Human-Computer Interaction

History of HCI

Professor Bilge Mutlu

Today's Agenda

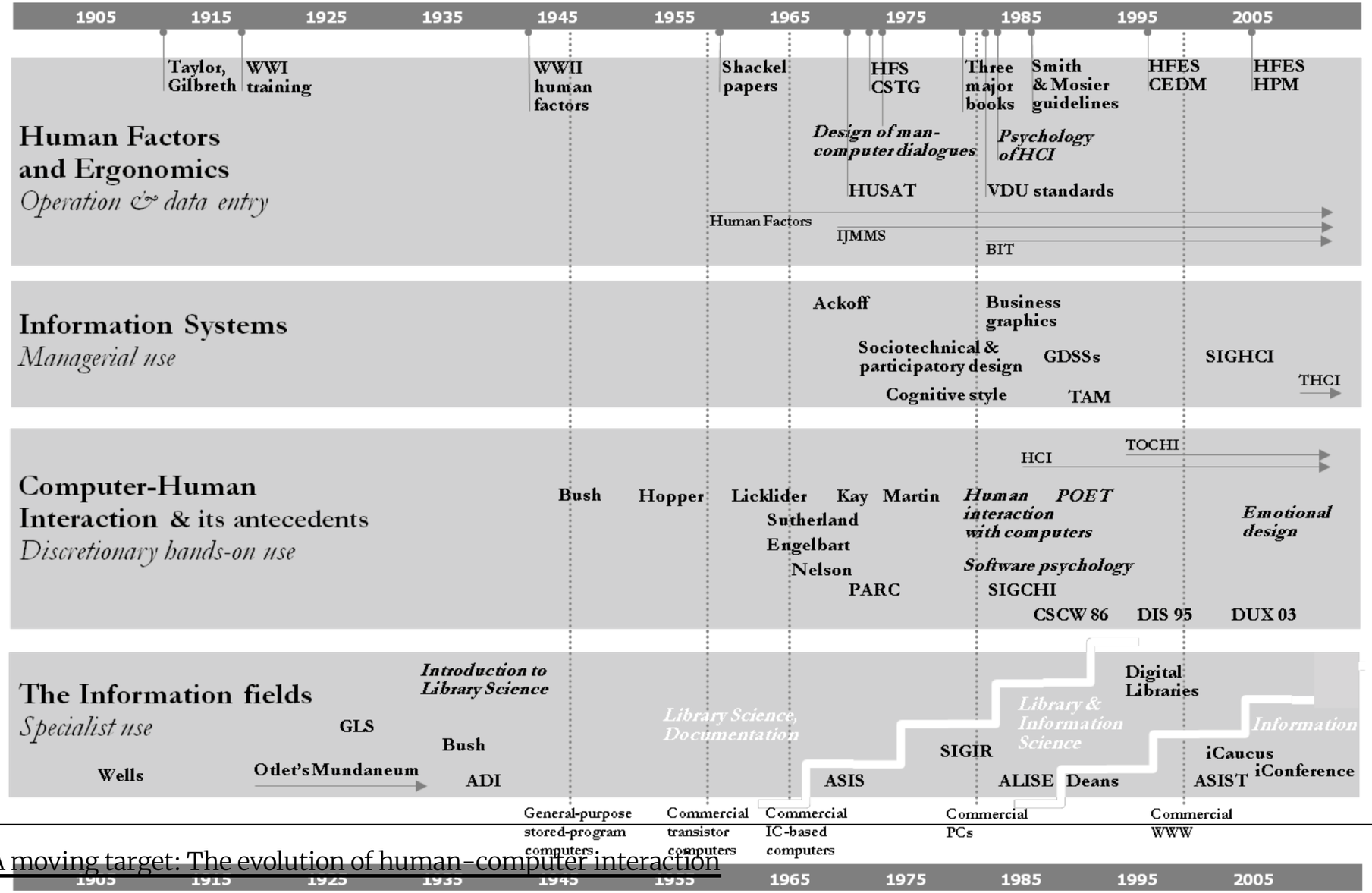
» Topic overview: *History of HCI*

» Provocation: *But what about AI?*

» Discussion

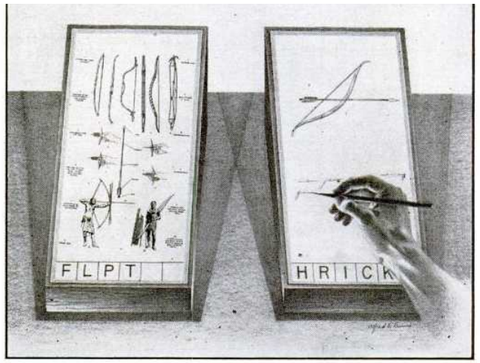
Topic overview:
History of HCI

1



[1]Grudin, 2012, A moving target: The evolution of human–computer interaction

1945 (Vannevar Bush)[2]



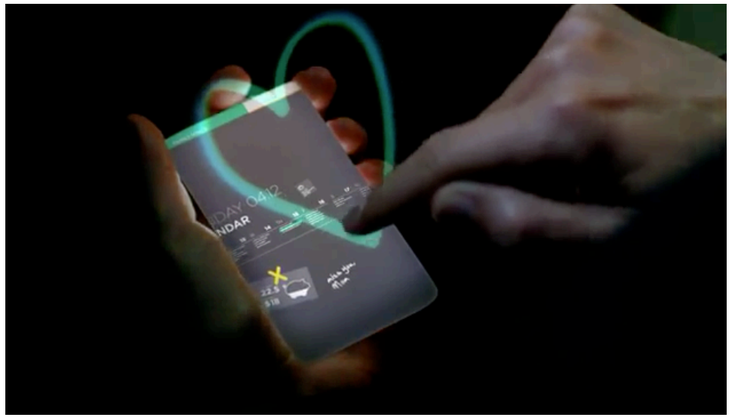
MEMEX IN USE is shown here. On one transparent screen the operator of the future writes notes and commentary dealing with reference material which is projected on the screen at left. Insertion of the proper code symbols at the bottom of right-hand screen

