

Human-Computer Interaction

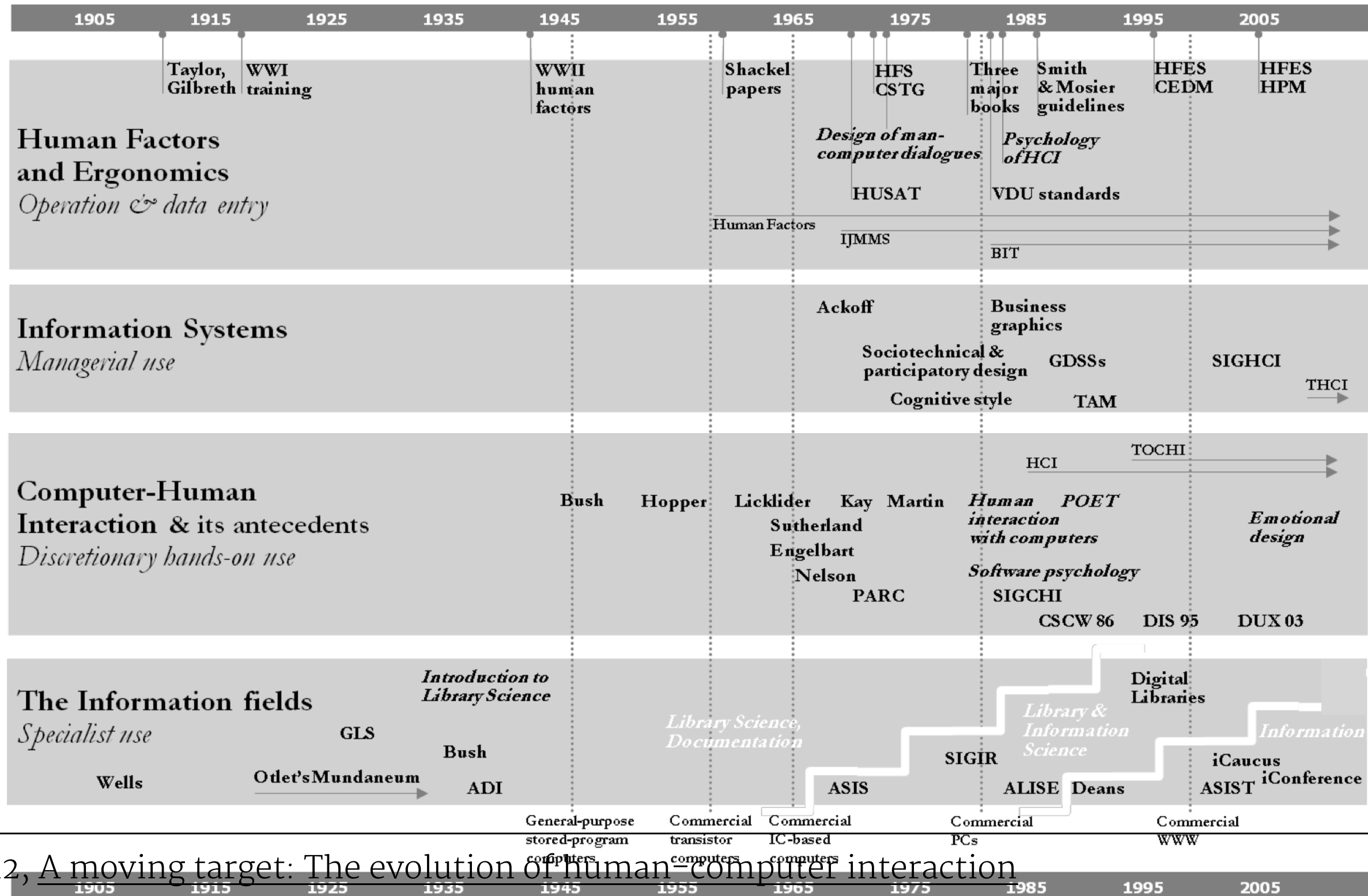
History of HCI

Professor Bilge Mutlu

Today's Agenda

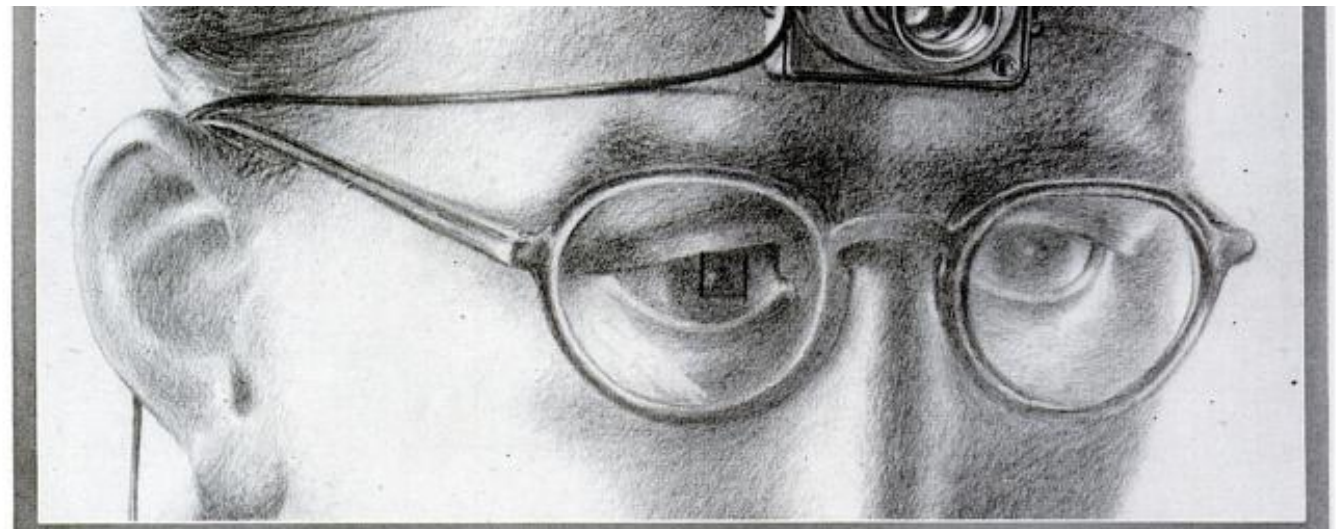
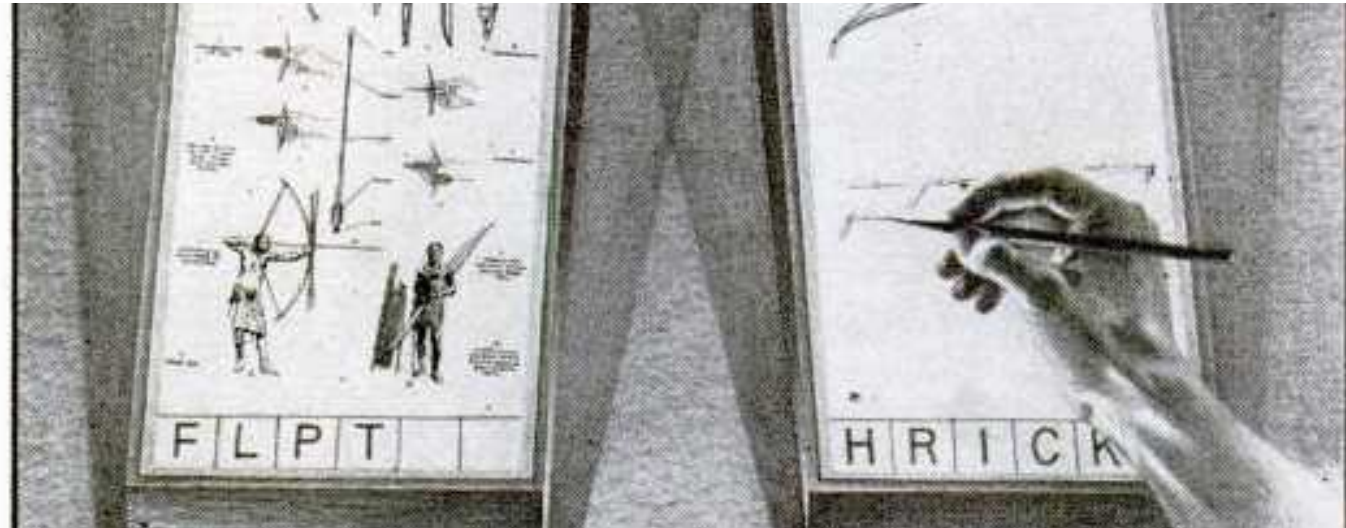
- >> Topic overview: *History of HCI*
- >> Discussion
- >> Project overview

