

University of Minnesota and Computing Industry

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Charles Babbage Institute

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Topics today . . .

1. Mn *was* Silicon Valley
2. Birth* in St. Paul's Midway
3. “Silver mine” (impacts...*)
4. “Goldy mine” (UMn people)

*(of Mn's pioneering computer industry)

California's 'Silicon Valley'



California's 'Silicon Valley'



Adobe



Apple



Cisco



eBay



Facebook



Google



HP



Intel



Oracle

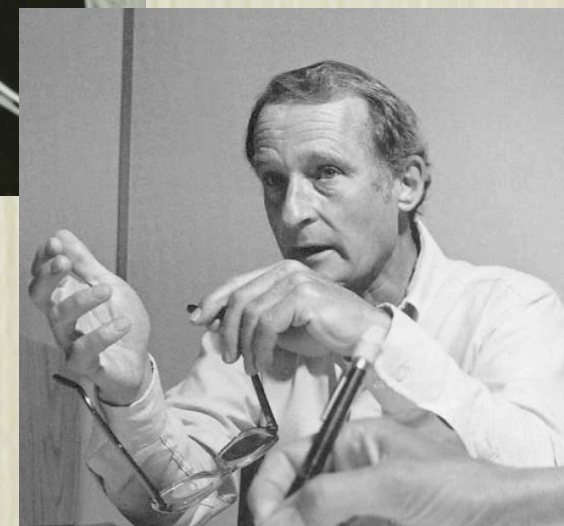
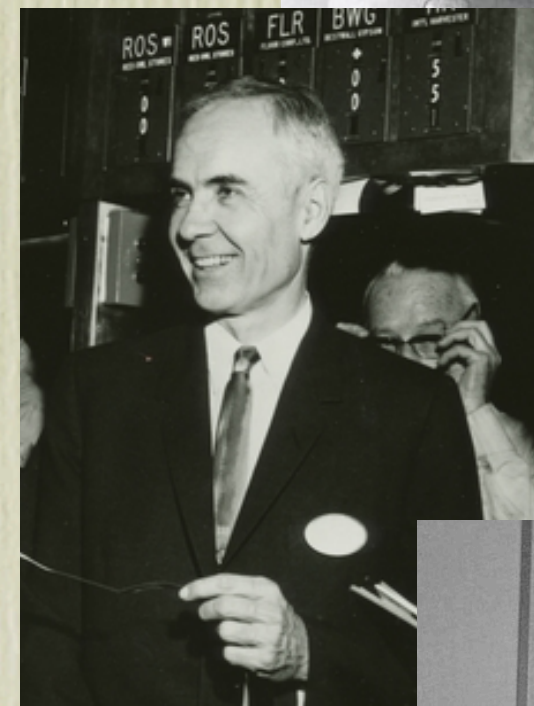
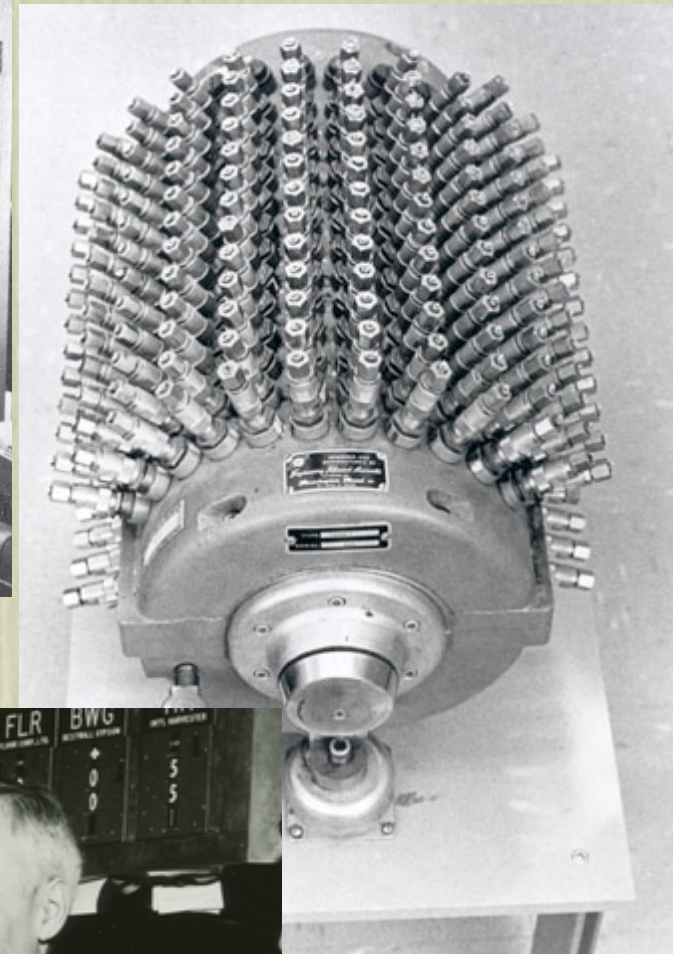
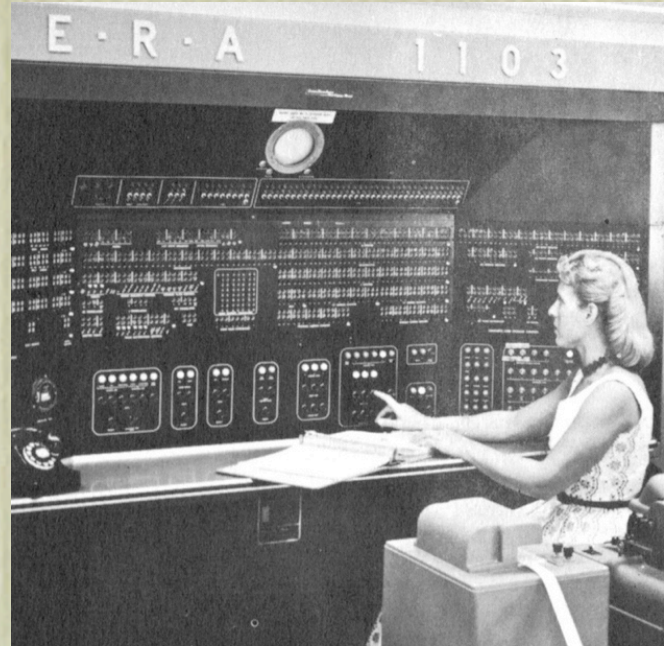


