways (1942)	Information Information Information Information Medical Medical Time Power Transportation    
1980 - 2000	Virtual Reality Artificial Intelligence Digital Signal Processing (DSP) <ol style="list-style-type: none"> 1. Fiber Optics & Photonics 2. Tunable Lasers 3. Dark Fiber & Dumb Systems 4. CD's (1,000,000 Pages) 5. Antinoise noise Human Genome Project Genetic Engineering Nanoprocessing & Buckyballs Magnetic Levitation MEMS and Micro-robots	Information Information Information Information Information Information Information Information Environment Medical Medical Material Transportation The New Age       

Rail travel at high speeds is not possible because passengers, unable to breathe, would die of asphyxia.

**Dionysius Lardner
English scientist (1793-1859)**

Who the Hell wants to hear actors talk?

**Harry M. Warner
Founder, Warner Bros. Studio
(1927)**

Radio has no future. Heavier-than-air flying machines are impossible. X-rays will prove to be a hoax.

**William Thompson, English
scientist (1824-1907)**

Computers in the future may weigh no more than 1.5 tons.

Popular Mechanics -- 1949

No sensible man would transact his affairs by a means of communication such as Bell's telephone

**Western Union Board of Directors
letter to shareholders -- October
1877**

The driver must stay in control of the vehicle. The human brain is a much better computer than anything we can build to deal with adaptive situations.