A SCIENTIST OF THE FUTURE RECORDS EXPERIMENTS WITH A TINY CAMERA FITTED WITH UNIVERSAL-FOCUS LENS. THE SMALL SQUARE IN THE EYEGLASS AT THE LEFT SIGHTS THE OBJECT

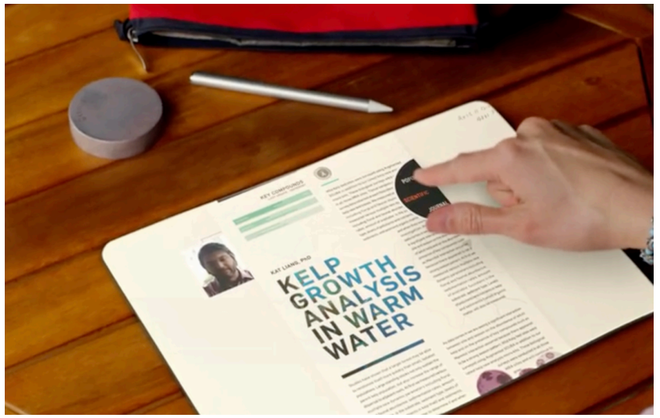
AS WE MAY THINK

A TOP U. S. SCIENTIST FORESEES A POSSIBLE FUTURE WORLD

2011 (Microsoft)



2015 (Microsoft)



[2] Wired, Microsoft, Microsoft

1940s[3]

Memex, 1945, Vannevar Bush, OSRD

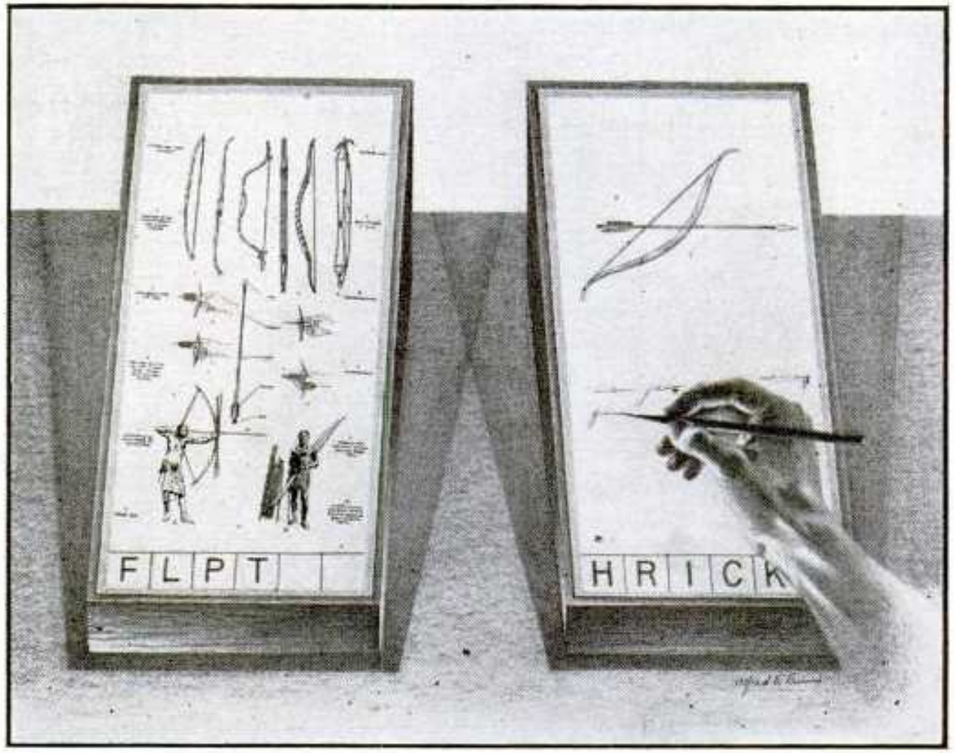
» Stores all records/articles/communications