Yahoo



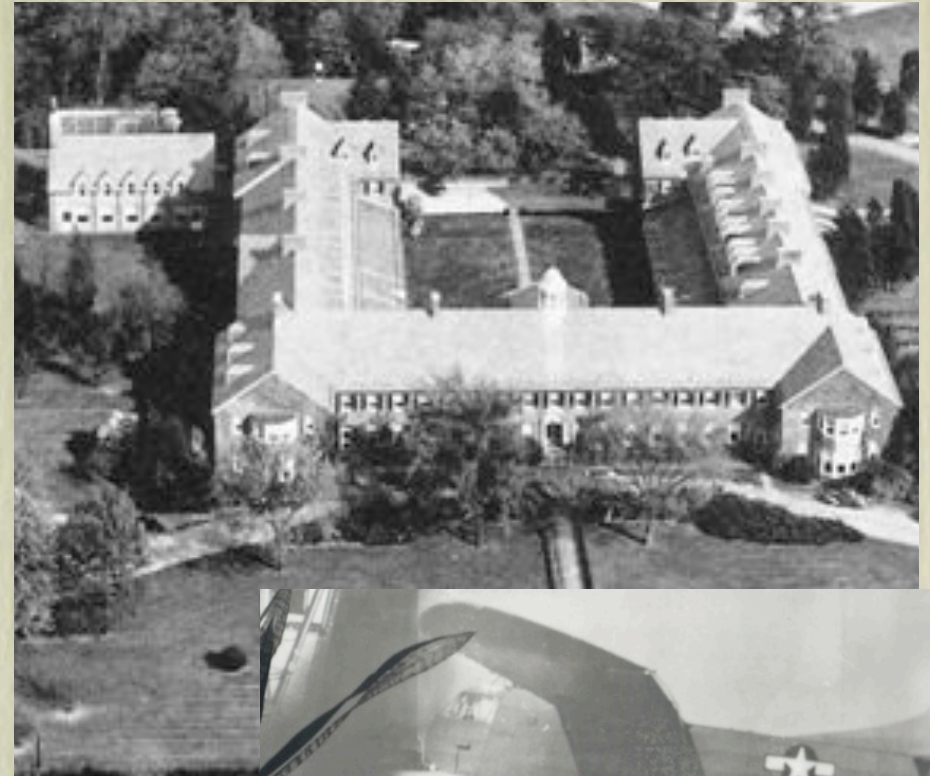
MN *was* Silicon Valley (1950s–1970s)

- ‘stored program’ computer [1950]
- magnetic data storage
- computer industry
- ‘supercomputer’
- ‘first’ WWW



