Human–Computer Interaction

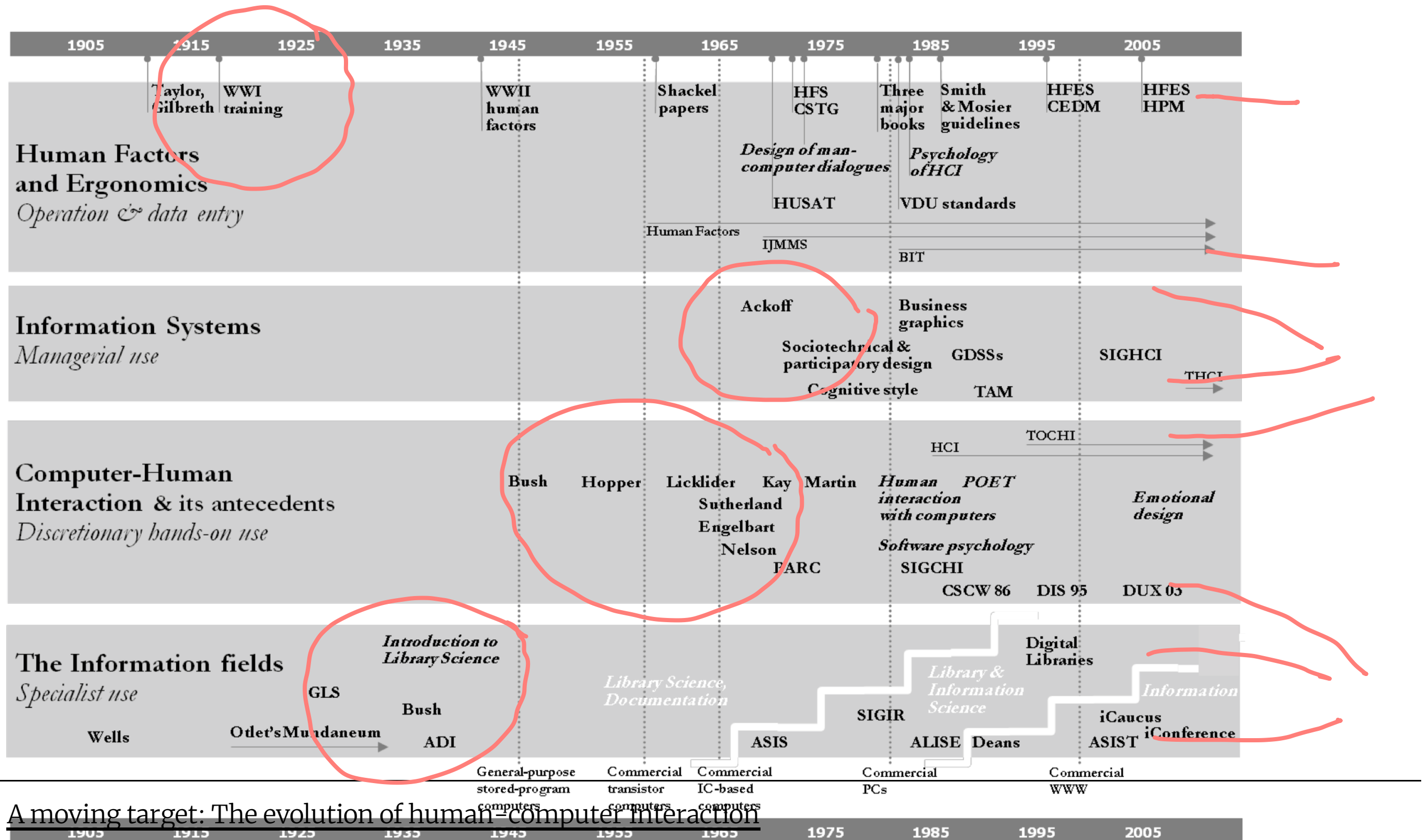# History of HCI

Professor Bilge Mutlu

Today's Agenda

» Topic overview: *History of HCI*

» Discussion

» Project overview
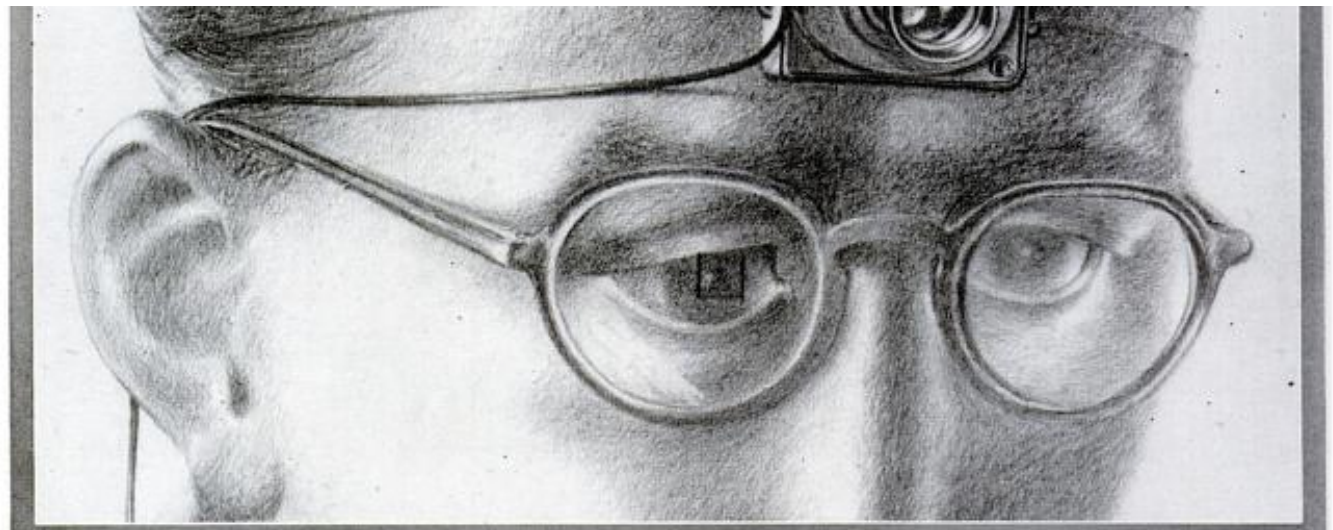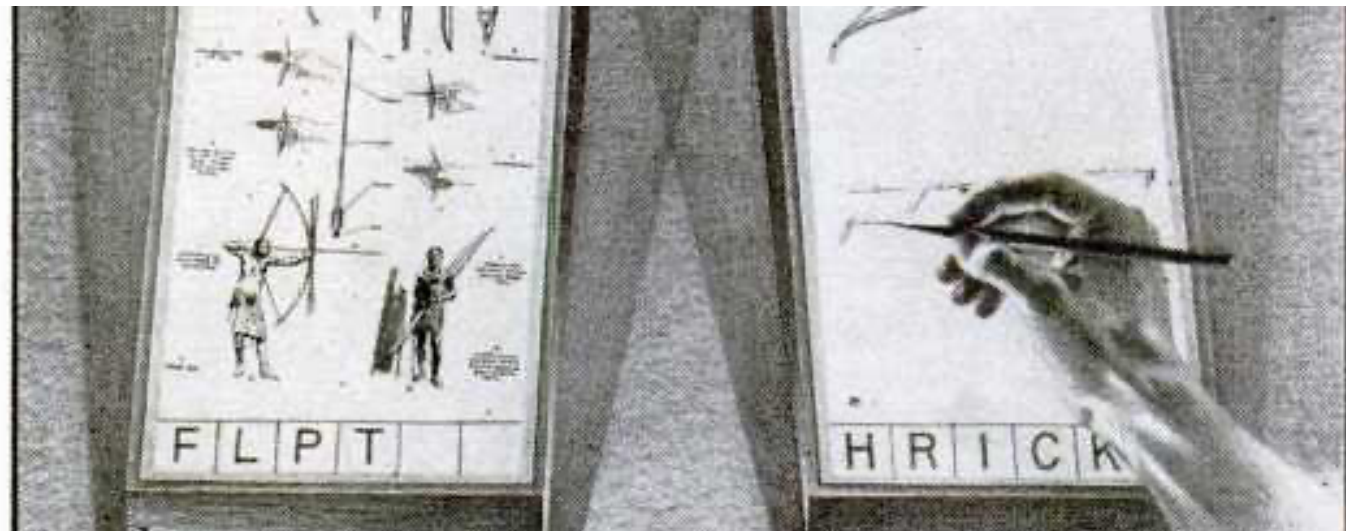
Topic overview: *History of HCI*

	1905	1915	1925	1935	1945	1955	1965	1975	1985	1995	2005

Human Factors and Ergonomics
Operation & data entry

Taylor, Gilbreth — WWI training — WWII human factors — Shackel papers — HFS CSTG — Three major books — Smith & Mosier guidelines — HFES CEDM — HFES HPM

Design of man-computer dialogues — *Psychology of HCI*

HUSAT — VDU standards

Human Factors — IJMMS — BIT

Information Systems
Managerial use

Ackoff — Business graphics

Sociotechnical & participatory design — GDSSs — SIGHCI

Cognitive style — TAM — THCI

Computer-Human Interaction & its antecedents
Discretionary hands-on use

HCI — TOCHI

Bush — Hopper — Licklider — Kay — Martin — *Human interaction with computers* — *POET* — *Emotional design*

Sutherland — Engelbart — Nelson — *Software psychology*

PARC — SIGCHI

CSCW 86 — DIS 95 — DUX 03

The Information fields
Specialist use

Introduction to Library Science — Digital Libraries

GLS — *Library Science, Documentation* — *Library & Information Science* — *Information*

Wells — Odet's Mundaneum — Bush — SIGIR — iCaucus iConference

ADI — ASIS — ALISE Deans — ASIST

General-purpose stored-program computers — Commercial transistor computers — Commercial IC-based computers — Commercial PCs — Commercial WWW