» Items retrieved by indexing, keywords, cross-referencing

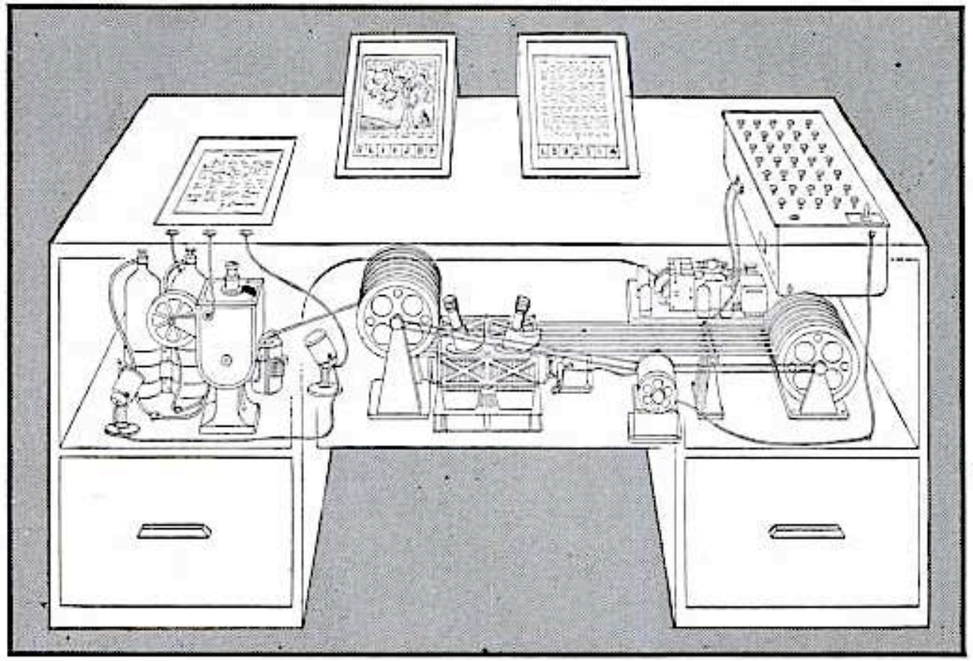
» Information linked through associative trails

[3] Image source

4



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

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."