Computer industry in St. Paul

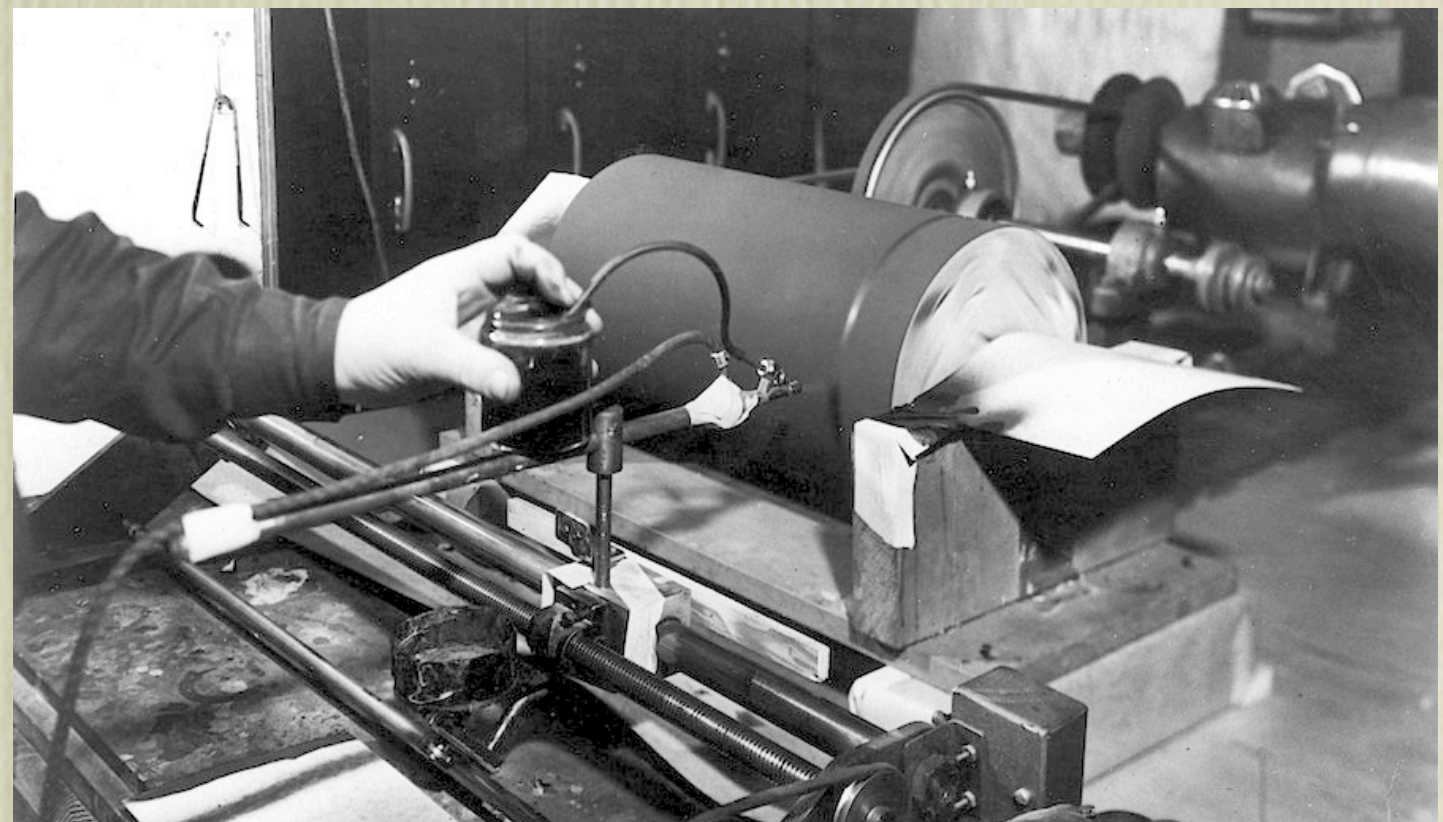
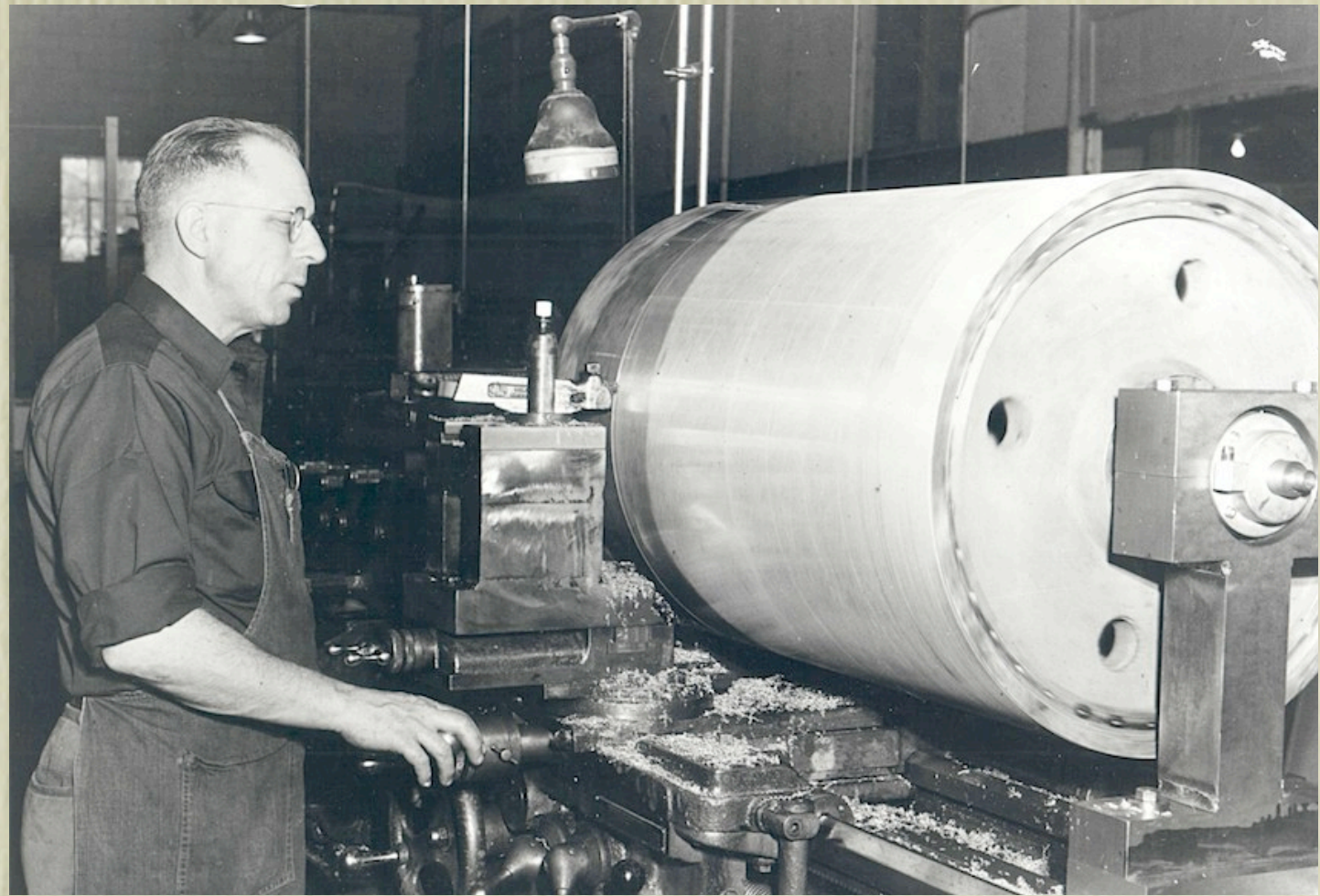
- Secret crypto built Dayton OH ... to wartime Washington
- John Parker's St. Paul glider factory
- CSAW to Engineering Research Associates (f. 1946) in 'radiator shop'