	1905	1915	1925	1935	1945	1955	1965	1975	1985	1995	2005

[1]Grudin, 2012, A moving target: The evolution of human-computer interaction
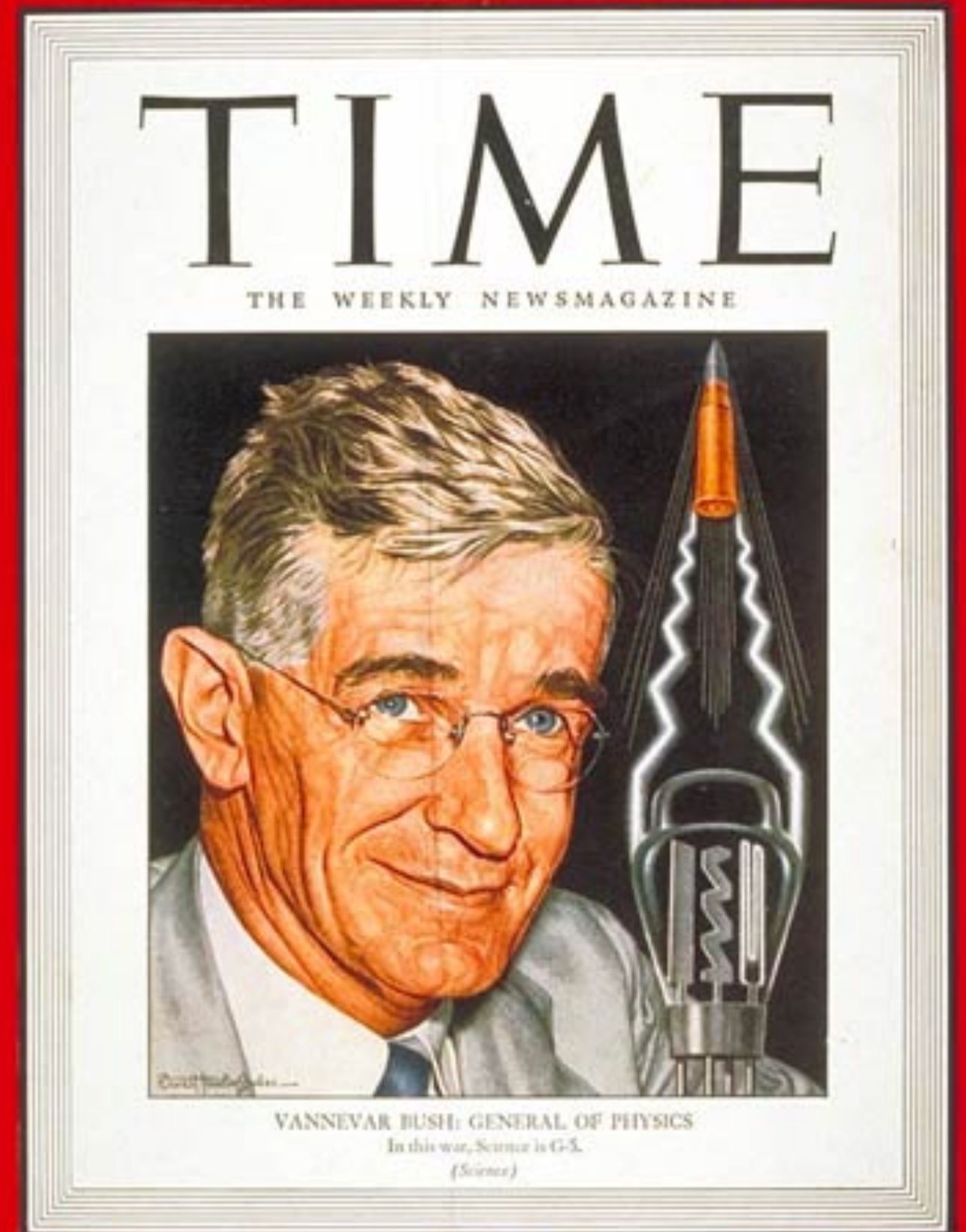
1945 (Vannevar Bush)[2]

2011 (Microsoft)

1940s[3]
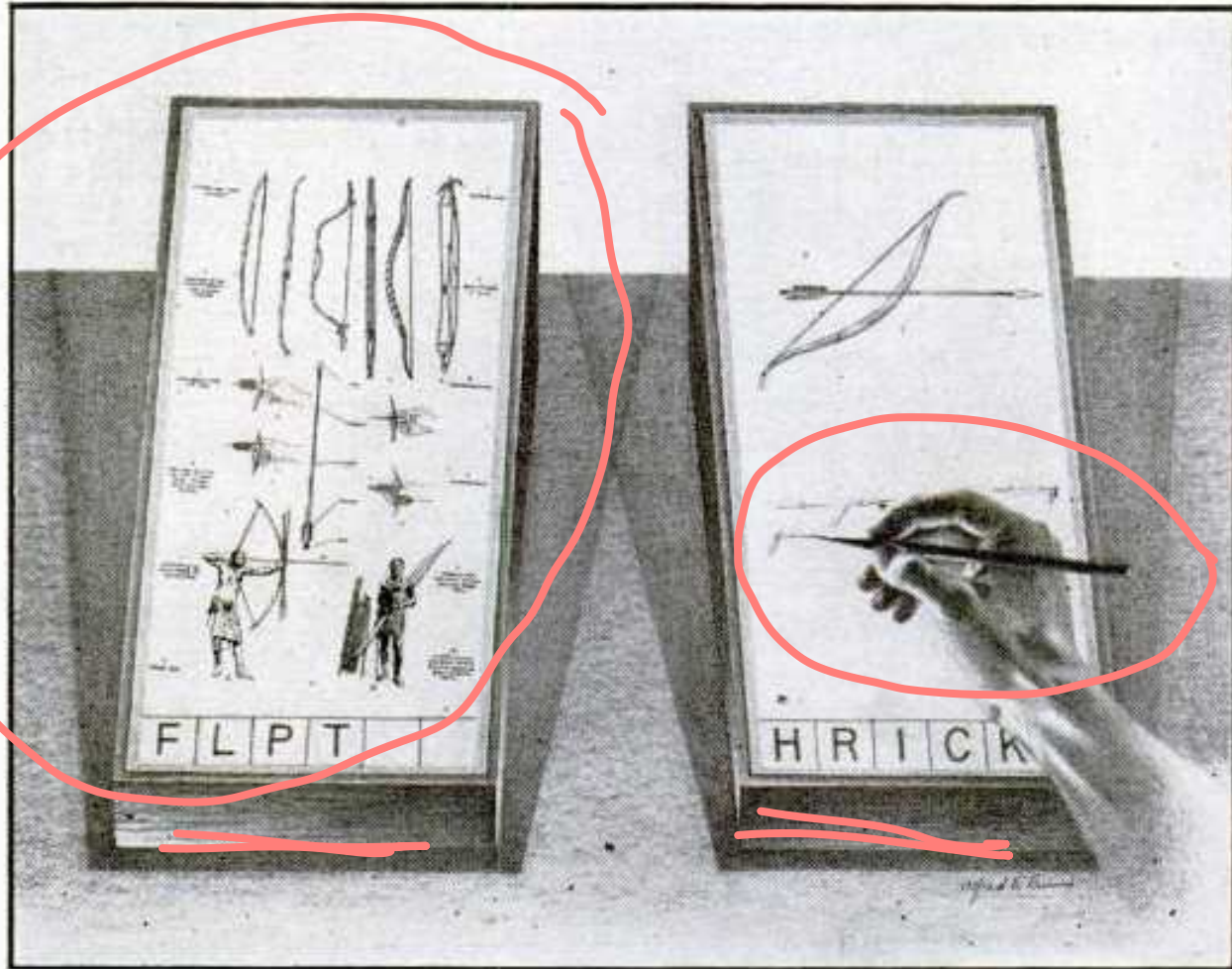
Memex, 1945, Vannevar Bush, OSRD

» Stores all records/articles/ communications

» Items retrieved by indexing, keywords, cross-referencing

» Information linked through associative trails

wiki < hyperlinks ≈ Web

TIME
THE WEEKLY NEWSMAGAZINE

VANNEVAR BUSH: GENERAL OF PHYSICS
In this war, Science is G-5.
(Science)

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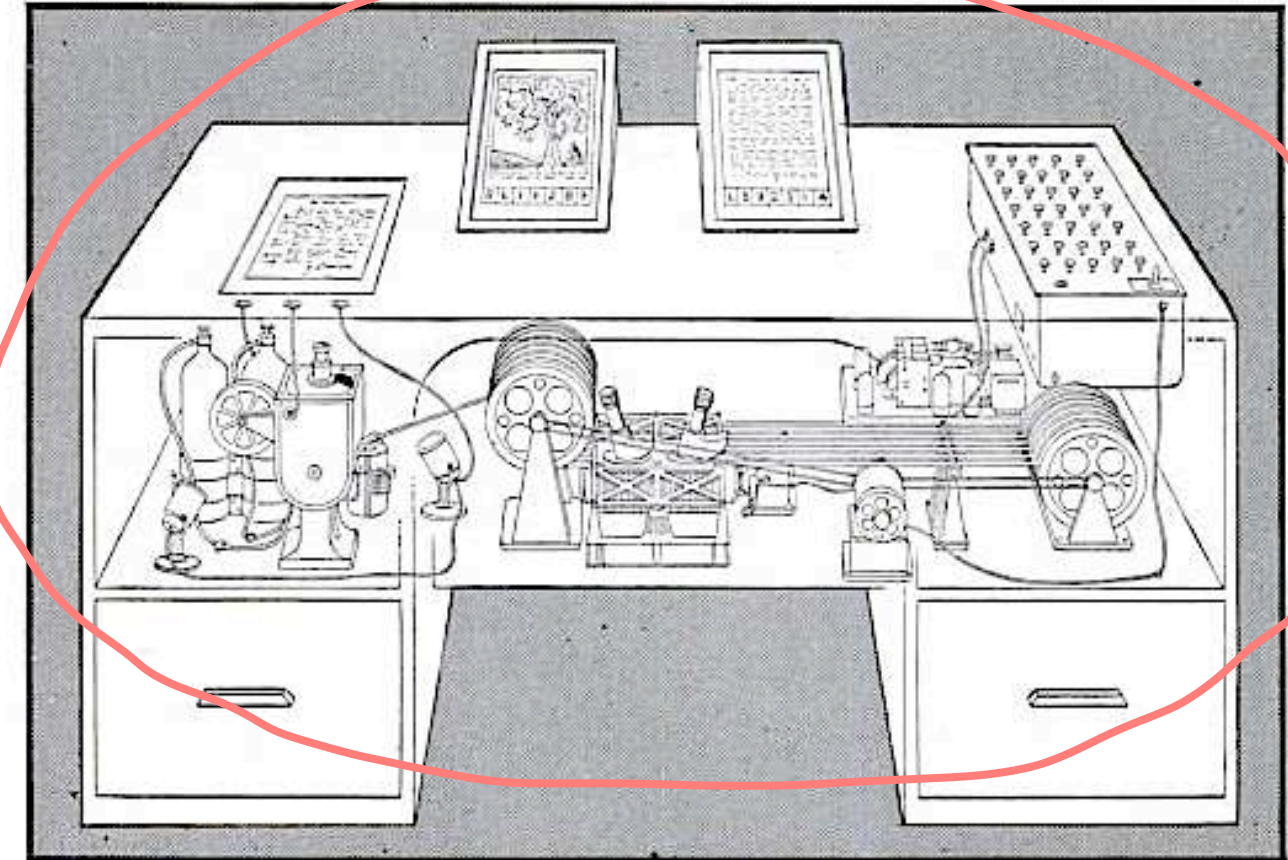
MEMEX in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicro-film filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files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