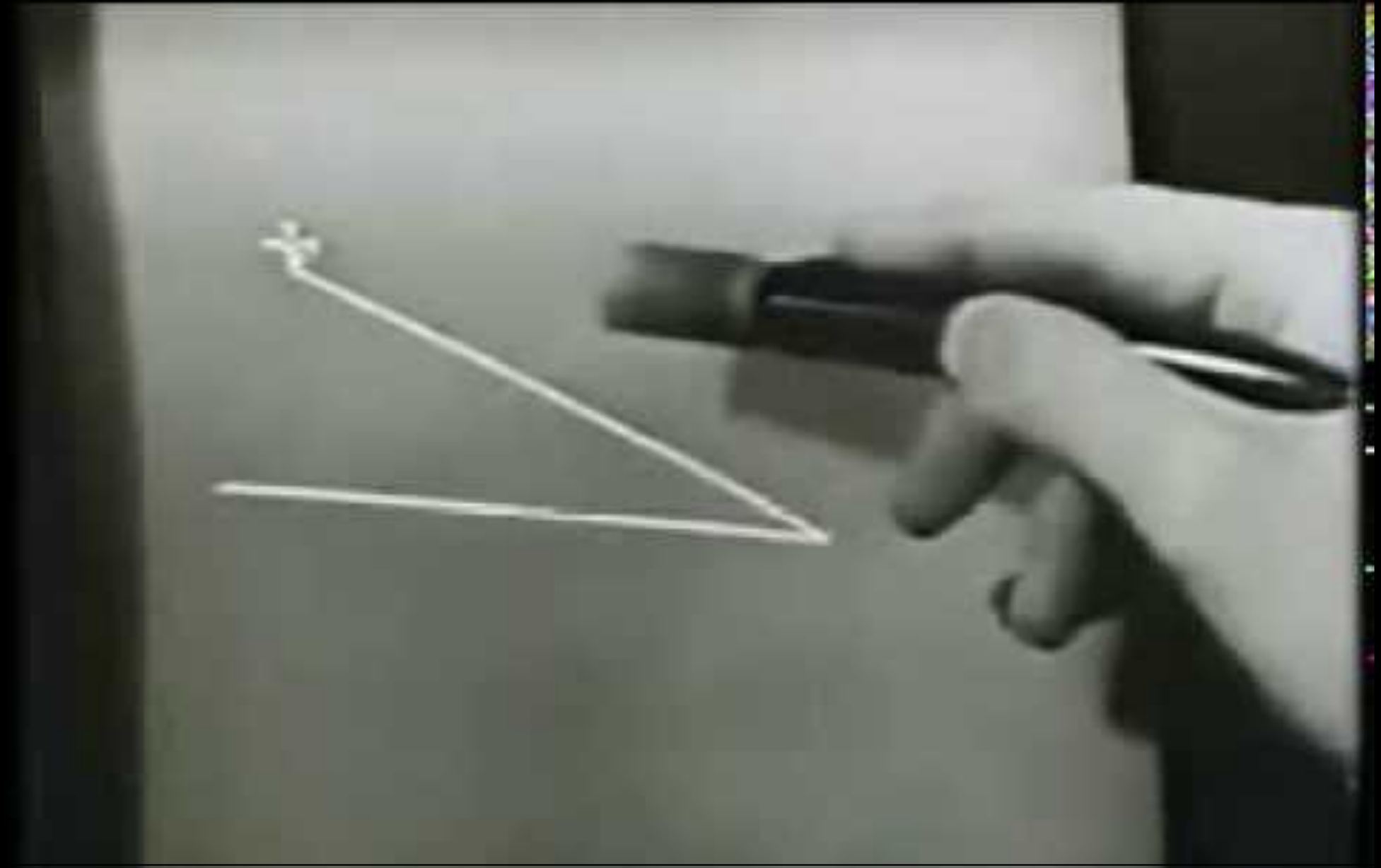
[5] Image source

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

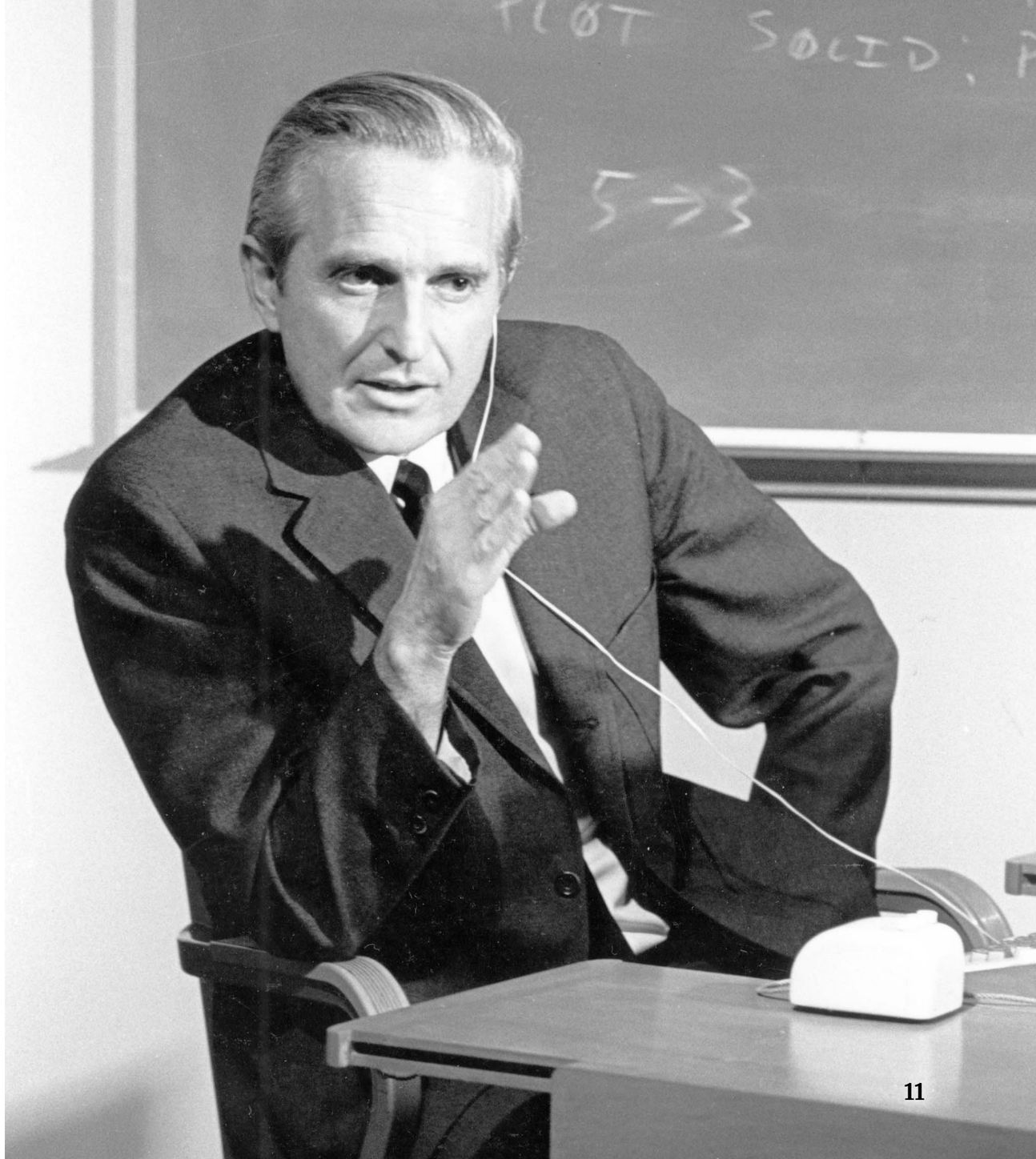
[6] Image source



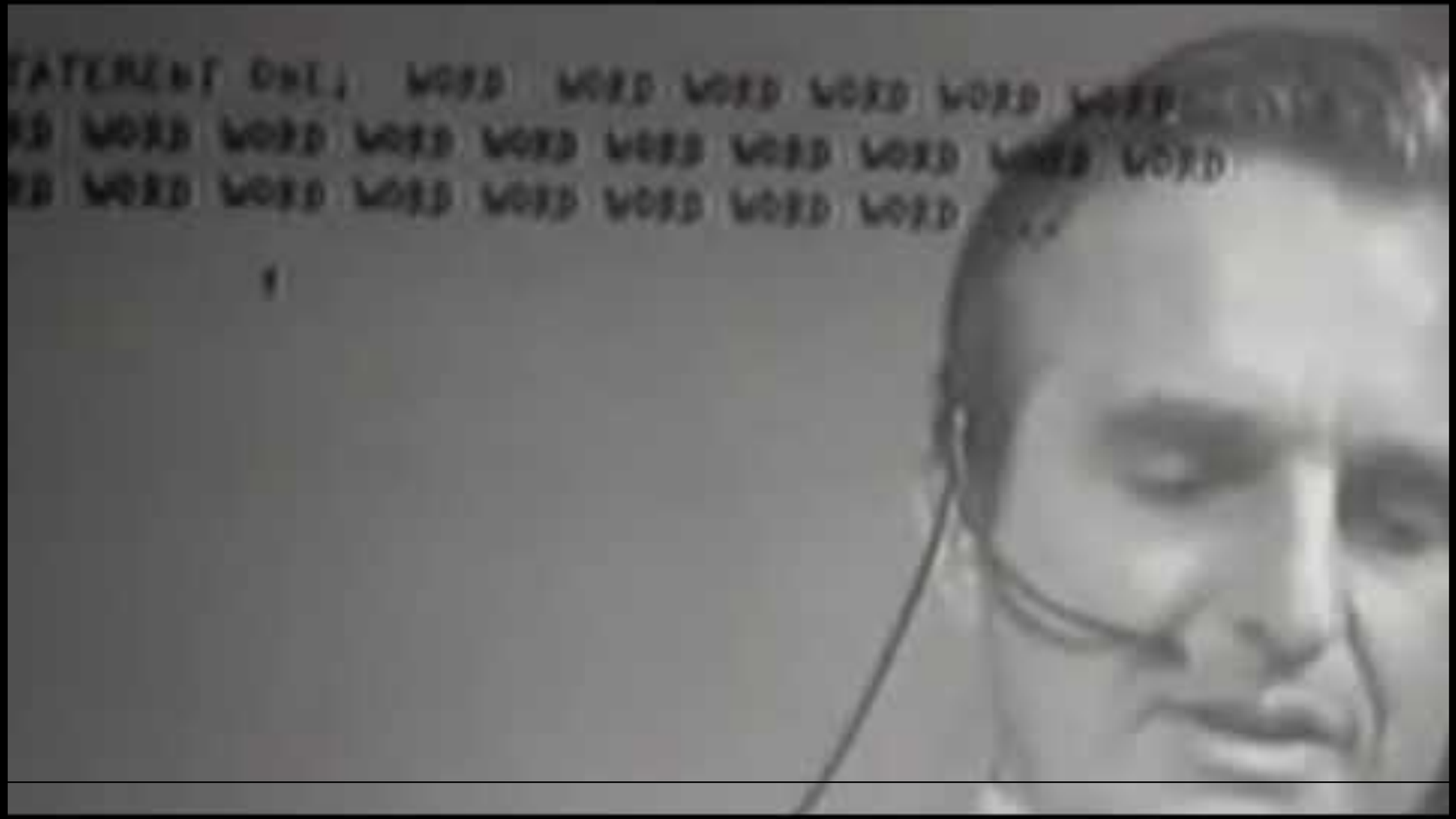
1960s[8]