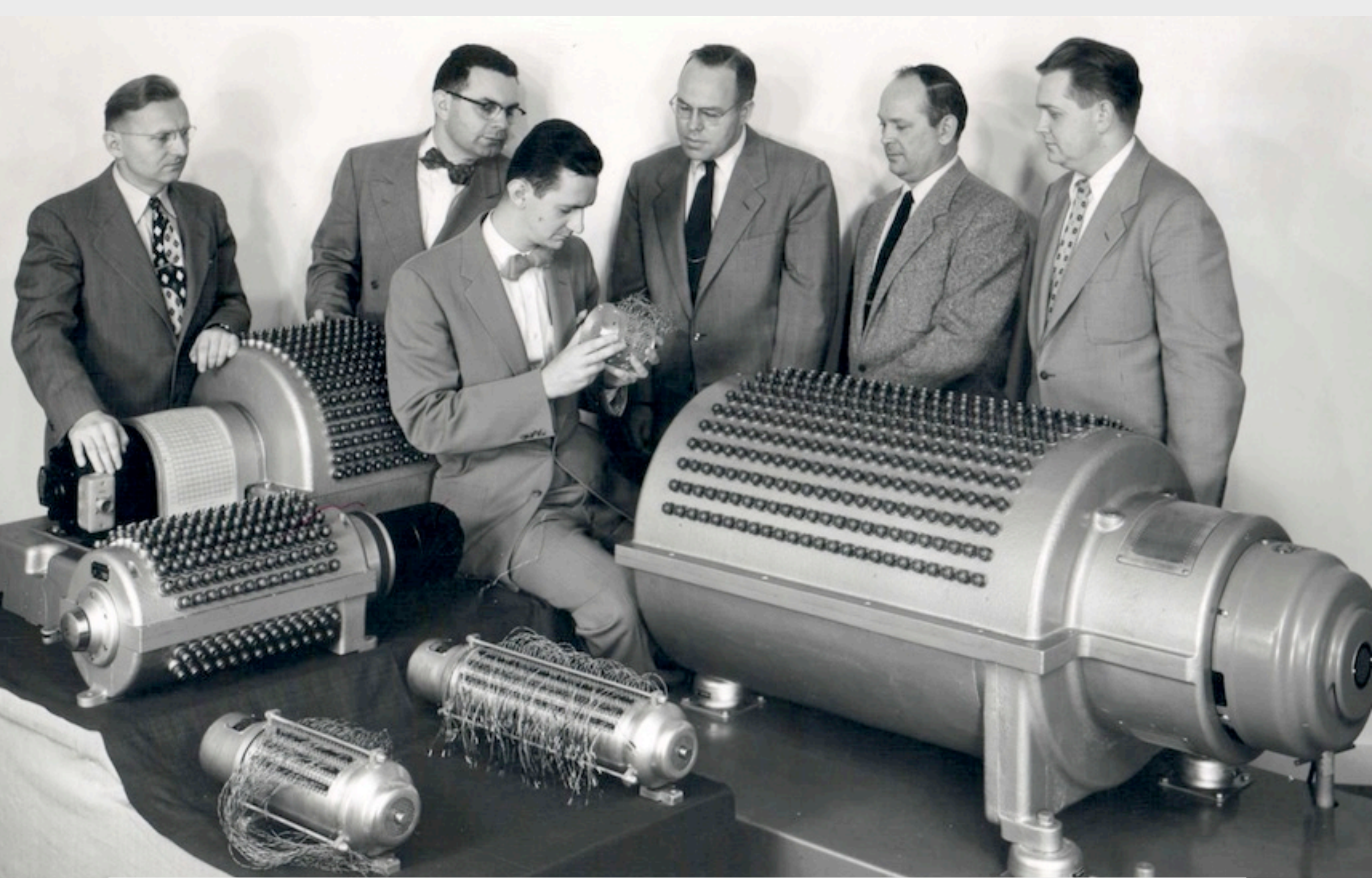




Birth in Midway industrial district

- Workers Snelling shops ► ERA
- Spray-on magnet ERA + 3M





ERA's Jack Hill, Arnold Cohen, Frank Mullaney, Bob Perkins, Arnie Hendrickson, Bill Keye [c.1955]

Silver mine: MN's computer industry

2. Engineering Research Associates
[f. 1946]
3. Sperry-Rand Univac [f. 1955]
Unisys 1986- \Rightarrow 29 spin-offs
4. Control Data Corp. [1957-92] \Rightarrow 45
spin-offs inc. Cray Research [1972]
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

Minnesota employment in computing (1980-2011)

50,000

40,000

30,000

20,000

10,000

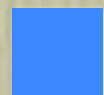
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1980