AS WE MAY THINK CONTINUED

[4] Image source

1960s[5]

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."
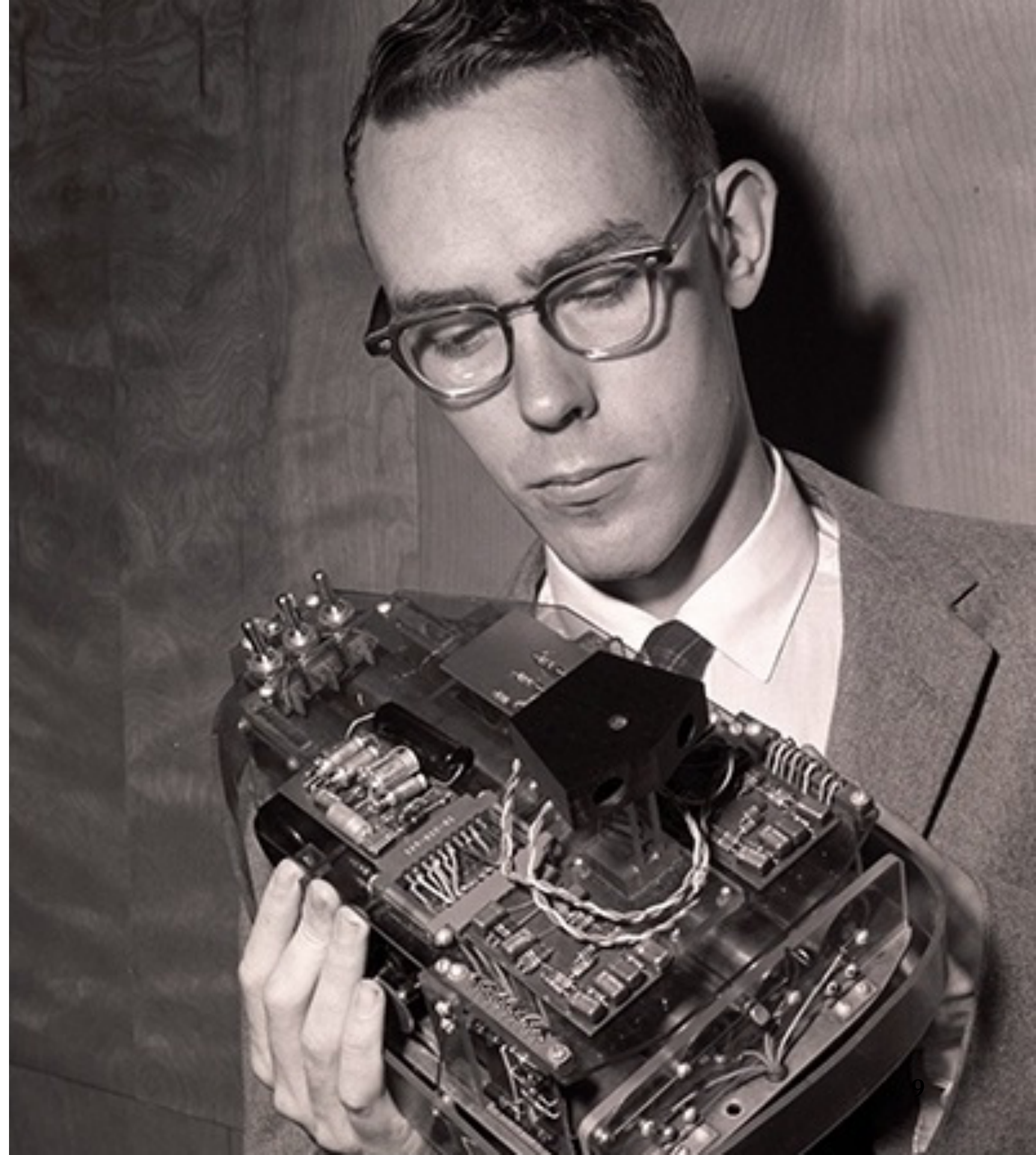

1960s[6]