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

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



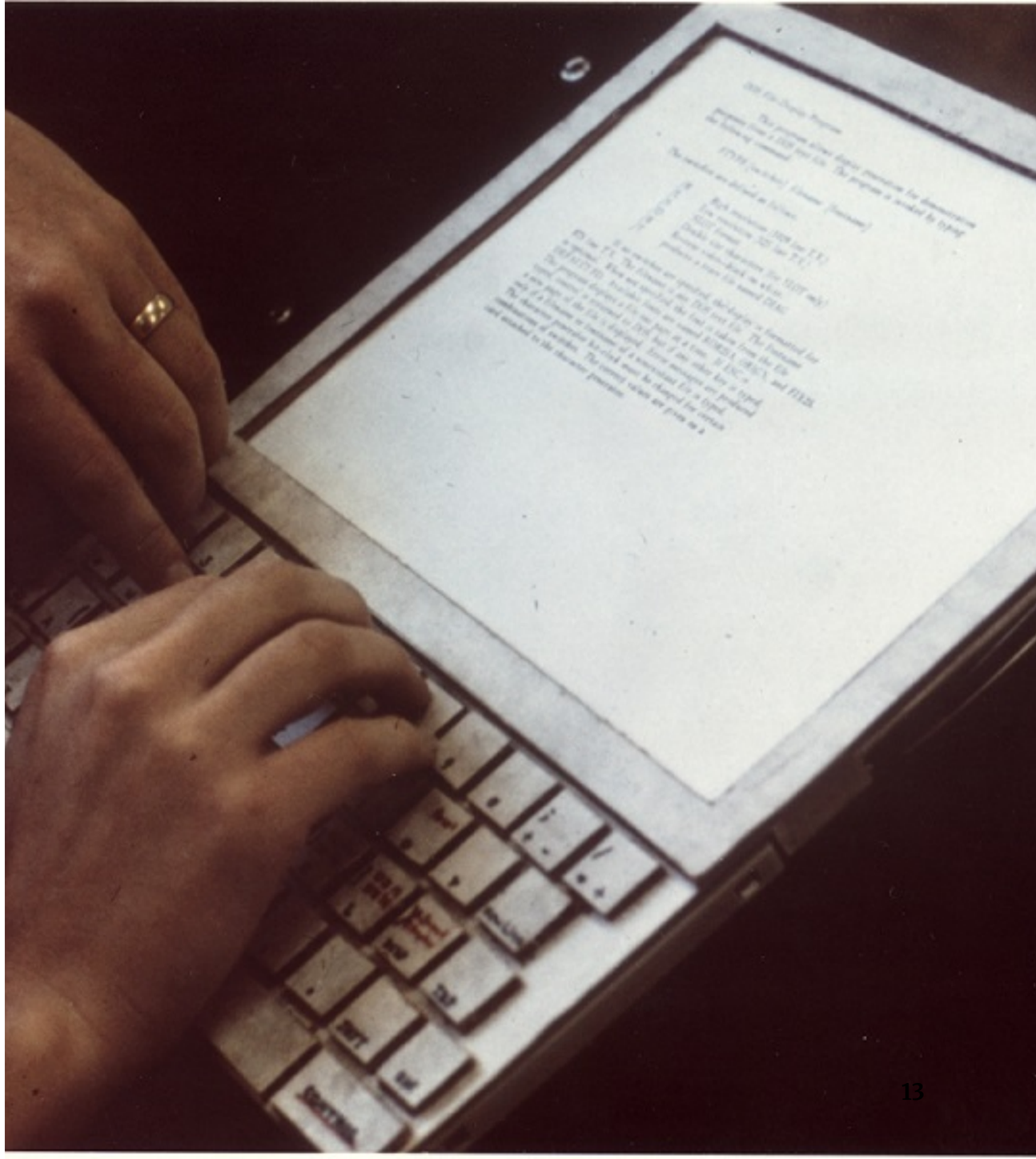
[8] Image source



1960s[10]