1990

2001

2011



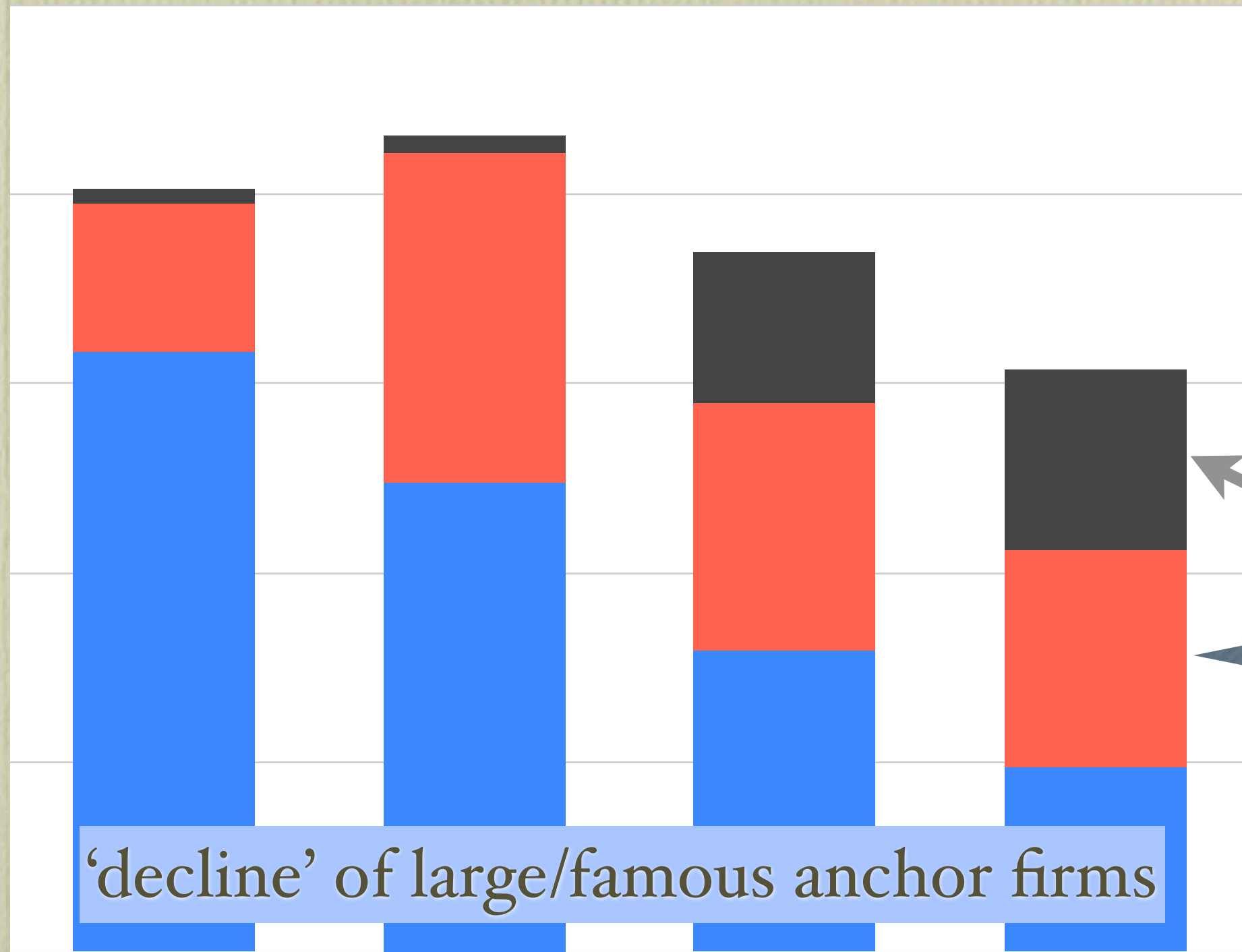
Anchors



Hardware



Software



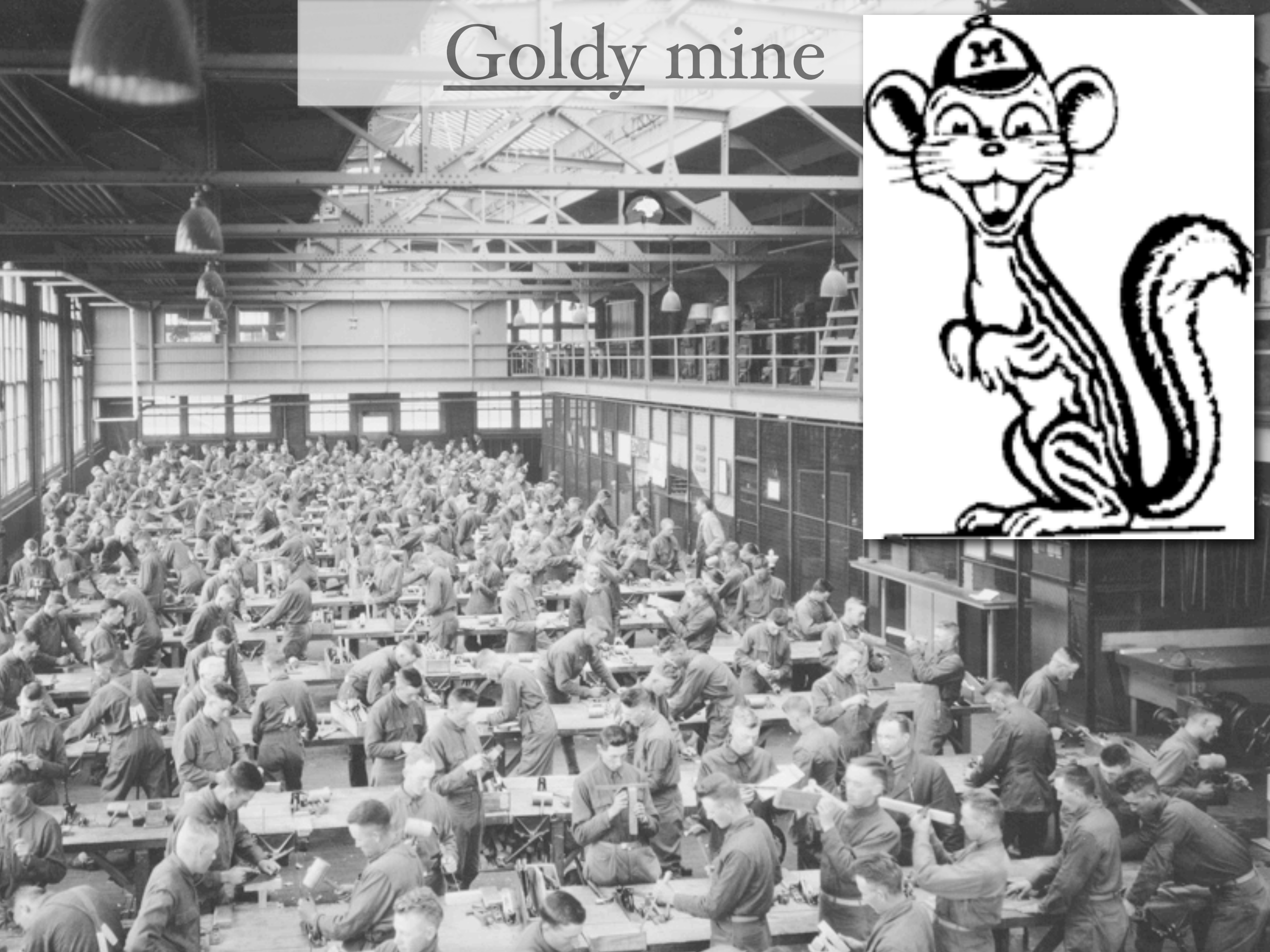
'decline' of large/famous anchor firms

hidden strengths of today's MN high-tech

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?