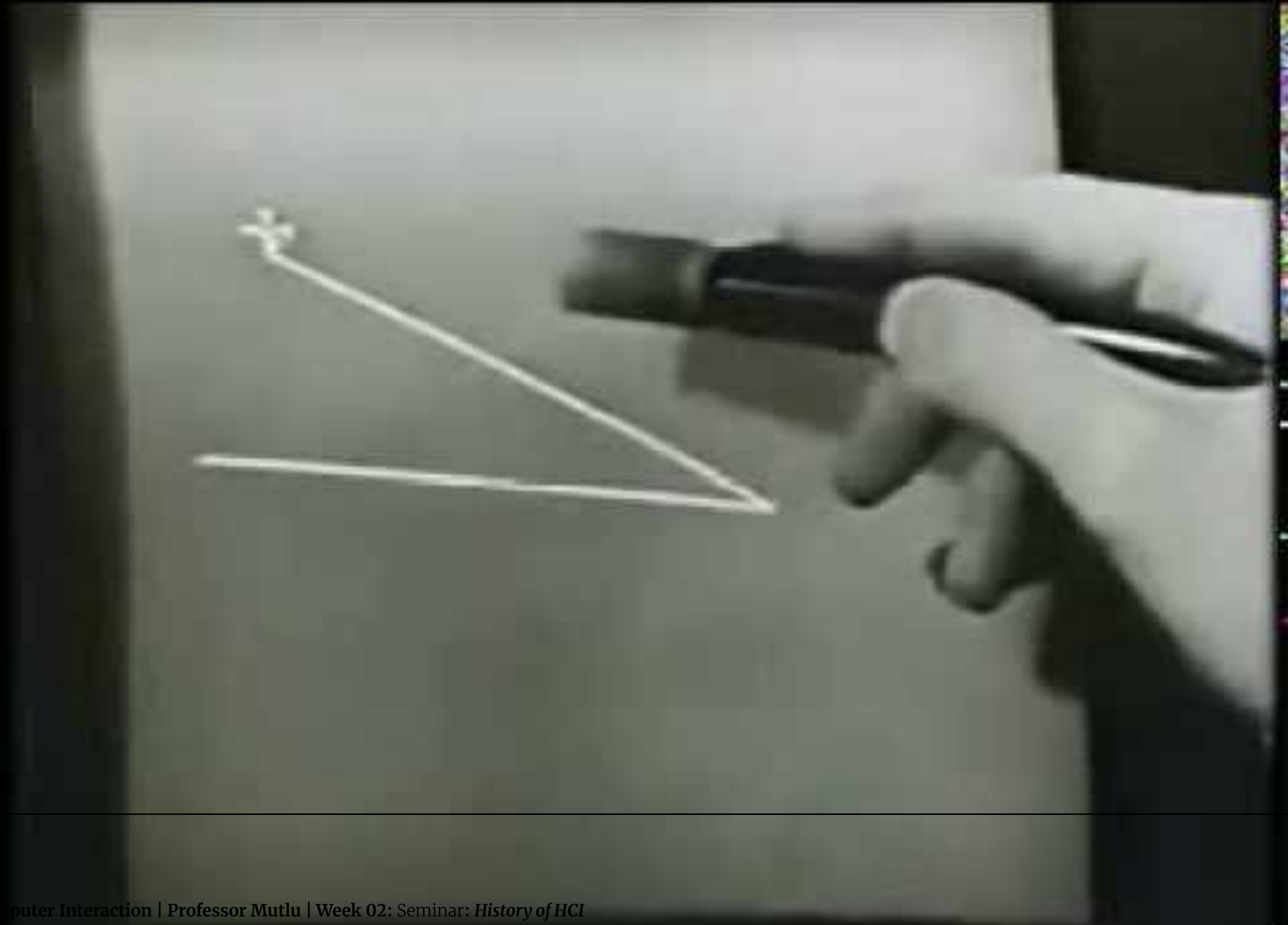*SketchPad*, 1963, Ivan Sutherland, MIT

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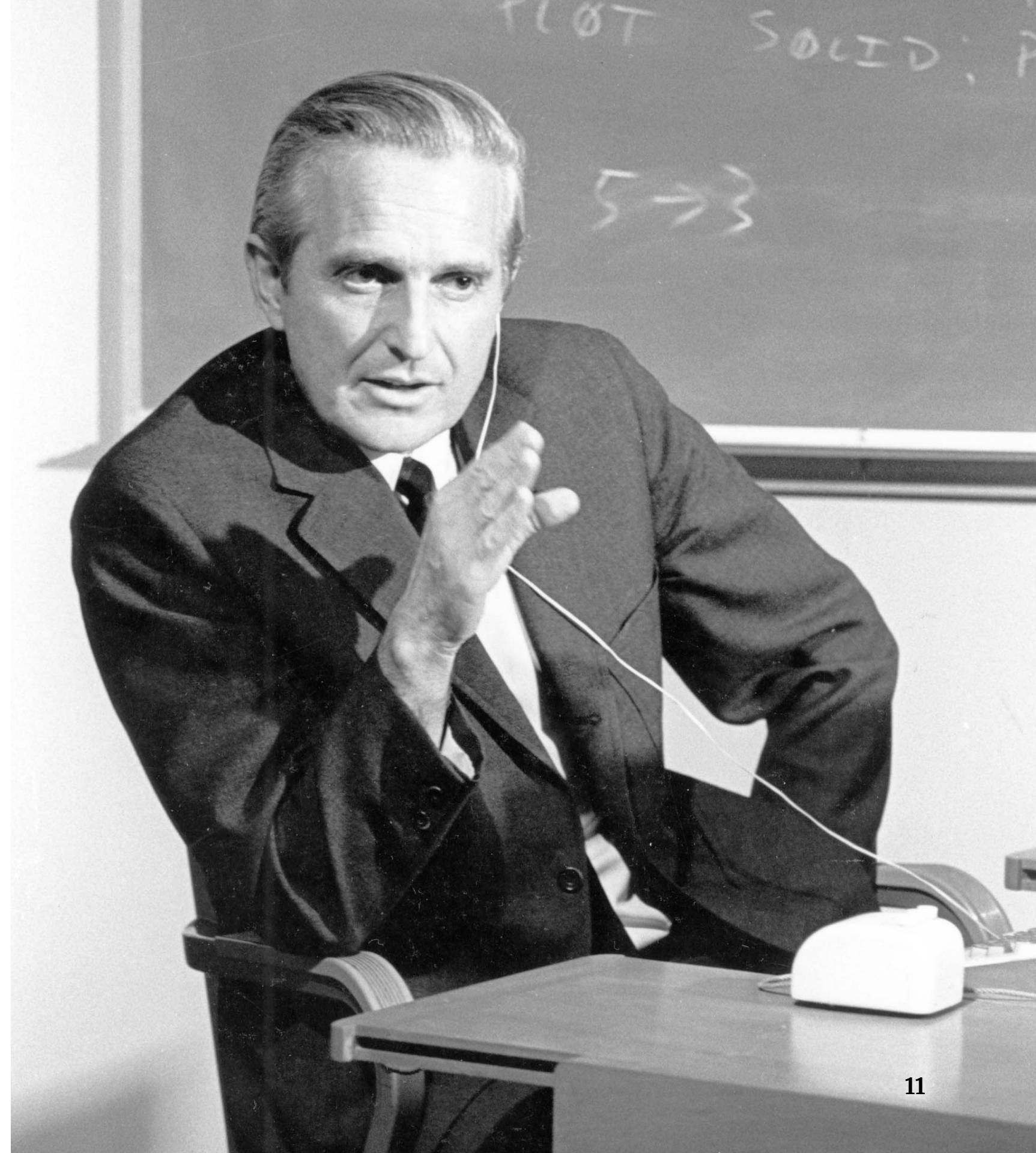

[6] Image source

1960s[8]

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

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

STATEMENT ONE: WORD WORD WORD WORD WORD WORD
WORD WORD WORD WORD WORD WORD WORD WORD WORD WORD
WORD WORD WORD WORD WORD WORD WORD WORD ...
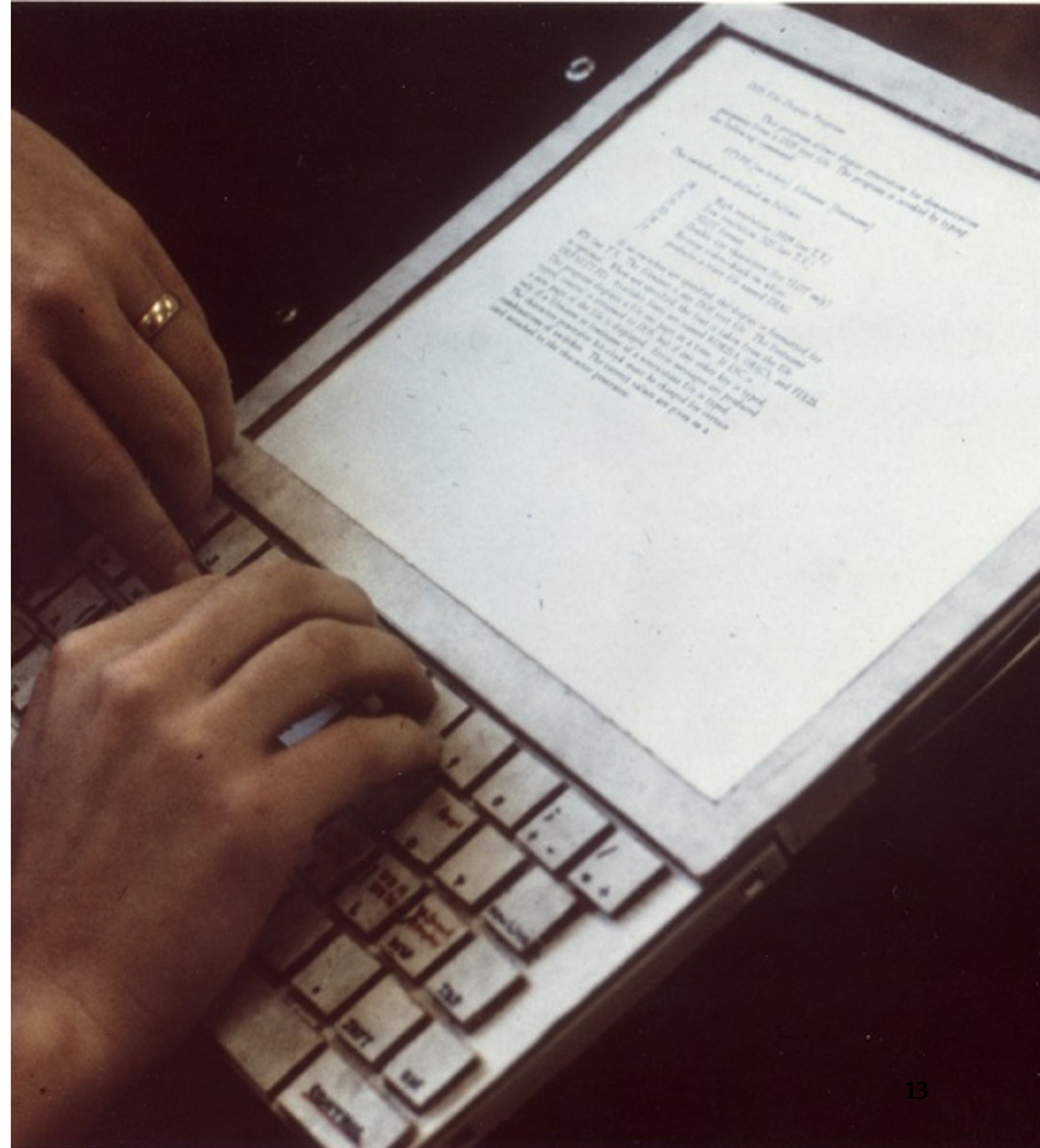
1

1960s[10]

Dynabook, 1968, Alan Kay, Xerox PARC

The Dynabook mockup introduced
personal computer, *desktop interface*

1970s

Xerox Alto, 1973, Xerox PARC[11] [12]