Dynabook, 1968, Alan Kay, Xerox PARC

The Dynabook mockup introduced *personal computer*, *desktop interface*



[10] Image source

1970s

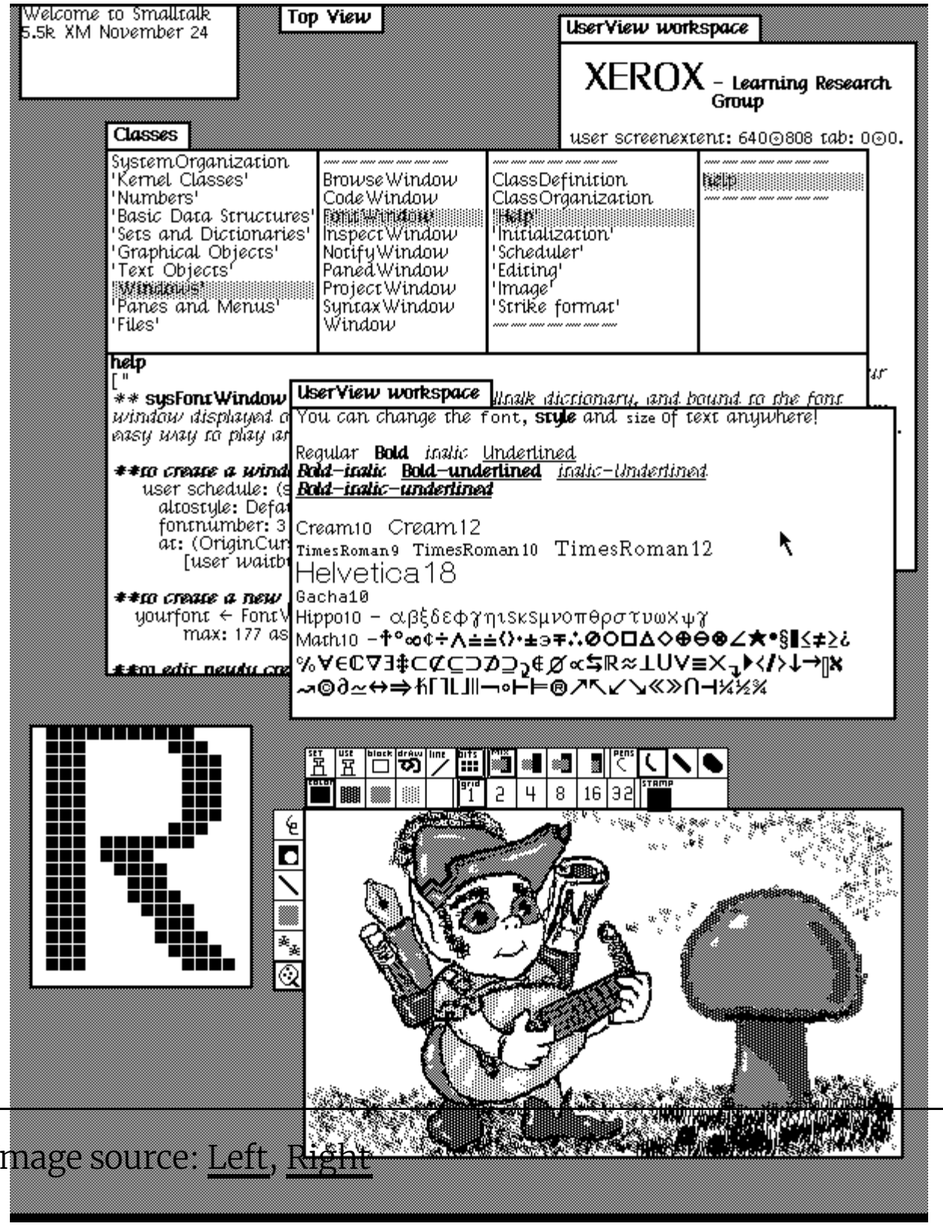
Xerox Alto, 1973, Xerox PARC[11] [12]