Goldy mine



Goldy mine



DR. ARNOLD A. COHEN

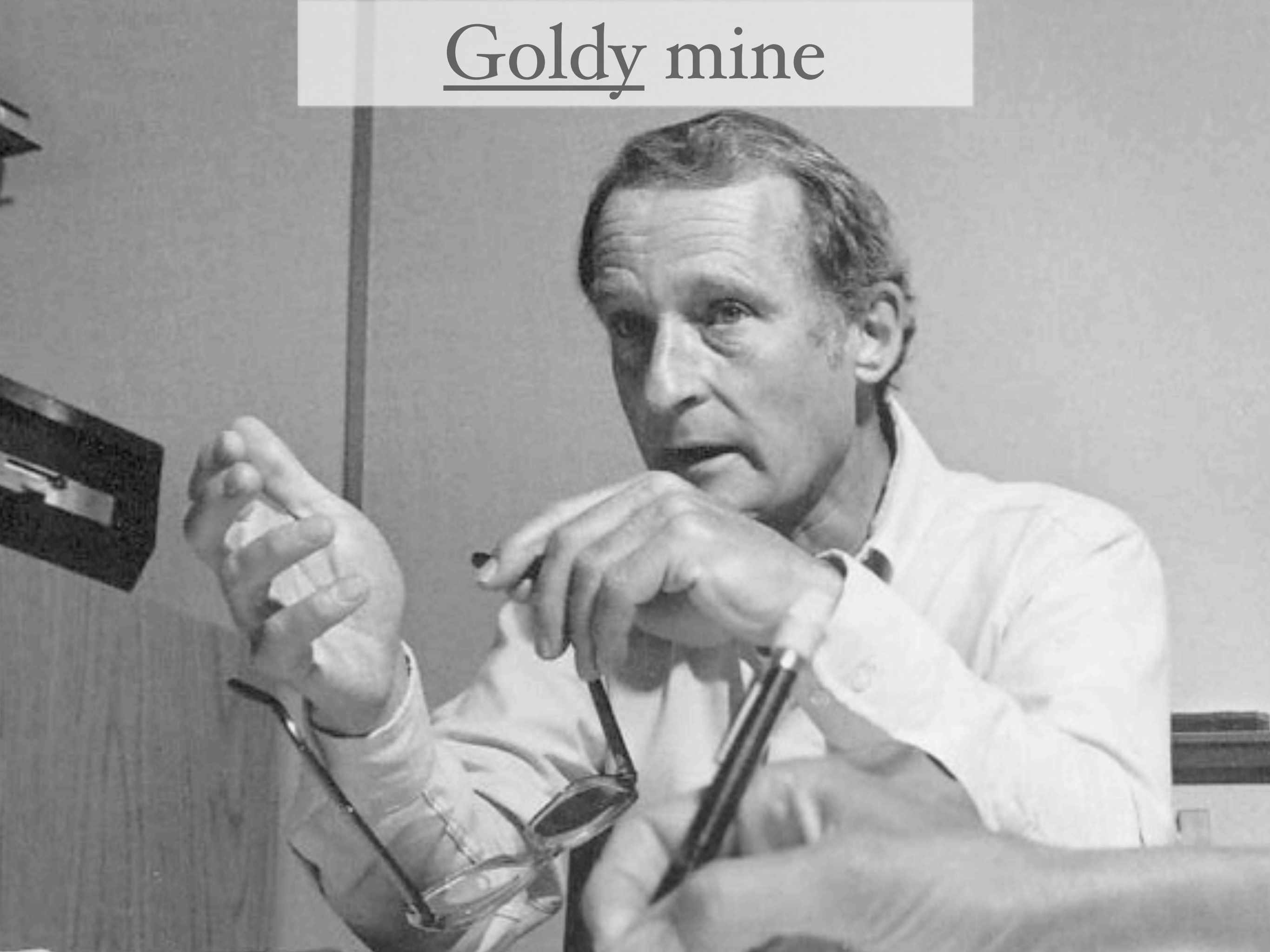
As a Staff Electrical Engineer, Dr. Arnold A. Cohen is a member of the ERA Technical Supervisory Staff. In the course of his active supervision of systems study and development projects, he has been responsible for much of ERA's original work on computer systems.