Topic overview: *History* *of HCI*



¹Grudin, 2012, A moving target: The evolution of human-computer interaction

1945 (Vannevar Bush)²



2011 (Microsoft)



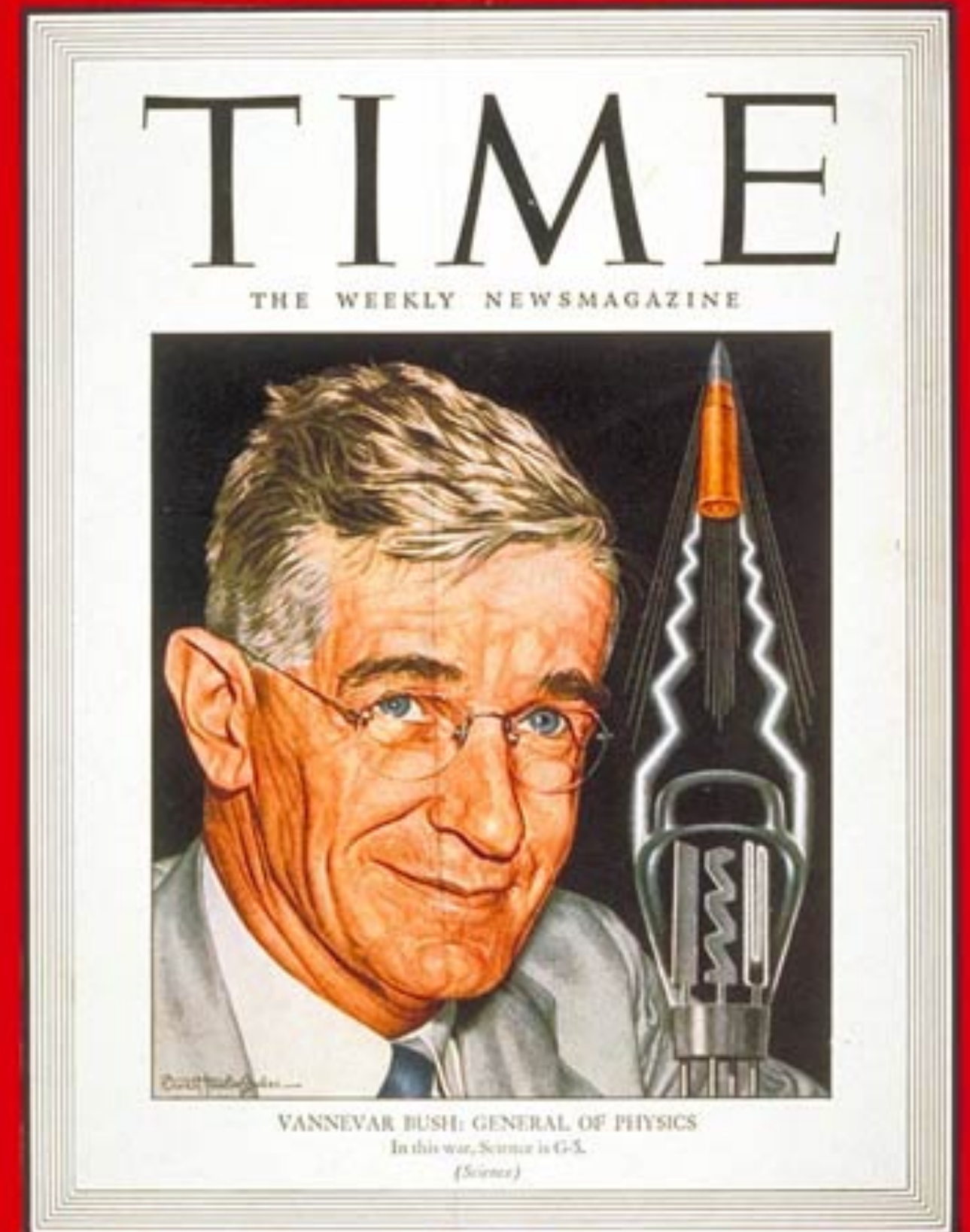
² [Wired](#), [Microsoft](#)