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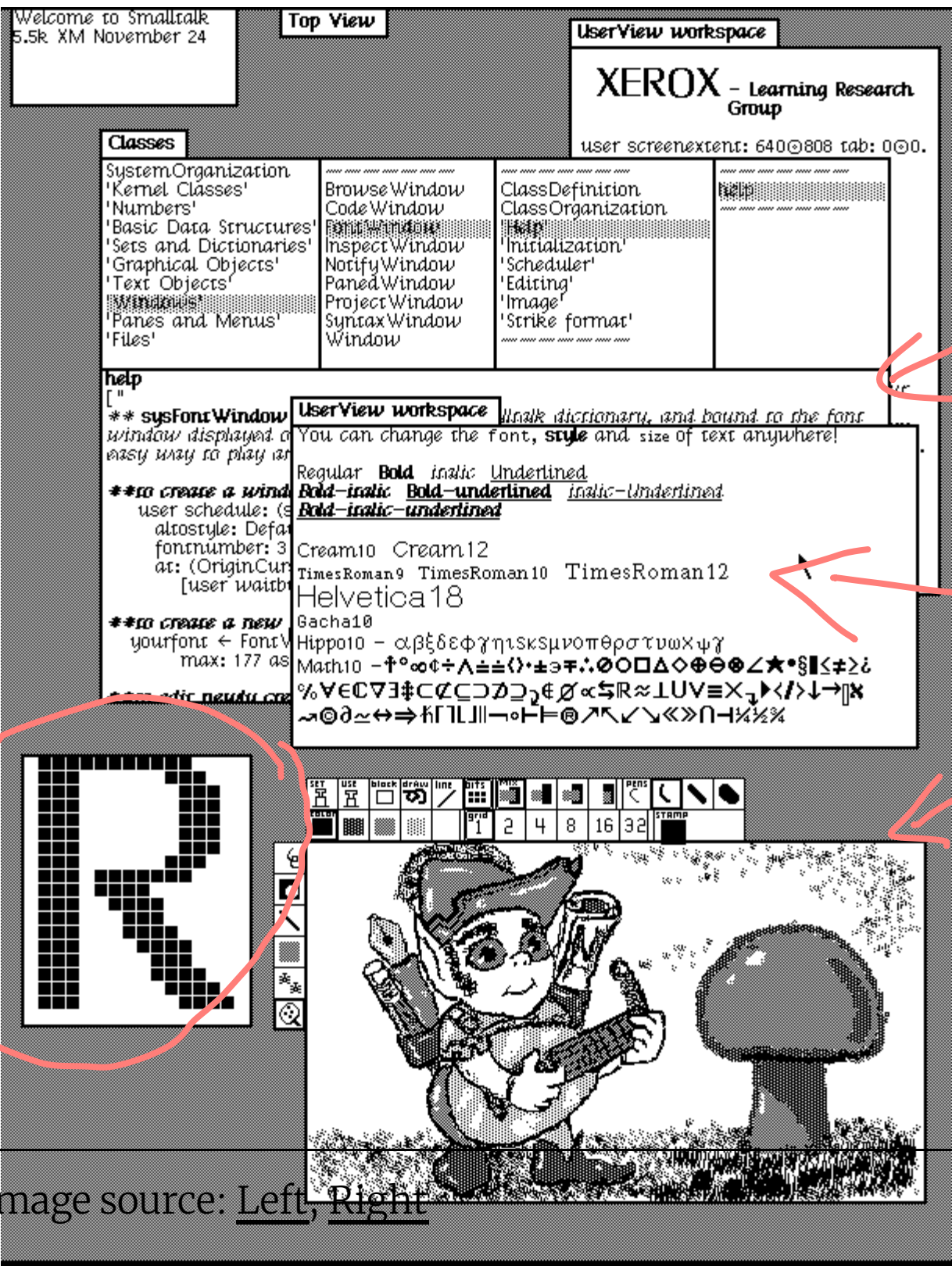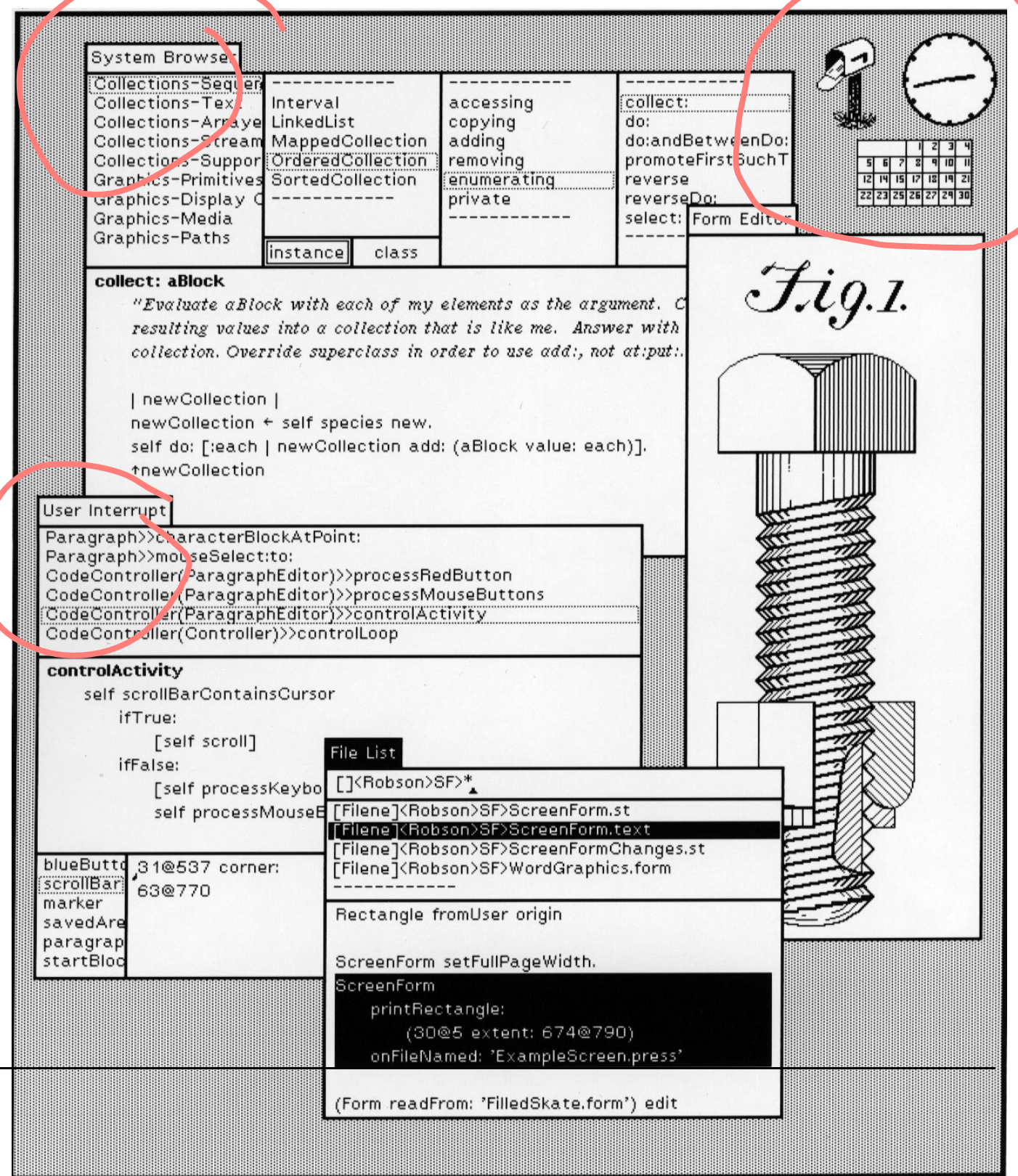
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[11]Wikipedia: Xerox Alto

[12]Image source

Welcome to Smalltalk
5.5k XM November 24

Top View

UserView workspace

XEROX – Learning Research Group

user screenextent: 640⊝808 tab: 0⊝0.

Classes

SystemOrganization
'Kernel Classes'
'Numbers'
'Basic Data Structures'
'Sets and Dictionaries'
'Graphical Objects'
'Text Objects'
'Windows'
'Panes and Menus'
'Files'

BrowseWindow
CodeWindow
FontWindow
InspectWindow
NotifyWindow
PanedWindow
ProjectWindow
SyntaxWindow
Window

ClassDefinition
ClassOrganization
'Help'
'Initialization'
'Scheduler'
'Editing'
'Image'
'Strike format'

help

help
["
** sysFontWindow
window displayed
easy way to play

** to create a wind
user schedule: (s
altostyle: Defa
fontnumber: 3
at: (OriginCur
[user waitb

** to create a new
yourfont ← FontV
max: 177 as

UserView workspace

You can change the font, **style** and size of text anywhere!

Regular **Bold** *italic* Underlined
Bold-italic **Bold-underlined** *italic-Underlined*
Bold-italic-underlined

Cream10 Cream12
TimesRoman9 TimesRoman10 TimesRoman12
Helvetica18
Gacha10
Hippo10 – αβξδεφγηιsκsμνοπθρστυωχψγ
Math10 –†°∞¢÷∧≡±∓∓∴∅○□△◇⊕⊗⊘∠★•§▌≤≠≥¿

System Browse
Collections-Seque
Collections-Tex
Collections-Array
Collection-Stream
Collection-Suppor
Graphics-Primitive
Graphics-Display
Graphics-Media
Graphics-Paths

Interval
LinkedList
MappedCollection
OrderedCollection
SortedCollection

accessing
copying
adding
removing
enumerating
private

collect:
do:
do:andBetweenDo:
promoteFirstSuchT
reverse
reverseDo:
select:

instance   class

collect: aBlock

"Evaluate aBlock with each of my elements as the argument. C
resulting values into a collection that is like me. Answer with
collection. Override superclass in order to use add:, not at:put:.

| newCollection |
newCollection ← self species new.
self do: [:each | newCollection add: (aBlock value: each)].
↑newCollection

Form Editor

F.ig.1

User Interrupt

Paragraph>>characterBlockAtPoint:
Paragraph>>mouseSelect:to:
CodeController(ParagraphEditor)>>processRedButton
CodeController(ParagraphEditor)>>processMouseButtons
CodeController(ParagraphEditor)>>controlActivity
CodeController(Controller)>>controlLoop

controlActivity
    self scrollBarContainsCursor
        ifTrue:
            [self scroll]
        ifFalse:
            [self processKeybo
            self processMouseE

File List

[]<Robson>SF>*

[Filene]<Robson>SF>ScreenForm.st
[Filene]<Robson>SF>ScreenForm.text
[Filene]<Robson>SF>ScreenFormChanges.st
[Filene]<Robson>SF>WordGraphics.form
————————
Rectangle fromUser origin

ScreenForm setFullPageWidth.
ScreenForm
    printRectangle:
        (30@5 extent: 674@790)
    onFileNamed: 'ExampleScreen.press'

(Form readFrom: 'FilledSkate.form') edit

blueButt 31@537 corner:
scrollBar 63@770
marker
savedAre
paragrap
startBloc

1970s [14]