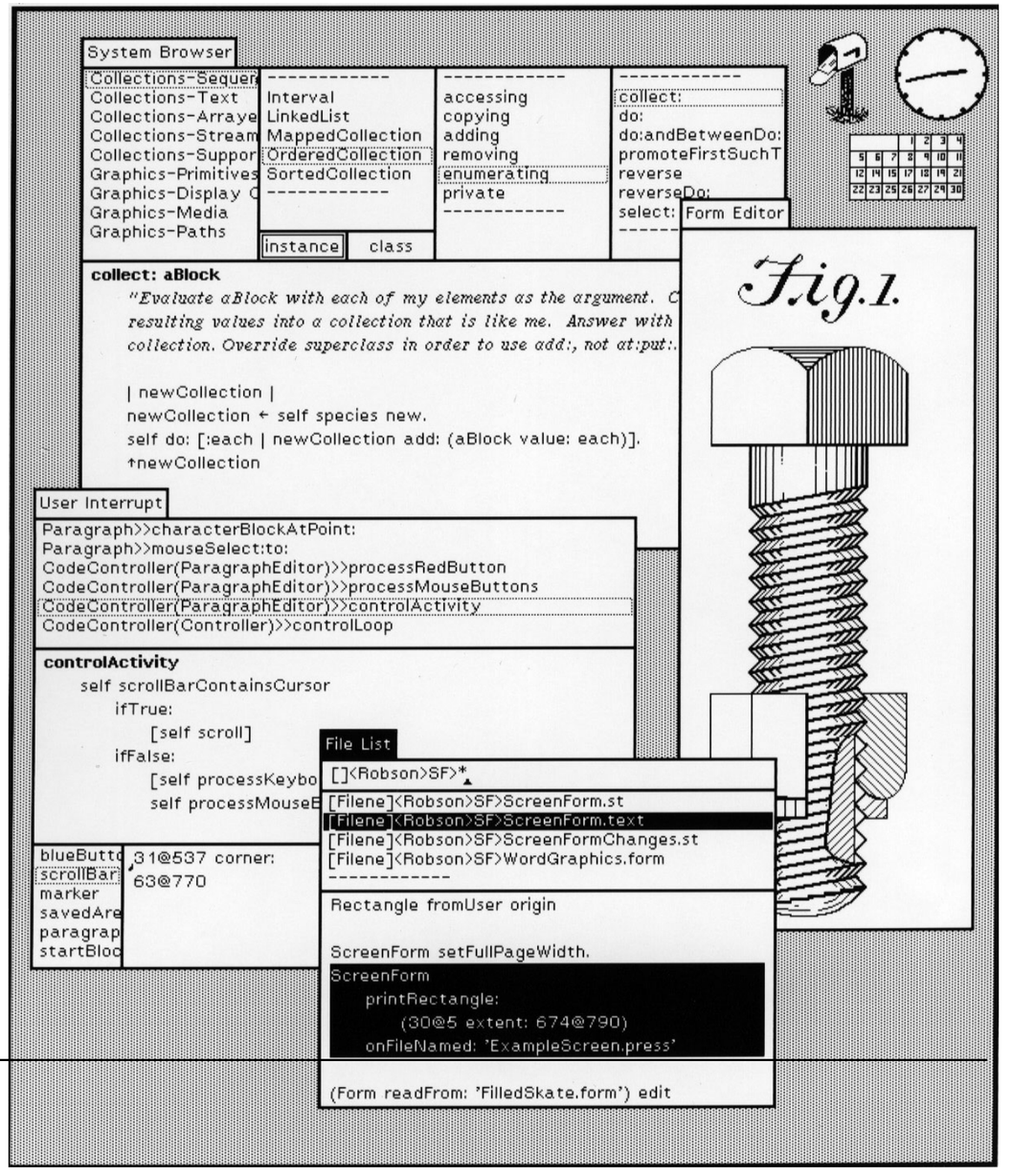
The first computer to support an OS based on a GUI that integrated the ideas developed for Dynabook: the *desktop metaphor*, *GUI*, *ethernet*

[11] Wikipedia: Xerox Alto

[12] Image source

13





[13] Image source: Left, Right

1970s [14]

Apple II, 1977, Apple

First mass production personal computer, color graphics

[14] Image source

1980s[15] [16] [17]