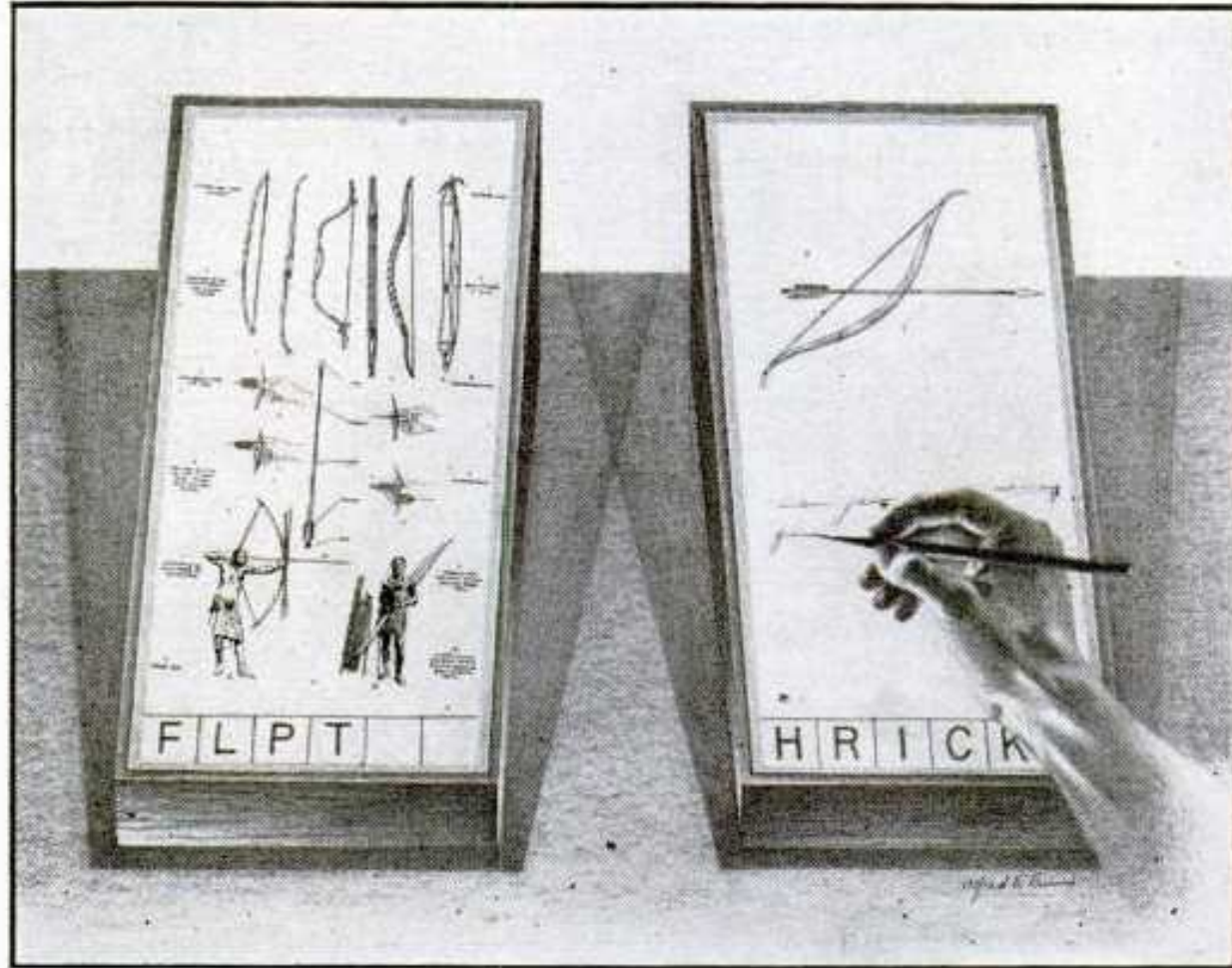
1940s³

Memex, 1945, Vannevar Bush, OSRD

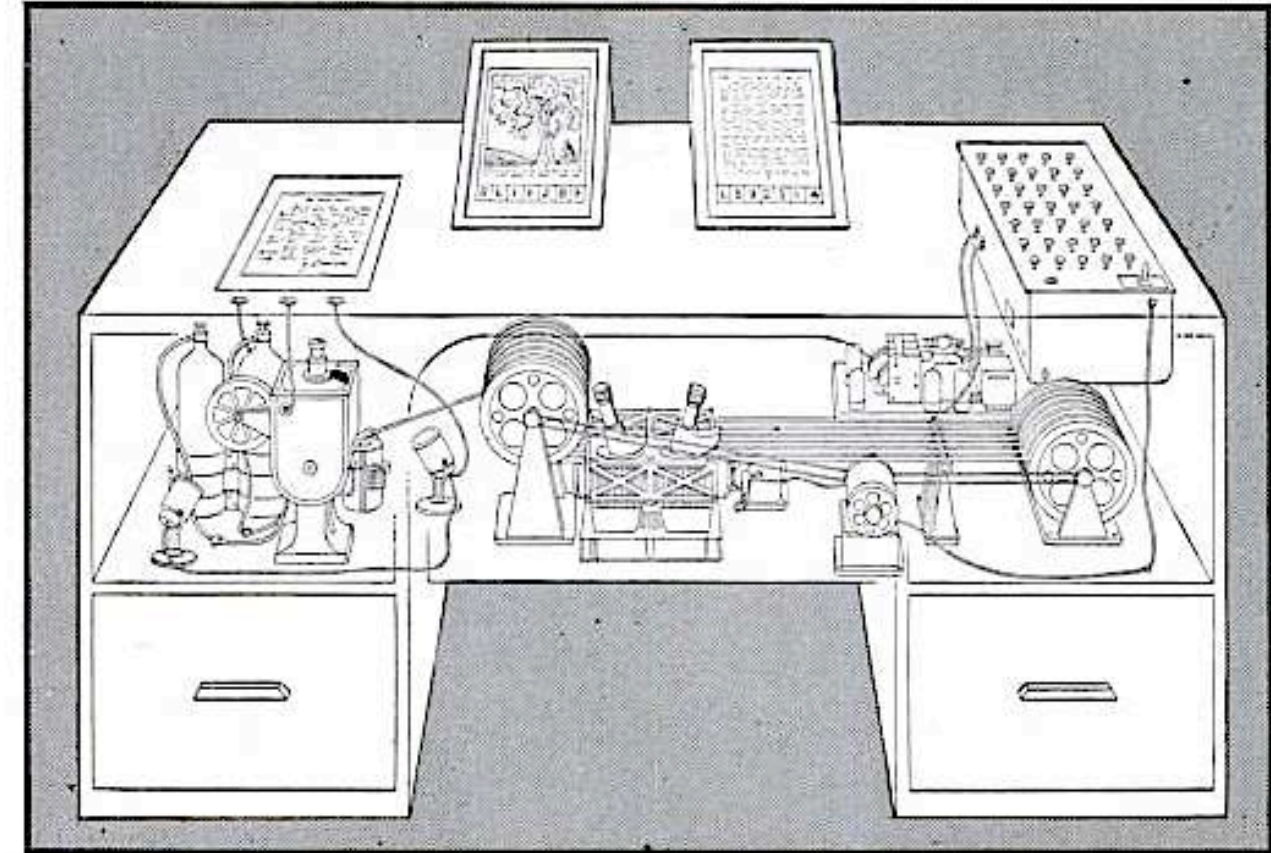
- » Stores all records/articles/communications
- » Items retrieved by indexing, keywords, cross-referencing
- » Information linked through associative trails

³Image source





MEMEX IN USE is shown here. On one transparent screen the operator of the future writes notes and commentary dealing with reference material which is projected on the screen at left. Insertion of the proper code symbols at the bottom of right-hand screen will tie the new item to the earlier one after notes are photographed on supermicrofilm.



MEMEX in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

AS WE MAY THINK CONTINUED

⁴[Image source](#)

1960s⁵

*Man-Computer Symbiosis, 1960,
Joseph Licklider, ARPA*

“Men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking.”