Apple II, 1977, Apple

Personal computer that was first mass production, color graphics

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.
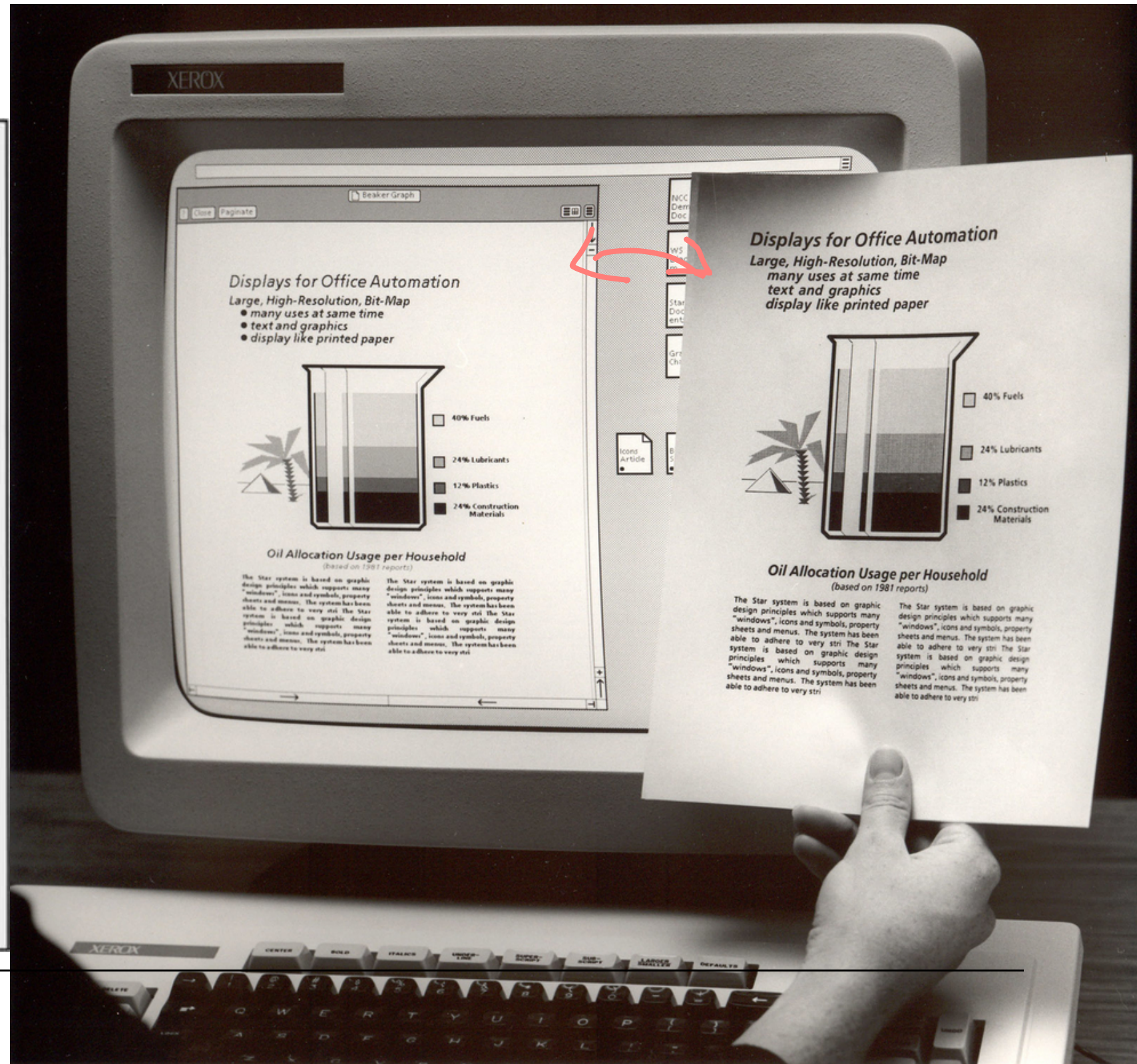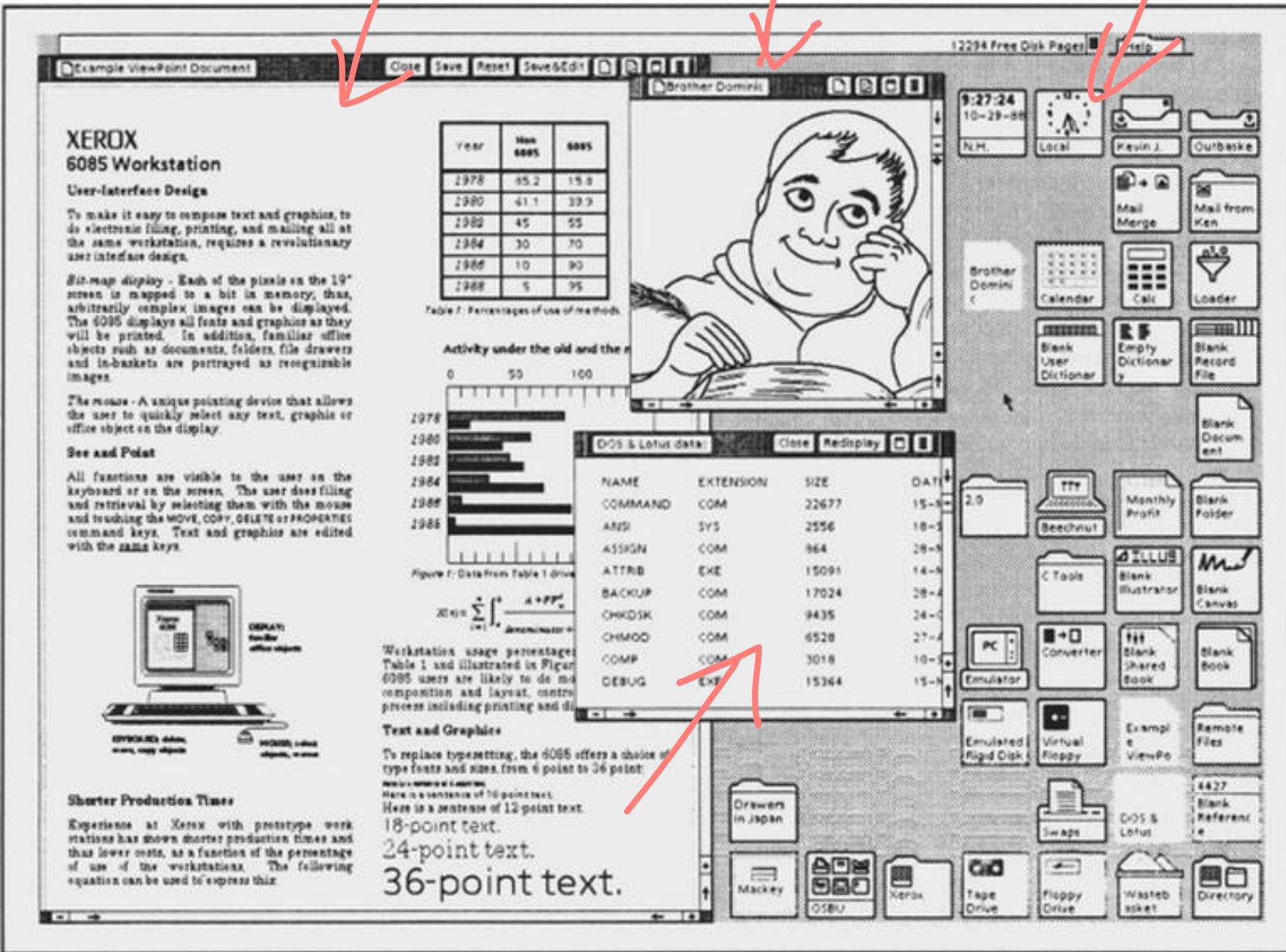

