Topics today . . .

1. Mn was Silicon Valley
2. Birth* in St. Paul’s Midway
3. “Silver mine” (impacts...*)
4. “Gold mine” (consequences*)
5. Lessons for high-tech innovation?
6. CBI + what to ‘see’ today?

*(of Mn’s pioneering computer industry)
California’s ‘Silicon Valley’
California’s ‘Silicon Valley’

- Adobe
- Apple
- Cisco
- PayPal
- Facebook
- Google
- HP
- Intel
- Oracle
- Nvidia
California’s ‘Silicon Valley’

- Adobe (1982)
- Apple (1976)
- Cisco (1984)
- PayPal (1999)
- Facebook (2004)
- Google (1998)
- HP (1939)
- Intel (1968)
- Oracle (1977)
- Nvidia (1993)
MN was Silicon Valley (1950s–1970s)

• ‘stored program’ computer [1950]
• magnetic data storage
• computer industry
• ‘supercomputer’
• ‘first’ WWW
Computer industry in St. Paul

• Secret crypto built Dayton OH ... to wartime Washington
• John Parker’s St. Paul glider factory
• CSAW to Engineering Research Associates (f. 1946) in ‘radiator shop’
Birth in Midway industrial district

- Workers Snelling shops ➔ ERA

- Spray-on magnet ERA + 3M
Birth at St. Paul 'radiator shop'

Silver mine: MN’s computer industry

2. Engineering Research Associates [f. 1946]

   Unisys 1986- ⇒ 29 spin-offs


5. Honeywell (computing = 1958-91)

6. IBM-Rochester [1956--]
Silver mine: MN computer workforce

MN by mid-1970s . . .

- ... 1.8% of US population
- ... 3.3% of US manufacturing jobs
- ... 12% of US $6B computer sales
- ... 17% of US computer mfg jobs
Why ‘not’ Silicon Valley MN?

✓ Technology & innovation
✓ Computer-center ‘industrial district’
✓ Venture capital #2 [1958-63]
✓ Sales to military + govt + univ labs + FAA’s air-traffic control
Why ‘not’ Silicon Valley MN?

✓ Technology & innovation
✓ Computer-center ‘industrial district’
✓ Venture capital #2 [1958-63]
✓ Sales to military + govt + univ labs + ATC

✦ Less visible in commercial markets
✦ No journalist’s “Silicon Valley” [1971]
✦ Secret work ⇔ public visibility?
Gold mine: longer consequences

- ERA magnetic media ➔ 3M + Imation ➔ IBM’s model 650 computer
- Twin Cities ➔ ‘younger, female’ ➔ metro has 62% state’s population
- MECC ➔ Apple Computer education
- computing ➔ medical devices [ch.7]

✓ lessons for high-tech innovation?
Lessons: Chasing Silicon Valley

- China closing in on Silicon Valley as home of internet giants [12.2014]
- Metro Detroit Tech Economy ‘Equal to all of Silicon Valley’ [Detroit News 2.2015]
- Los Angeles ‘next Silicon Valley’ [2012–17]
- Where’s The Next Silicon Valley? [10.2017]

Shanghai, Toronto, Israel, Austin, Phoenix
Lessons: Chasing Silicon Valley

- **Why Creating The Next Silicon Valley ... Is The Wrong Goal** [Forbes 7.2014]
- **Next Silicon Valley is ... Silicon Valley**
  - “20-minute rule” for VC [NYT 10.2006]
  - Sequoia [f.1972]: ‘helpful if the company is close to our offices ... require very frequent contact’ = Menlo Park + China II
  - ‘If you live in Santa Clara, it’s doable ... If you live in Dubuque, it’s not.’
Minnesota employment in computing (1980-2011)

Anchors
Hardware
Software

Med Alley built on ‘Hardware’ firms inc. specialty, engineering, design, prototyping, micro-fab

Univac, Control Data, IBM, Honeywell + successors
Minnesota employment in computing (1980-2011)

Anchors

Hardware

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Med Alley built on ‘Hardware’ firms inc. specialty, engineering, design, prototyping, micro-fab

‘Hardware’ = EMD/Benchmark ... Hutchinson Technology/TDK ... Metalcraft Machine* ... MAD

1986: Argosy Electronics, Braemar Computer, CMC Assemblers, Crest Electronics, Dahlberg Electronics, Micro Dynamics, Minnesota Wire, Remmele Engr, Waters Instruments, Qnetics, SMR Computer Services, DISC Computer, West Central Computer ... Aequitron Medical, Biosensor Corp, CNS, Cardiac Pacemakers, Cardio-Pace Medical, Cherne Medical, Compucath, Dean Corp, Data Sciences, Digimed, Dimensional Medicine, Honeywell & Control Data plus UMN...
CBI from CA to MN 1980

• Computer history research and archiving
• 363 archival collections
• 418 + 643 oral histories
• 150,000 photos
• “1.5 miles” of paper records
• 4 staff + colleagues

Charles Babbage (1791-1871)
CBI and MN computing
What to see ‘today’?

tinyurl.com/sia-misa
US Bank West 7th/Shepard Rd
ERA Plant #1 W. Minnehaha Ave. (c.1955)
“Engineering Research Associates, the forerunner of Sperry’s Minnesota presence, is the acknowledged parent of some 100 Twin Cities computer firms. In commemoration of the 40th anniversary of ERA’s founding, this plaque is placed on the company’s original manufacturing site this 19th day of August 1986”

[Rolland Anderson, Bill Geiger, Bob MacDonald, and Jack Nichols]
Control Data Northside plant (1967)
Control Data Northside plant (1973)
Control Data Northside plant (2013)
Honeywell relay department (c.1930) MHS
Control Data 7801 Computer Ave. (1980s)
Control Data disk drive factory (1972)
Seagate 7801 Computer Ave. (2013)
Control Data now Health Partners (1980s)
Control Data Fibonacci series (2004)
AN: Can you tell me something about . . . Goldberg?

FM: In those days . . . security was very tight. We didn’t tell anybody what we were doing or who we were doing it for. But it was built around a magnetic drum with the information going on the magnetic drum and then . . . compare two or more tracks in different ways . . . there were a lot of elements of computers in them . . . The output was on a line printer . . . designed also at ERA. There were a lot of . . . things that went into computers like the magnetic drum, tape reader, tape punch, line printer . . . used for more general-purpose computers.

AN: Were all of those developed at ERA? FM: Yes . . .