⁵Image source



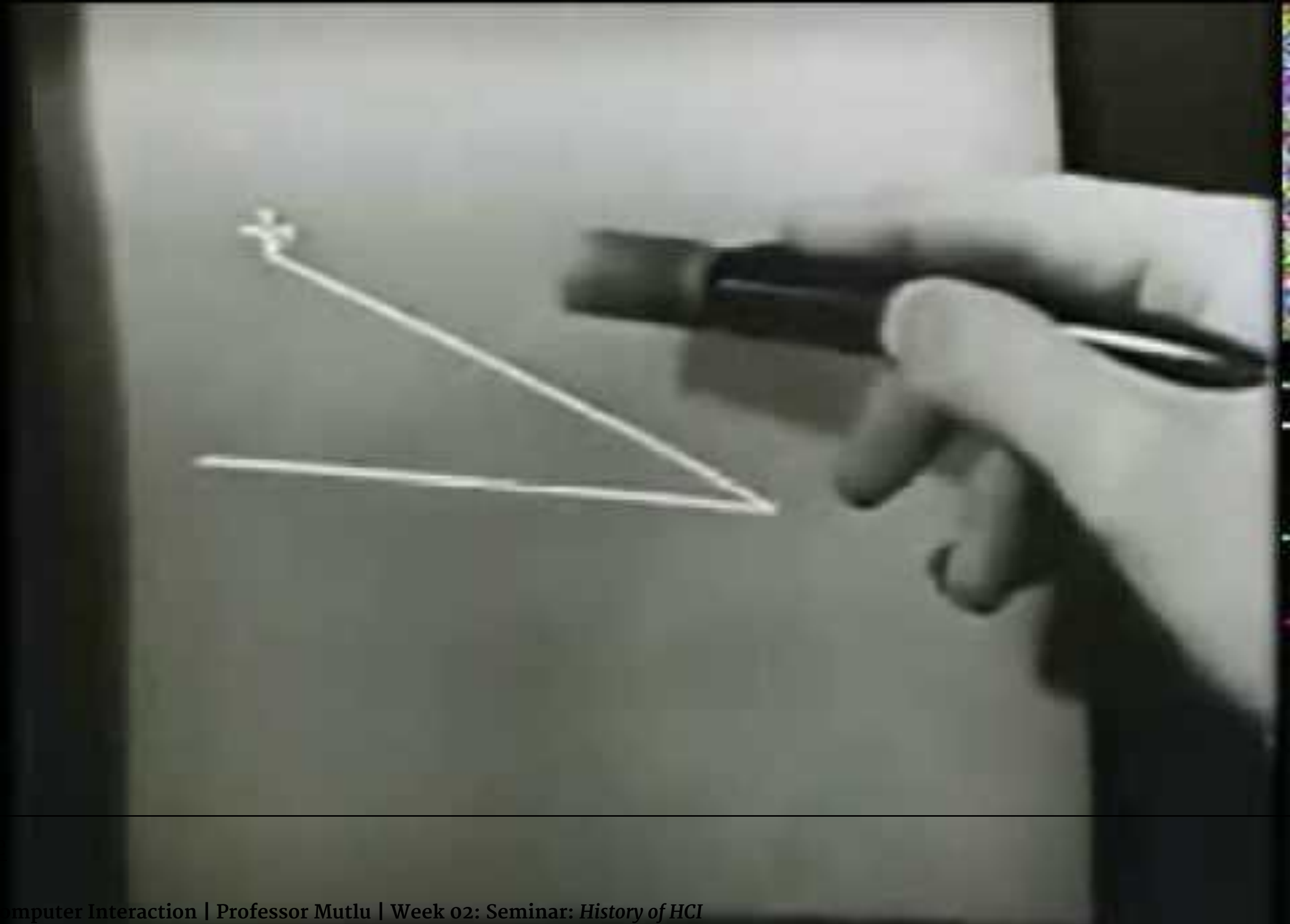
1960s⁶

SketchPad, 1963, Ivan Sutherland,
MIT

"Sketchpad: A Man-machine Graphical Communications System" introduced hierarchy, object-oriented graphics, constraints, icons, copying, light pen as input device, recursive operations

⁶Image source

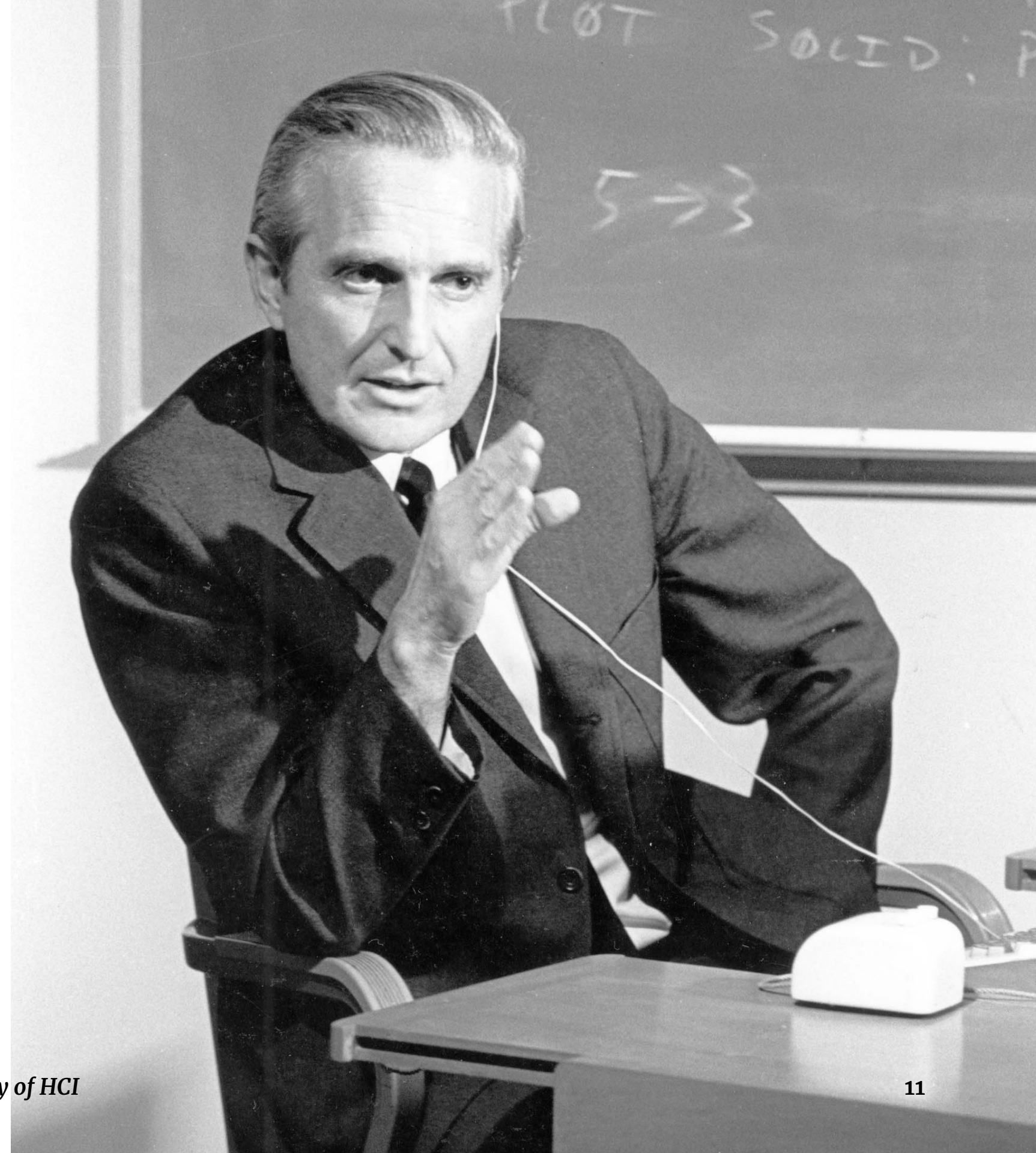




1960s⁸

The Mouse, 1968, Douglas Engelbart, Stanford Research Institute (SRI)

“Mother of all demos” introduced *hierarchical hypertext, multimedia, windows, shared files, electronic messaging, video conferencing*