**Ford Motor Company position
statement -- October 1995**

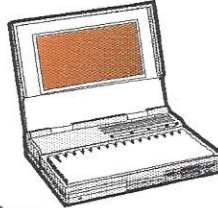
A Gale of Creative Destruction

1980 to 2000



Artificial Intelligence

Virtual Reality



Information

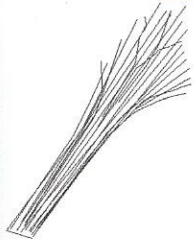


Information



Digital Signal Processing

Information



Fiber Optics & Photonics

Information

Tunable Lasers



Information

Dark Fiber & Dumb Systems

Information

1,000,000 Page CD's

Information



Antinoise Noise

Environment



Human Genome Project

Medical



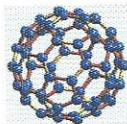
Genetic Engineering

Medical

Nanoprocessing

Material

Buckyballs

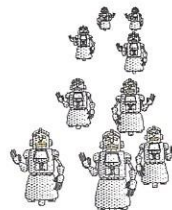


Material

Magnetic Levitation

Transportation

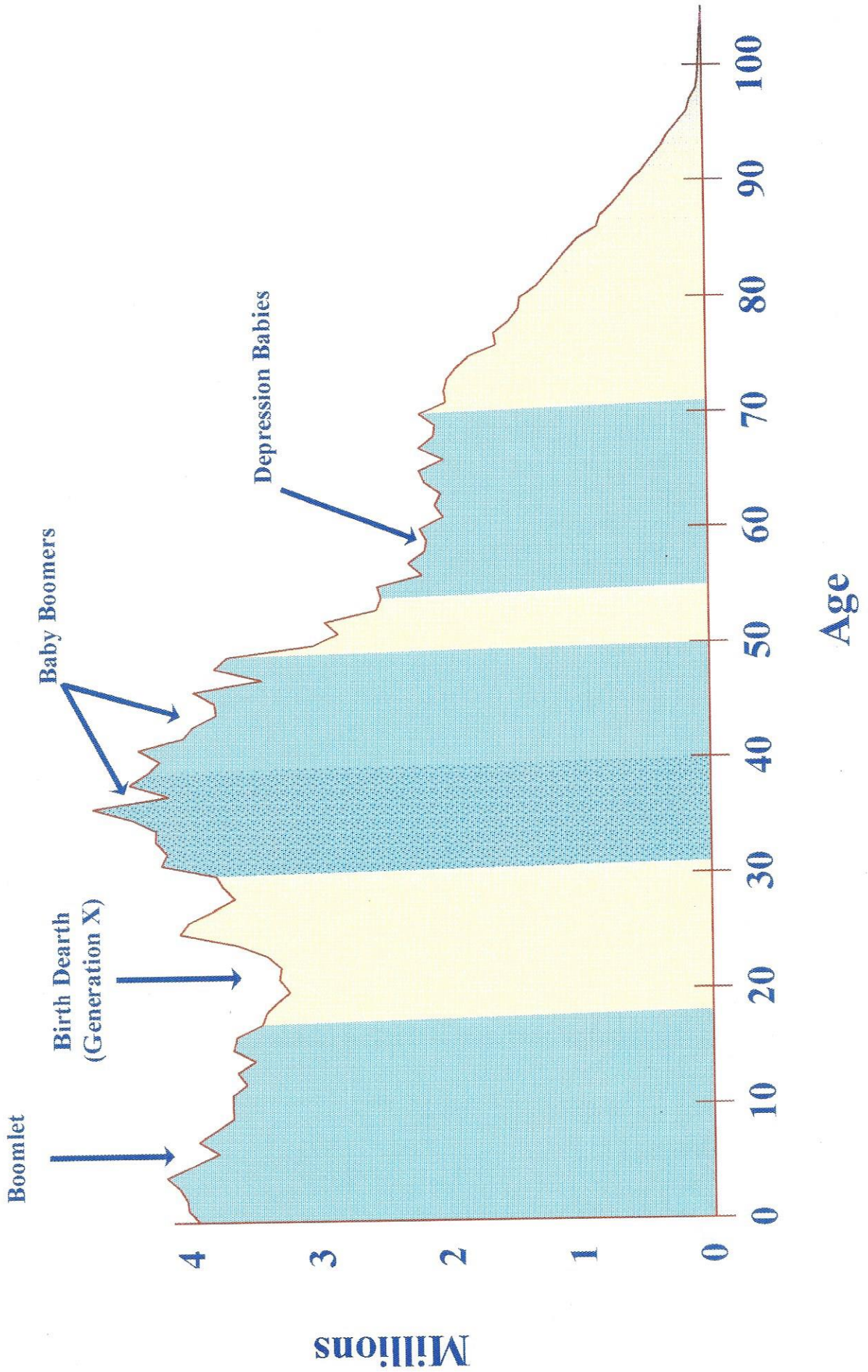
MEMS, Micro-motors
and Micro-robots



The new machinery

- 1946 ENIAC first demonstrated, "bug" defined
- 1947 Tubeless tire, nuclear reactor on line, transistor invented
- 1948 Atomic clock introduced, Velcro invented
- 1949 Communist China emerges, data storage on magnetic tape
- 1950 Weber grill, Embryos transplanted in cattle
- 1951 Superglue, disposable diaper
- 1952 UHF TV authorized, polio hits 47,665 in U.S.
- 1953 Color TV on NBC, microwave cooker patented, first kidney transplant
- 1954 Transistor radio, FORTRAN, TV dinners, polio vaccine
- 1955 Tappan microwave, artificial diamonds, introduction of optical fiber
- 1956 Test birth control pills, transatlantic phone cable
- 1957 Sputnik 1, Wisk is 1st liquid laundry detergent
- 1958 Stereo records, aluminum cans, modem data phone for binary data
- 1959 Fidel Castro, transistorized computers, COBOL
- 1960 Ruby laser, first communications satellite, PDP-1 computer has 26k RAM
- 1961 Selectric typewriter, FM stereo
- 1962 Magnetic audio tape, Silent Spring, laser eye surgery
- 1963 US-USSR hot line, Polaroid
- 1964 Vietnam, IBM 360, permanent press clothing, first industrial robot
- 1965 Sony's portable video recorder, AstroTurf, soft contact lenses
- 1966 Endangered Species Act, effective German measles vaccine
- 1967 Greenhouse warning, affordable microwave, CAT scan
- 1968 Oil supertankers, Wild and Scenic Rivers Act
- 1969 Stand alone ATM's, oil found in Alaska, moon landing, test-tube baby
- 1970 Pentagon starts GPS program, floppy disk, daisy wheel printer
- 1971 TI pocket calculator (+-*/) \$150 (560 1995 dollars), MRI
- 1972 Intel's 8080 chip, Pong, DDT use restricted
- 1973 DNA sliced, OPEC, tab on aluminum cans
- 1974 Bar code scanners, UN sets fax standard, warning on CFC's effect on ozone
- 1975 End Vietnam, laser printer, LCD displays, PC kits available
- 1976 16k chip commercially available, Genentech, JVC's VHS
- 1977 AT&T fiber optic experiments, Apple II, last smallpox in world
- 1978 Apple PC disk drive, first live test-tube baby
- 1979 Cellular telephones in Japan, genetically engineered human insulin
- 1980 Gene transfer between mice, current model of pull tops on Coors beer
- 1981 64k chips, DOS introduced, Aspartame, scanning tunneling microscope
- 1982 IBM 8086 PC, CBS/Sony CD, first artificial heart
- 1983 PCR for DNA, U.S. cellular phone, hard disks for computers (10 megabites)
- 1984 256k chips, fetal surgery, AT&T breakup
- 1985 Genetic fingerprinting, Windows, lasers clean clogged arteries, buckyballs discovered
- 1986 Chernobyl, neural network programmed to learn
- 1987 1,048k chips, telephones on Japanese airplanes
- 1988 First computer virus, transatlantic optical fiber cable
- 1989 Human Genome Project begun, high temp. superconductor, videodisk
- 1990 4,194k chips, Color fax, Intel 486, Jarvik heart abandoned
- 1991 64,000k chip developed, USSR dissolves, neuron simulating chip
- 1992 Digital cellular starts in U.S., software designs machines assembled one molecule at a time
- 1993 Intel Pentium chip, Flavr Savr tomato, MEMS, Mosaic available
- 1994 Computer beats Kasparov at Chess (timed game), worldwide death of frogs confirmed
- 1995 Fat protein, Netscape 1.0, bacterium genome completely sequenced
- 1996 Transmit 1 trillion bits of data over 1 fiber optic wire

United States Population 1995



Lifestyle