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[15] Wikipedia: Xerox Star

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

[17] Image source

Evolution of "Document" Icon Shape
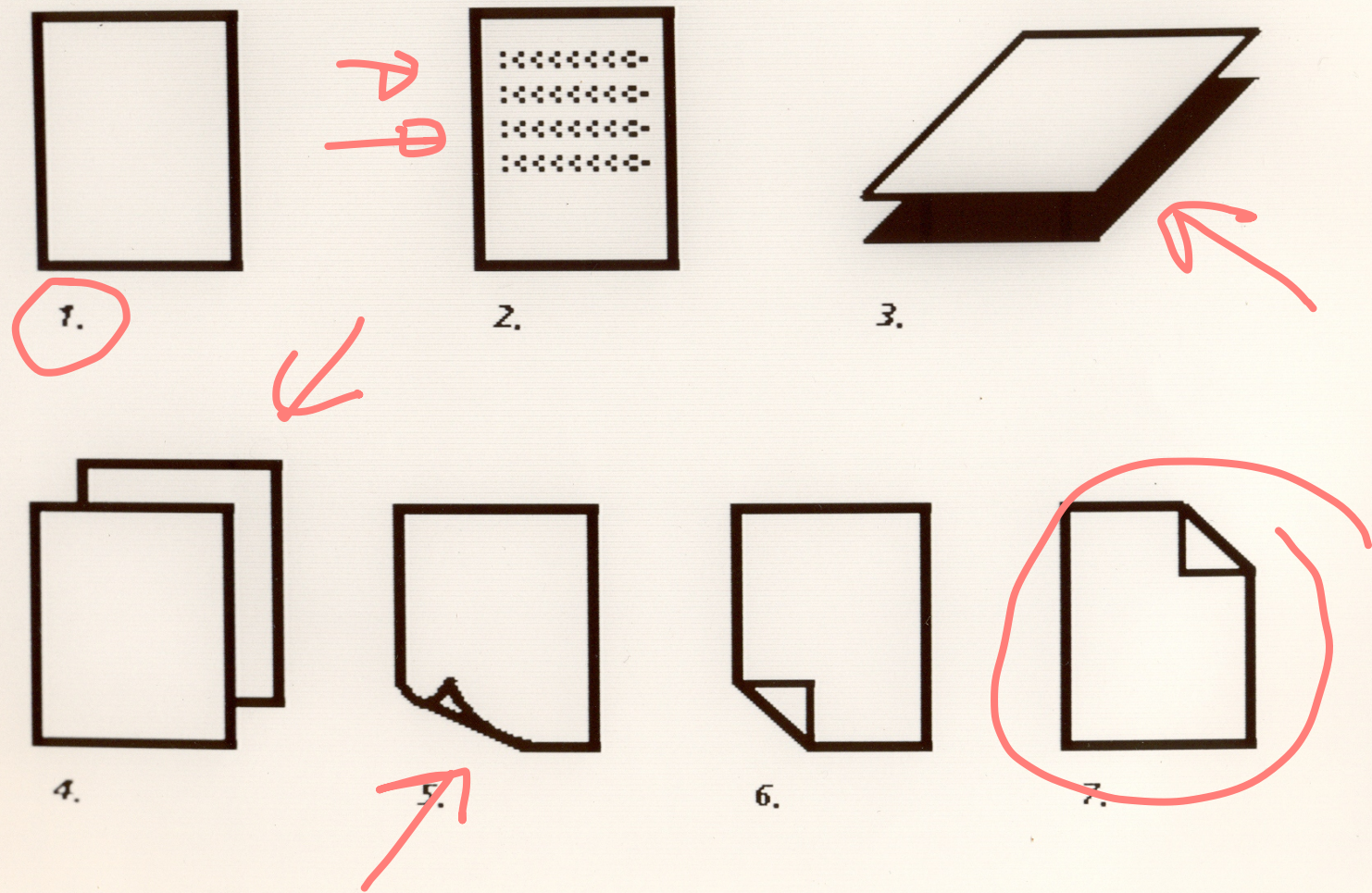
Figure 4.
Set 4 (Judd)
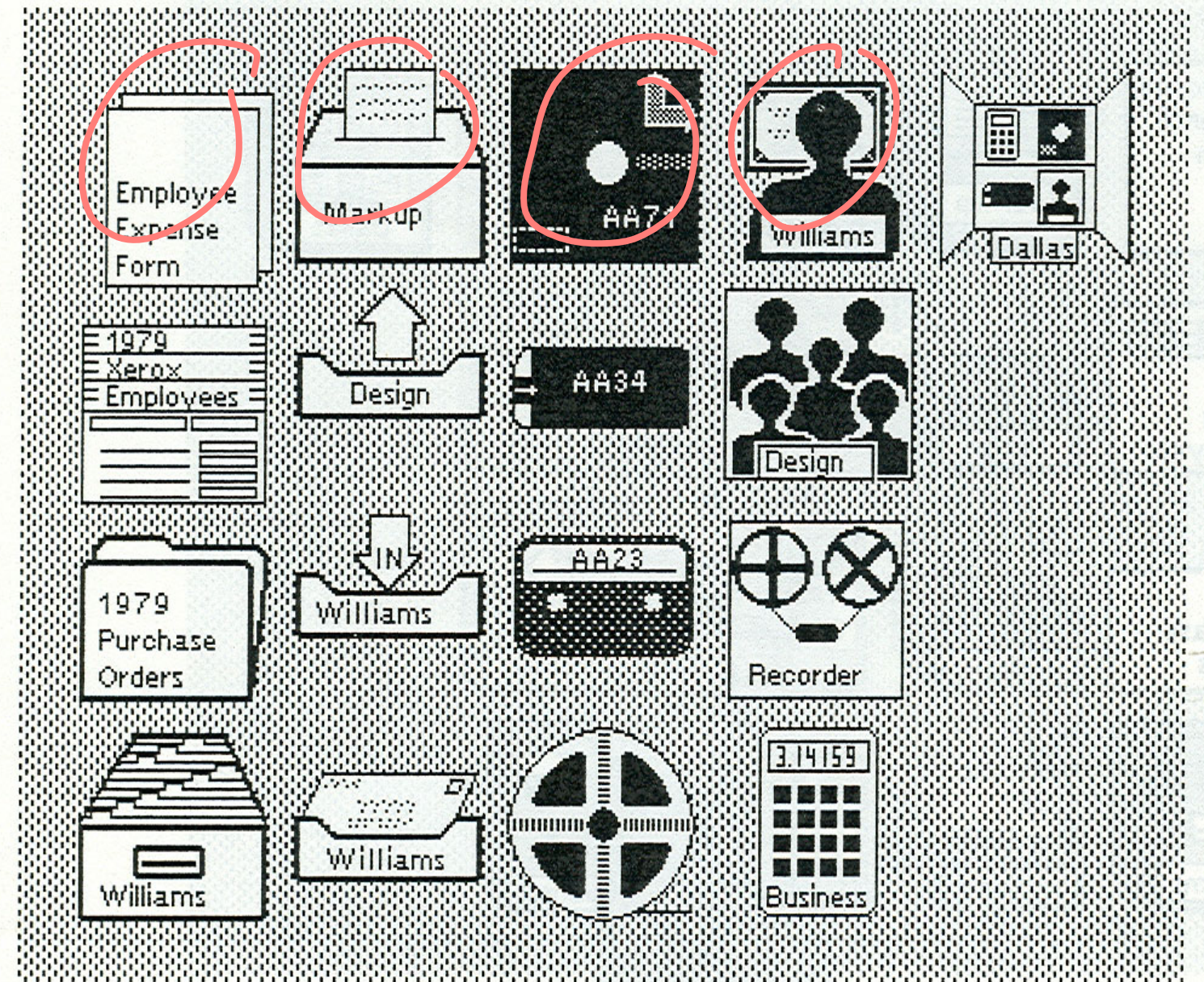
document	printer	floppy disk	user	directory
record file	out-basket	mag. card	group	
folder	in-basket	cassette	recorder	
file drawer	in-basket (with mail)	mag. tape	calculator	

1980s [20]

The Knowledge Navigator, 1987, Hugh Dubberly, Apple ATG

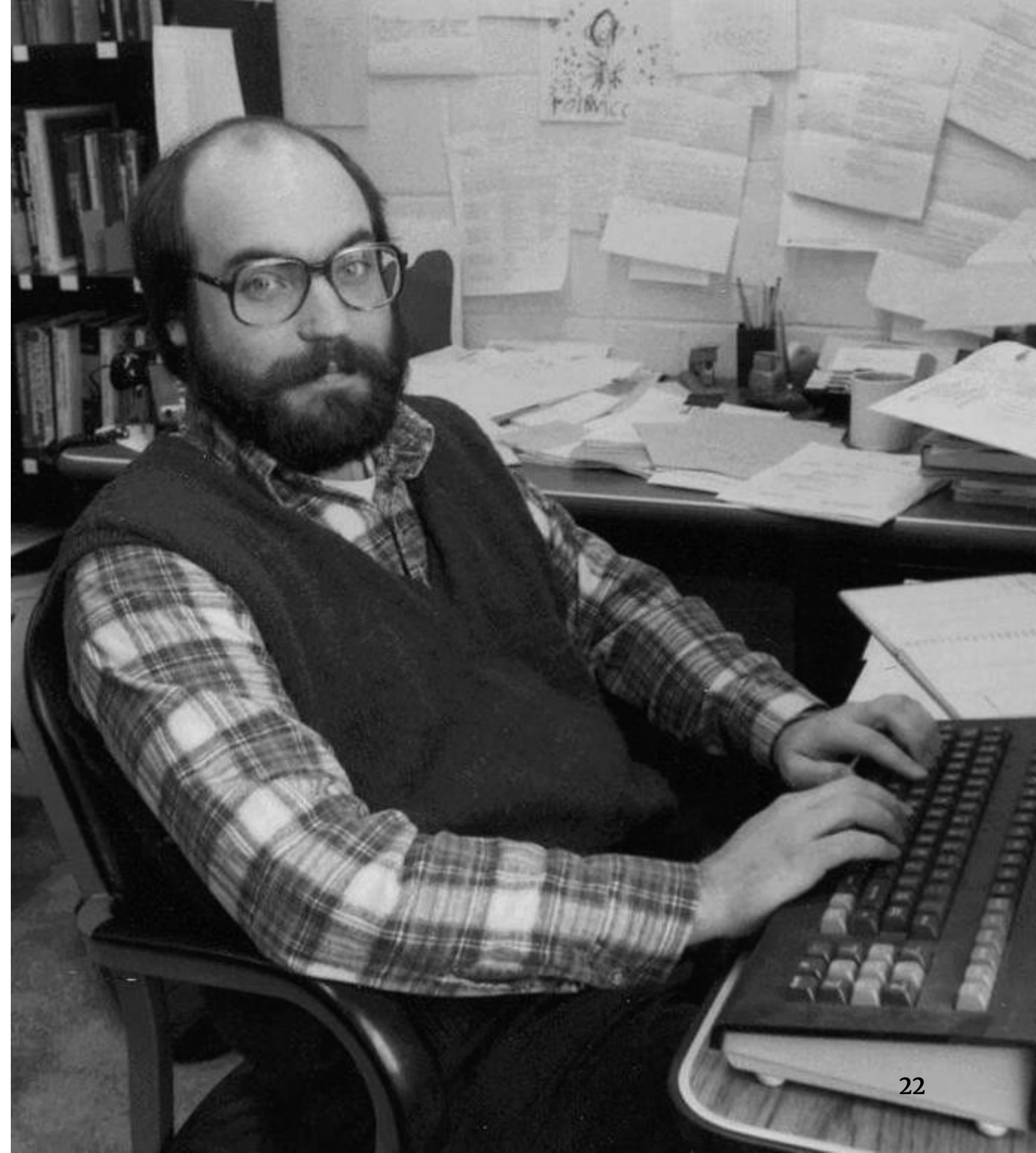Vision introduced *speech interfaces*, *virtual agents*
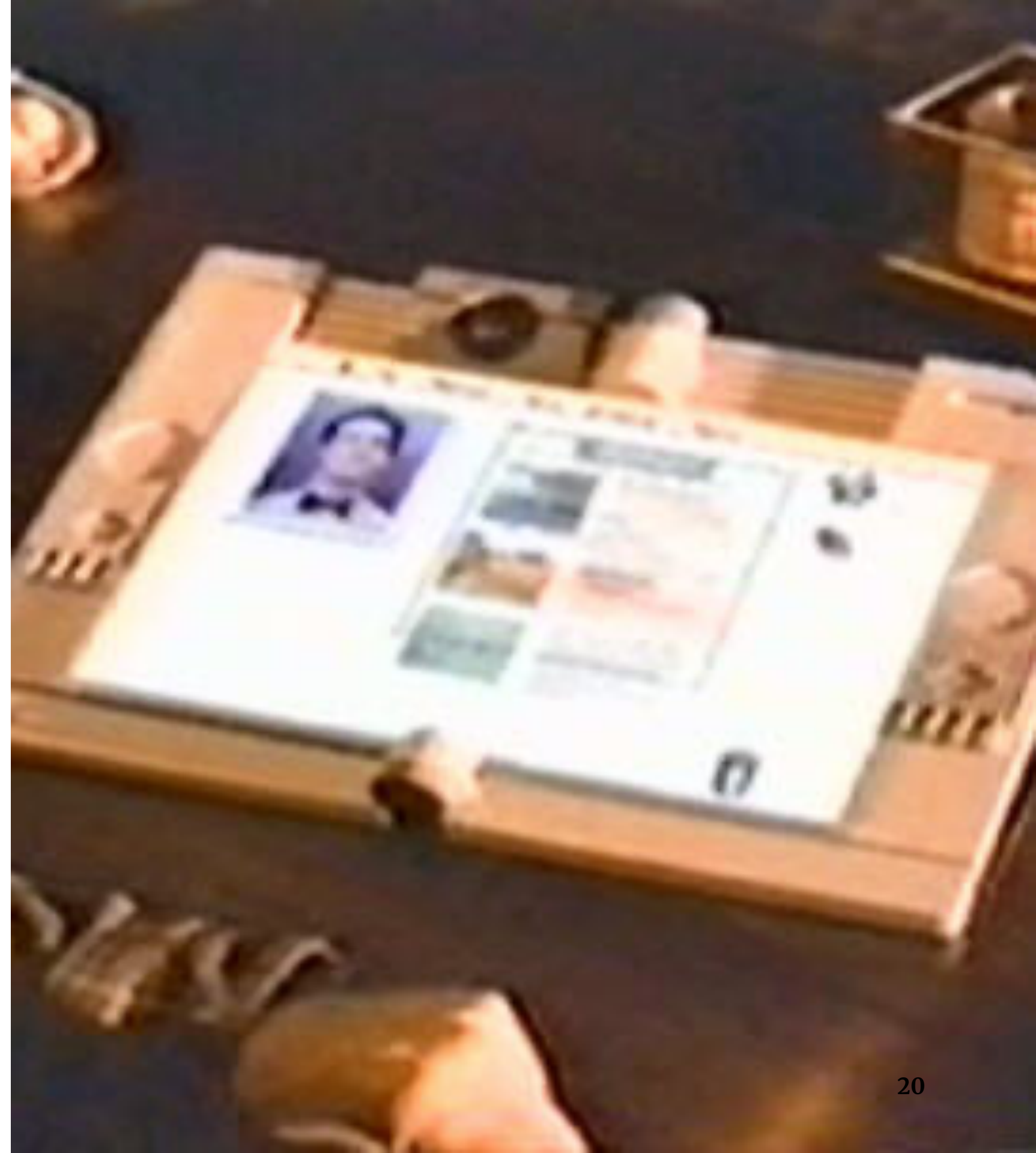
1990s[22]