⁸Image source

STATEMENT ON: WORD WORD WORD WORD WORD WORD
WORD WORD WORD WORD WORD WORD WORD WORD
WORD WORD WORD WORD WORD WORD WORD

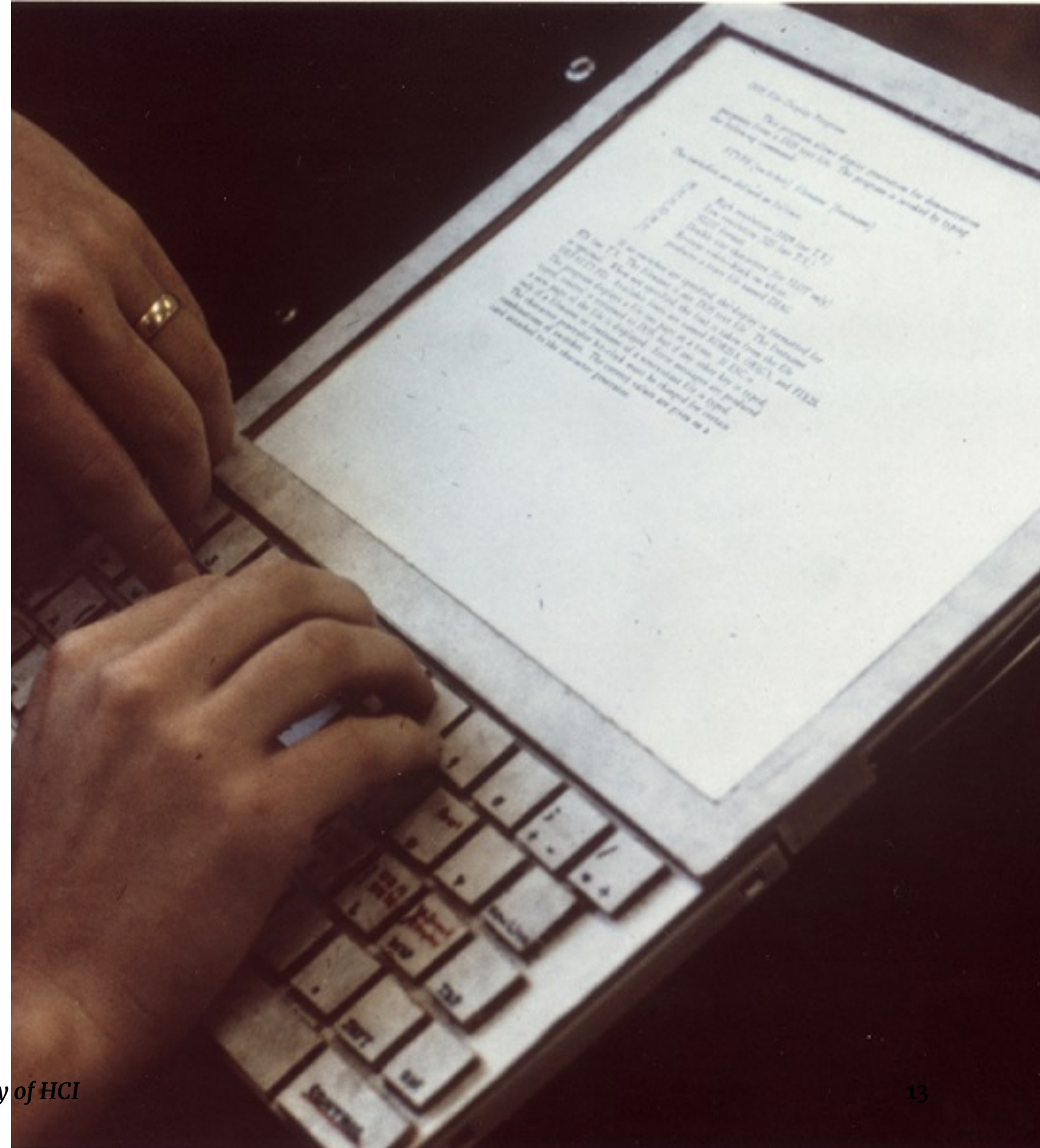
1



1960s¹⁰

Dynabook, 1968, Alan Kay, Xerox
PARC

The Dynabook mockup introduced
personal computer, desktop interface



¹⁰ Image source

1970s

Xerox Alto, 1973, Xerox PARC¹¹ [¹²]

The first computer to support an OS based on a GUI that integrated the ideas developed for Dynabook: the *desktop metaphor*, *GUI*, *ethernet*



¹¹[Wikipedia: Xerox Alto](#)

[¹²]: [Image source](#)

1970s¹⁴

Apple II, 1977, Apple

Personal computer that was first mass production, color graphics



¹⁴ [Image source](#)

1980s^{15 16 17}

Xerox Star, 1981, Xerox PARC

First commercial system with a user interface that integrates today's technologies, including *windows, icons, folders, mouse, etc.*



¹⁵ Wikipedia: [Xerox Star](#)

¹⁶ Videos of the Star Interface: [Part 1](#), [Part 2](#)

¹⁷ [Image source](#)

XEROX 6085 Workstation
User-Interface Design

To make it easy to compose text and graphics, to do electronic filing, printing, and mailing all at the same workstation, requires a revolutionary user interface design.

Bit-map display - Each of the pixels on the 19" screen is mapped to a bit in memory; thus, arbitrarily complex images can be displayed. The 6085 displays all fonts and graphics as they will be printed. In addition, familiar office objects such as documents, folders, file drawers and in-baskets are portrayed as recognizable images.

The mouse - A unique pointing device that allows the user to quickly select any text, graphic or office object on the display.

See and Point

All functions are visible to the user on the keyboard or on the screen. The user does filing and retrieval by selecting them with the mouse and touching the MOVE, COPY, DELETE or PROPERTIES command keys. Text and graphics are edited with the same keys.

Shorter Production Times

Experience at Xerox with prototype work stations has shown shorter production times and thus lower costs, as a function of the percentage of use of the workstation. The following equation can be used to express this:

$$X = \frac{A + PP}{1 + \frac{A}{PP}}$$

Table 1: Percentages of Use of the Tools

Year	Nov 6085	6085
1978	45.2	15.8
1980	41.1	33.3
1982	45	55
1984	30	70
1986	10	90
1988	5	95