After completion of his education at the University of Minnesota, where he served as a member of the Physics teaching staff and engaged in research, Dr. Cohen became associated with the Radio Corporation of Amer-

Goldy mine

- M Stein: computers 'intrinsic interest' \Rightarrow CS
- Wm Lipscomb: chem bonding (Nobel'76)
- Amundson & Aris: chemical engineering
- Ernst Eckert: heat transfer 'Mn mafia'
- MMPI personality inventory
- Economics (Fed Reserve): 4 Nobel prizes
- *university 'joined at hip' computing

Goldy mine



Goldy mine

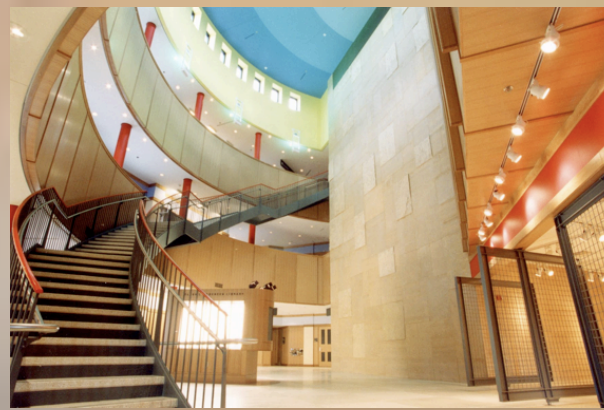
“I was fortunate in having an instructor at the University of Minnesota who was looking after me. When I said, ‘What’s next?’ he said, ‘If I were you, I’d just go down the street here to Engineering Research Associates, and I’d think you’d like what they’re doing there.’” – Seymour Cray

CBI *from* CA *to* MN 1980

- Computer history research and archiving
- 300+ archival collections
- 400 + 800 oral histories
- 150,000 photos
- “1 mile” of paper records
- 4 staff + colleagues
- www.cbi.umn.edu



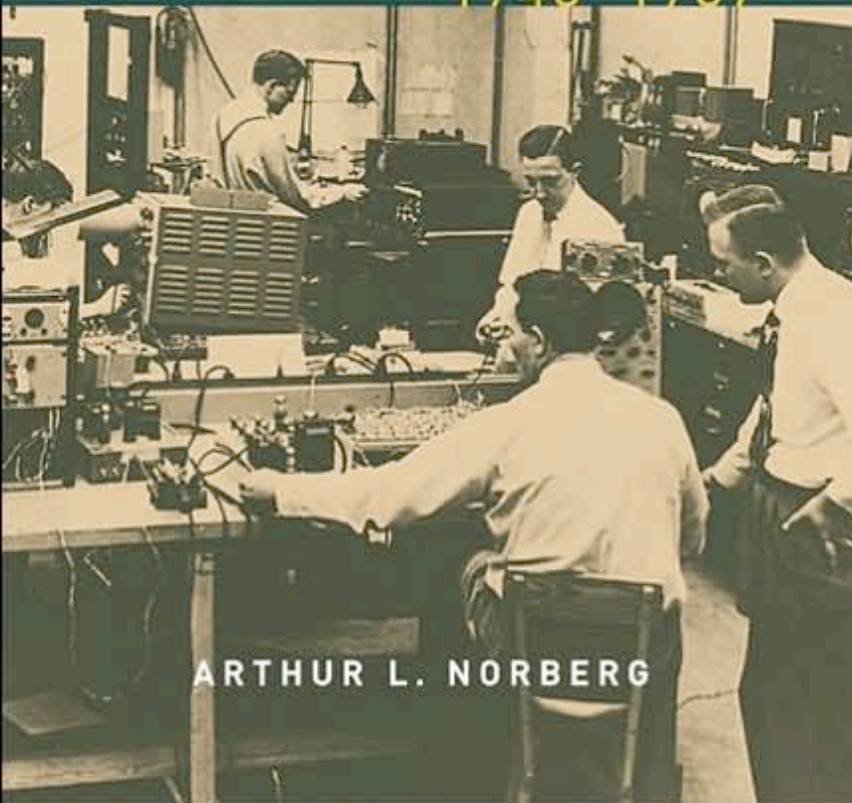
Charles Babbage
(1791-1871)



CBI *and* MN computing

COMPUTERS AND COMMERCE

A Study of Technology and Management
at Eckert-Mauchly Computer Company,
Engineering Research Associates, and
Remington Rand, 1946-1957

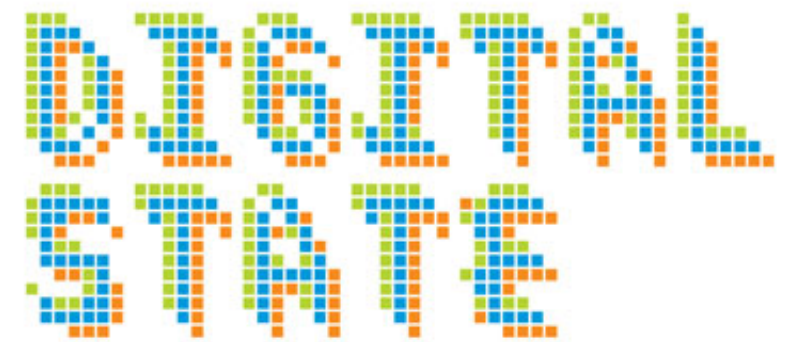


ARTHUR L. NORBERG



IBM Rochester

A Half Century of Innovation



» THE STORY OF MINNESOTA'S COMPUTING INDUSTRY



■ THOMAS J. MISA

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