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."
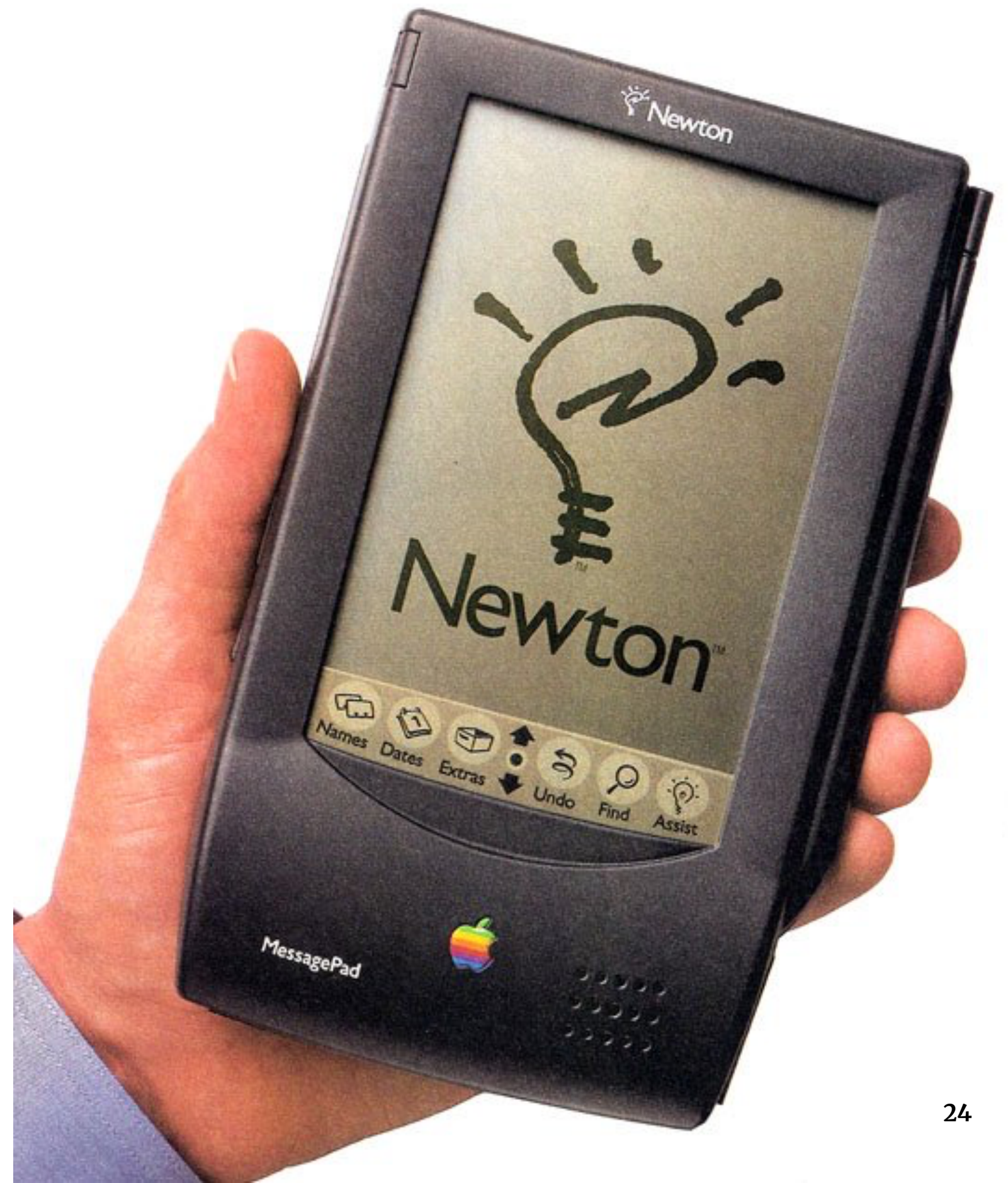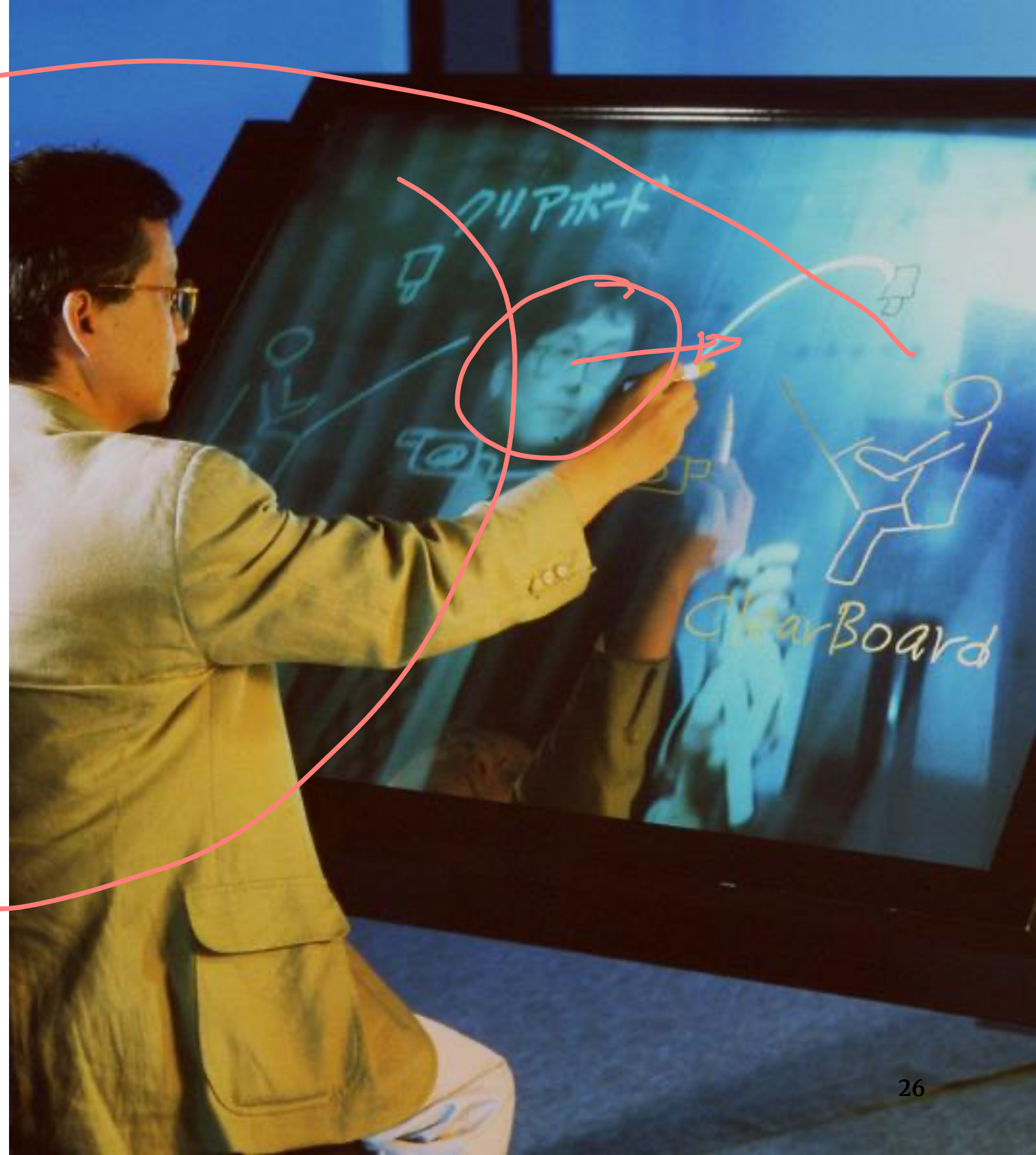
1990s[24]

Apple Newton, 1992, Apple

1990s[26]

Clearboard, 1992, Hiroshi Ishii, NTT

Prototype introduced *shared visual workspace*, *matched reference points*, *videoconferencing*

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?

» ...