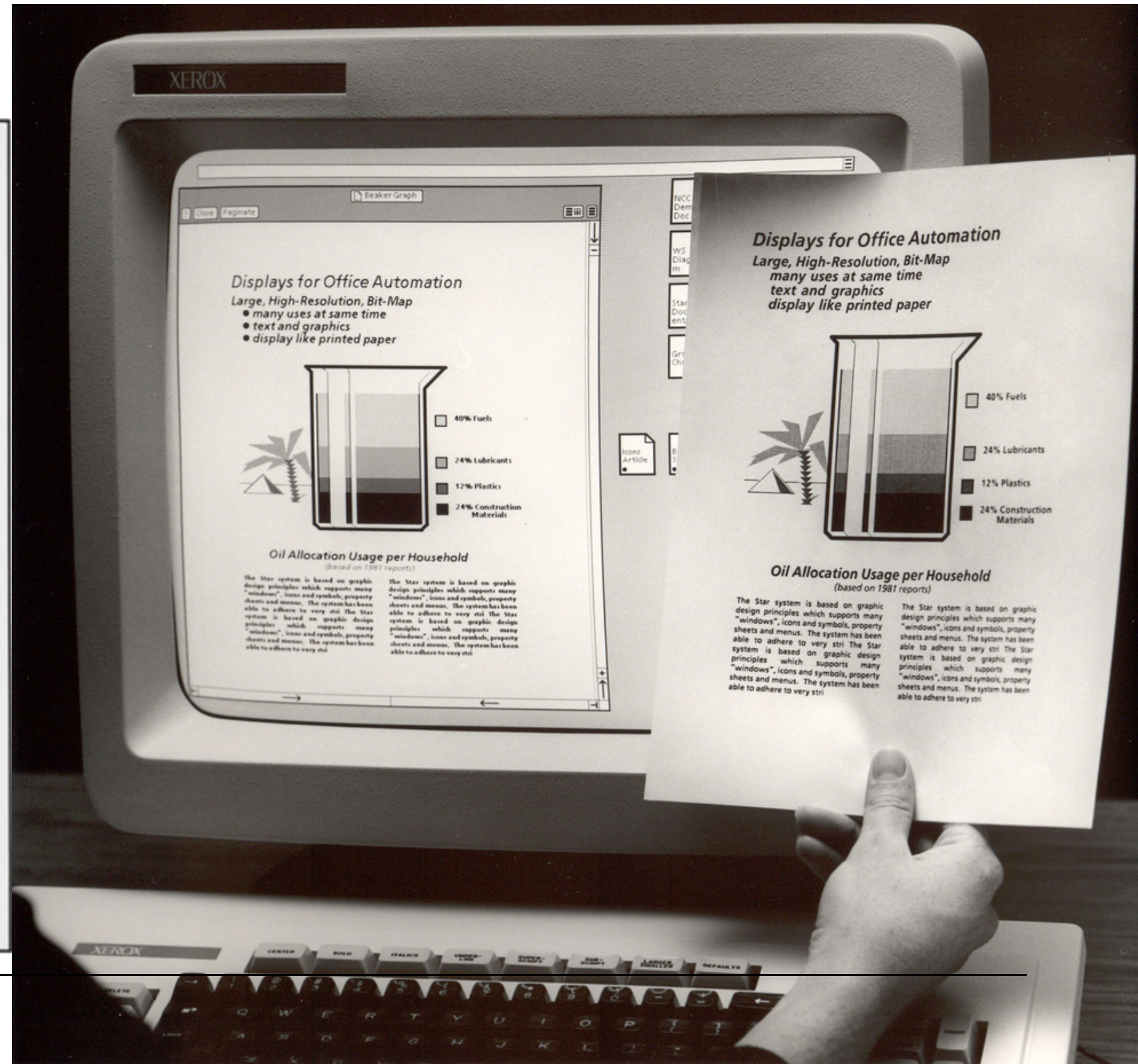
Figure 1: Data from Table 1 drive

Workstation usage percentages Table 1 and illustrated in Figure 6085 users are likely to do mid-composition and layout, control process including printing and di-

Text and Graphics

To replace typesetting, the 6085 offers a choice of type fonts and sizes from 6 point to 36 point:

Here is a sentence of 10 point text.
18-point text.
24-point text.
36-point text.



18 Image source: Left, Right

Evolution of "Document" Icon Shape

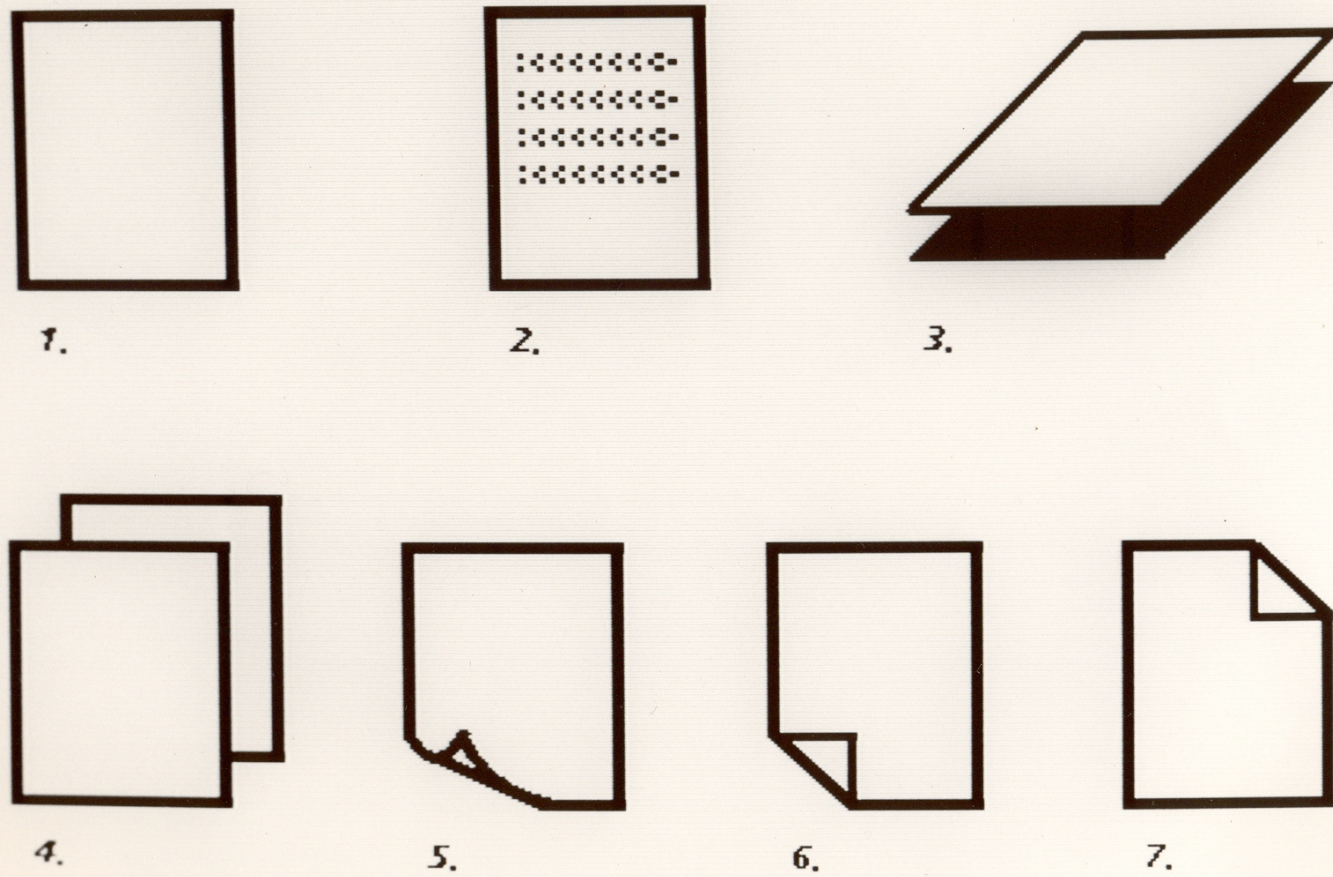
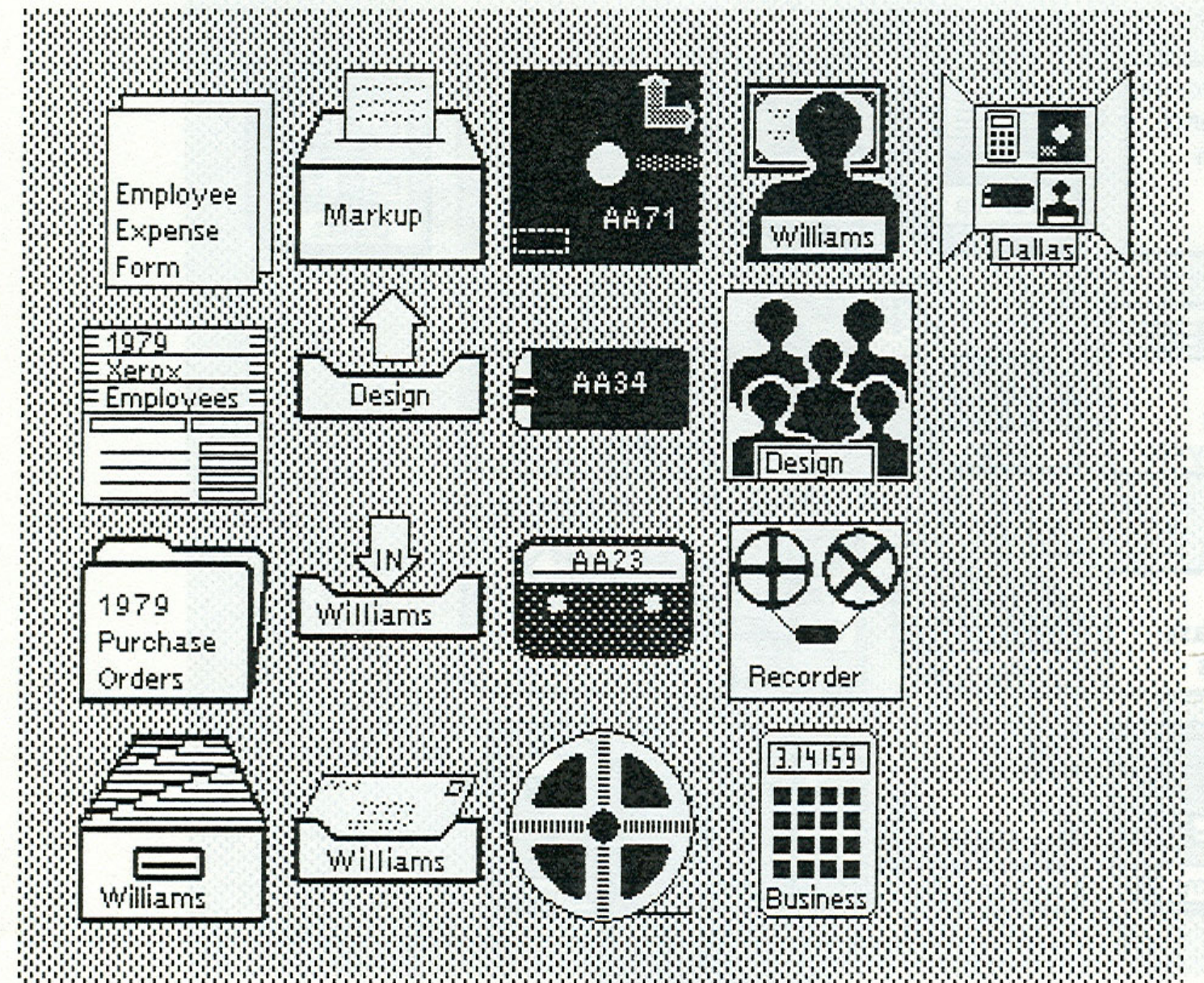


Figure 4.
Set 4 (Judd)



document	printer	floppy disk	user	directory
record file	out-basket	mag. card	group	
folder	in-basket	cassette	recorder	
file drawer	in-basket (with mail)	mag. tape	calculator	

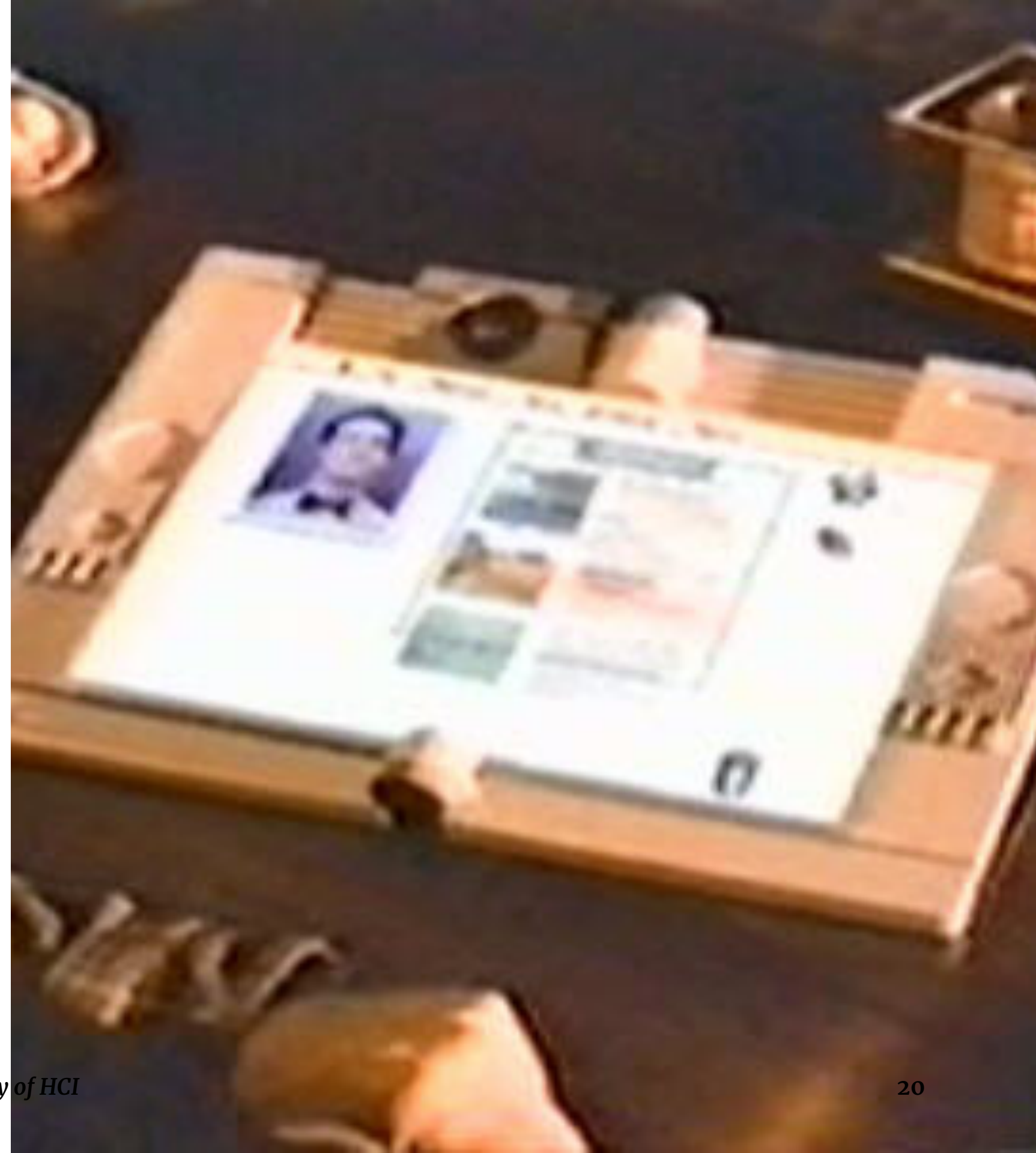
¹⁹ Image source: Left, Right

1980s[^20]

The Knowledge Navigator, 1987,
Hugh Dubberly, Apple ATG

Vision introduced *speech interfaces*,
virtual agents

[^20] : Image source





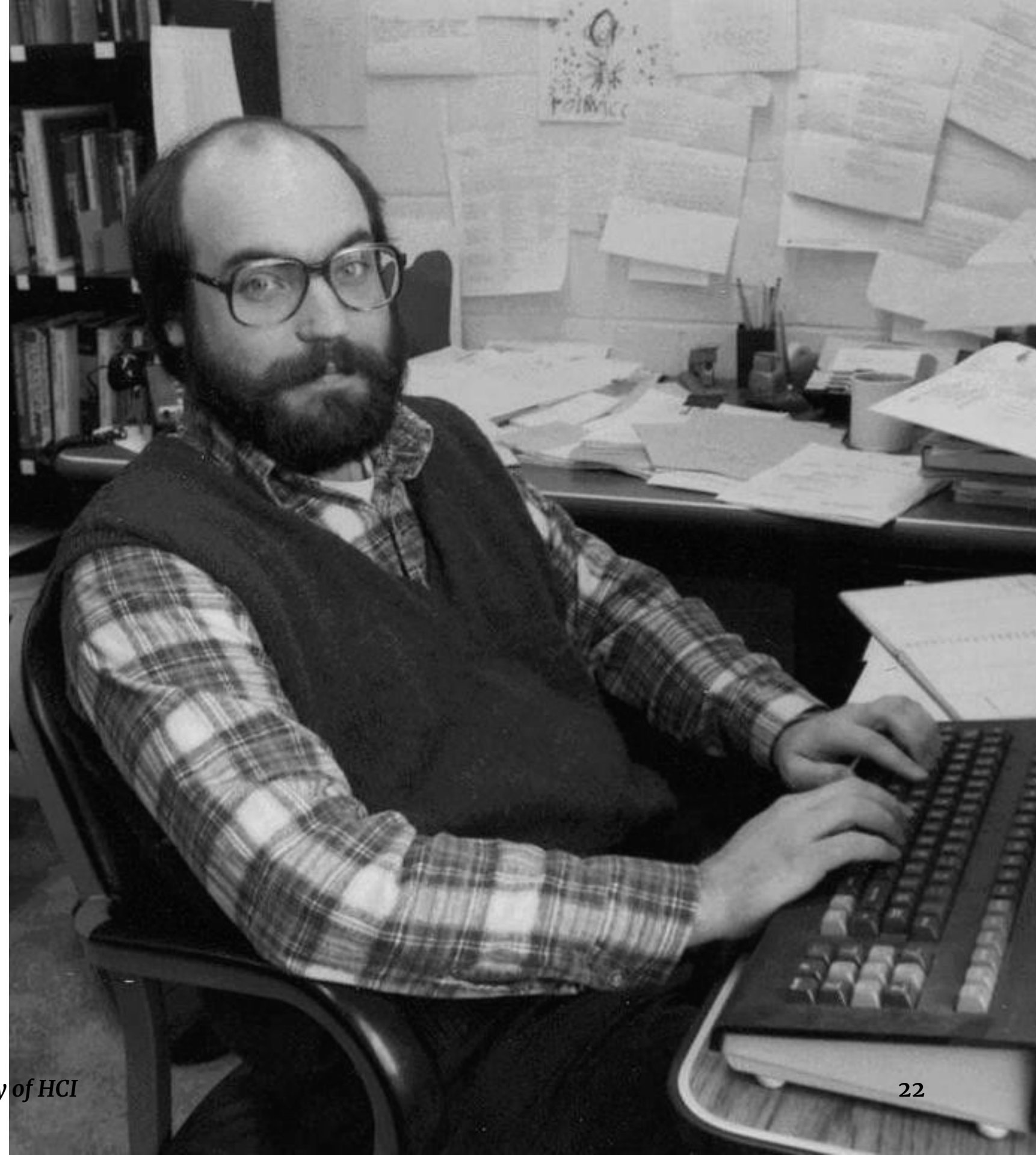
1990s²²

Ubiquitous computing, 1991, Mark Weiser, Xerox PARC

The Computer for the 21st Century

“The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.”

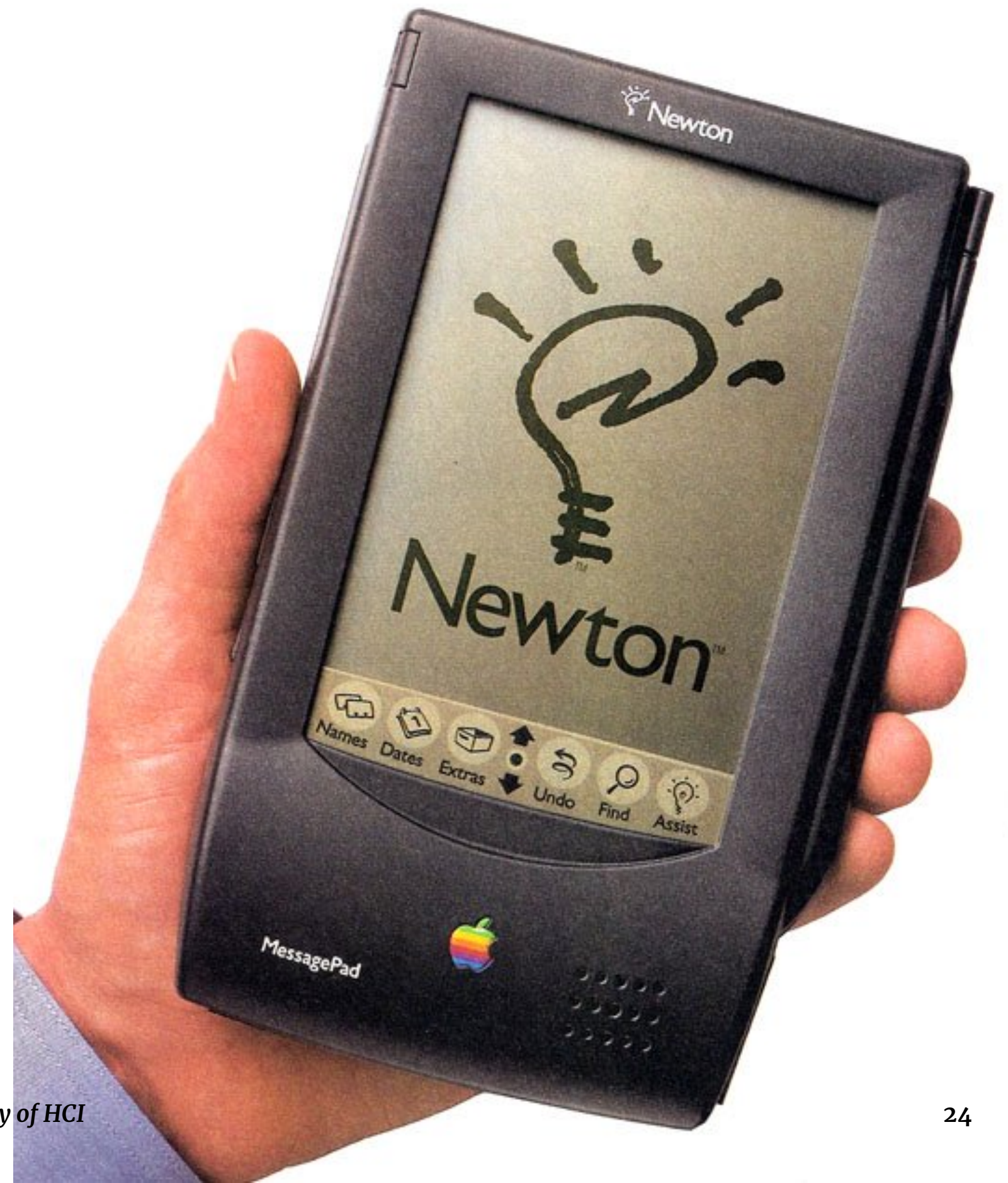
²² Image source





1990s²⁴

Apple Newton, 1992, Apple



²⁴ Image source



e

1990s²⁶

Clearboard, 1992, Hiroshi Ishii, NTT
Prototype introduced *shared visual workspace, matched reference points, videoconferencing*



²⁶Image source

Discussion

Some Questions

- >> What did you take from the history you read?
- >> What was surprising, unintuitive, unexpected?
- >> How does what you read change how you see HCI?
- >> How did external resources challenge/complement?
- >> ...