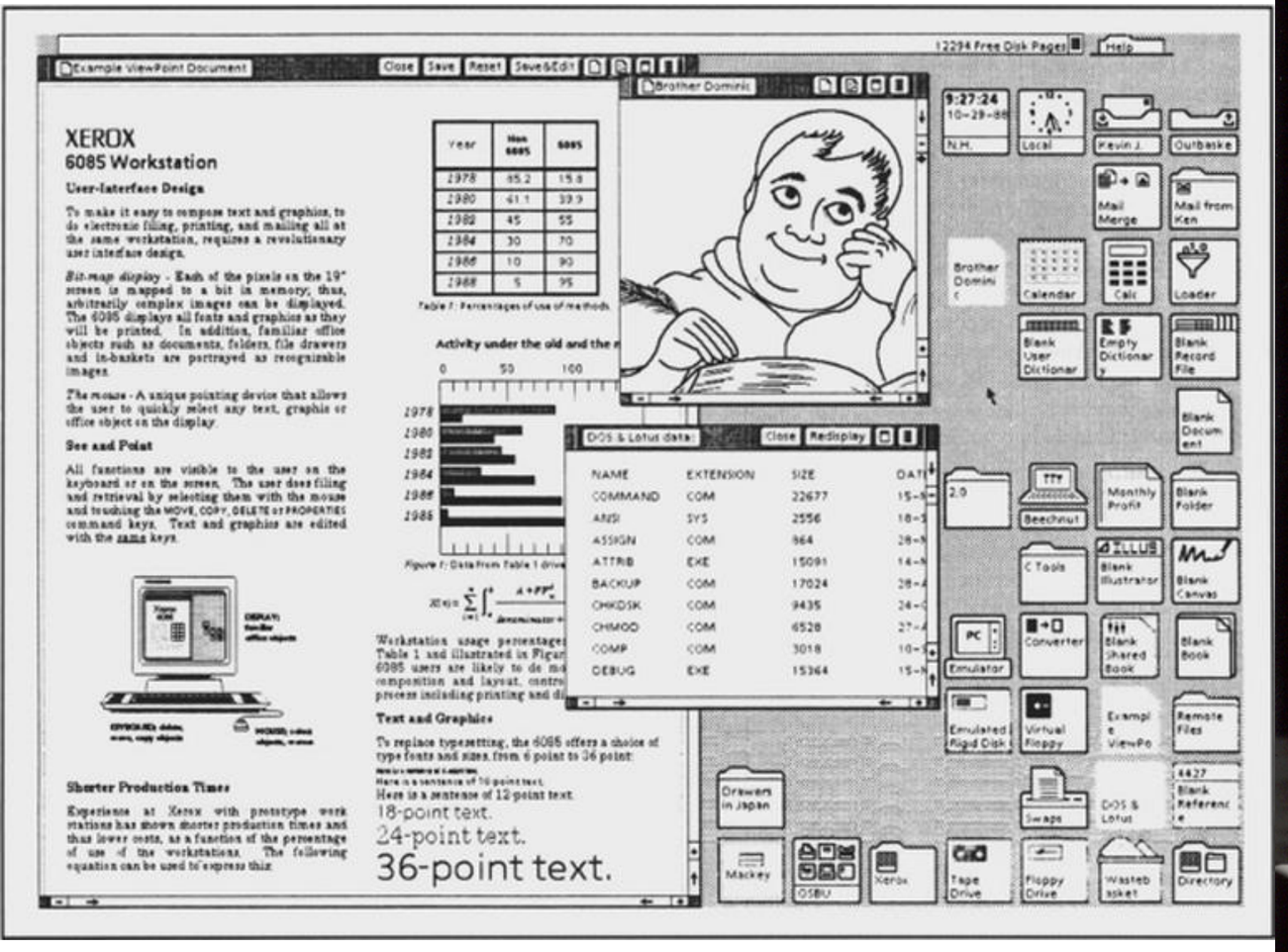
Xerox Star, 1981, Xerox PARC

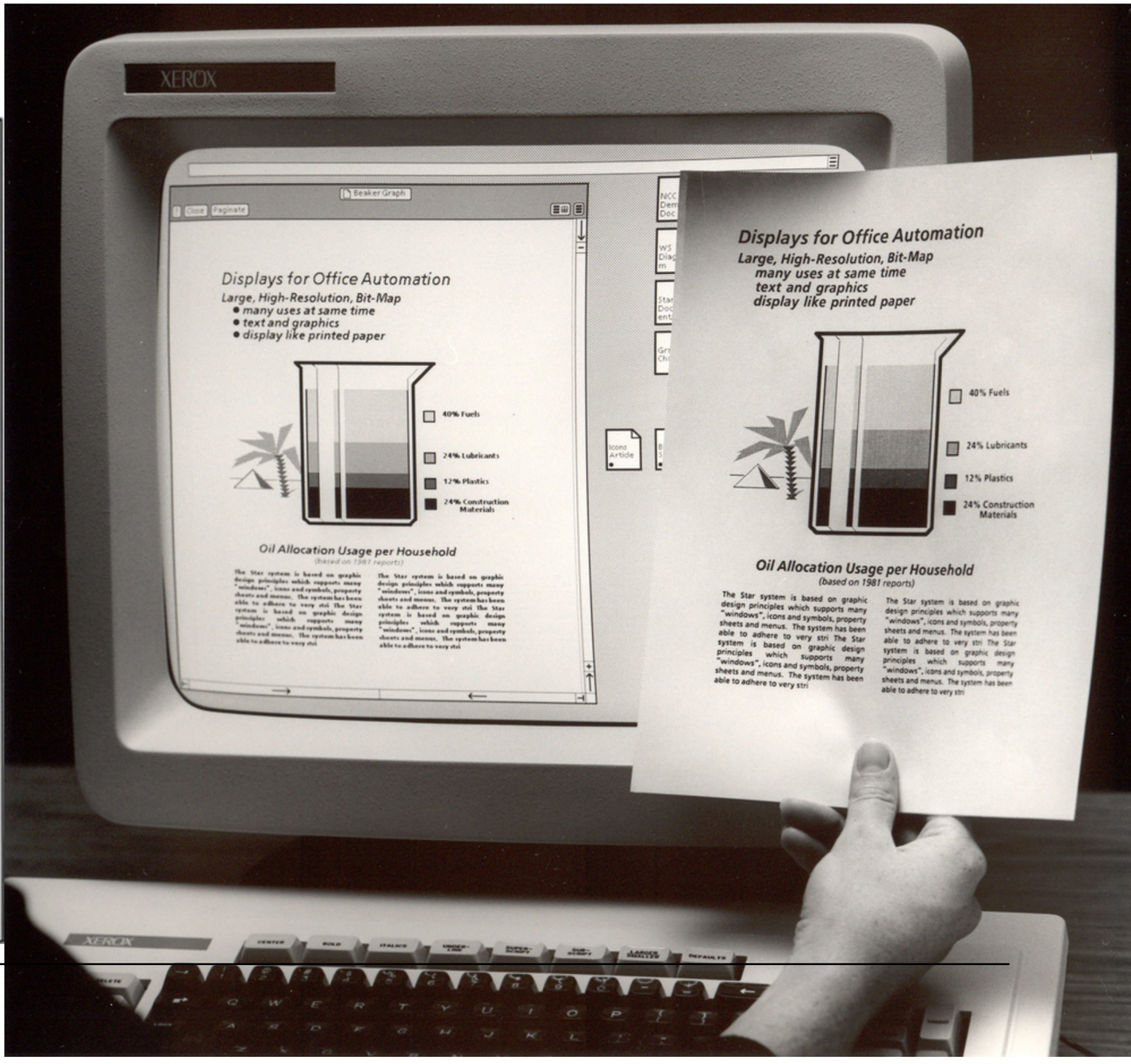
First commercial system with a user interface that integrates today's technologies, including *windows*, *icons*, *folders*, *mouse*, etc.

[15] Wikipedia: Xerox Star

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

[17] Image source





[18] Image source: Left, Right

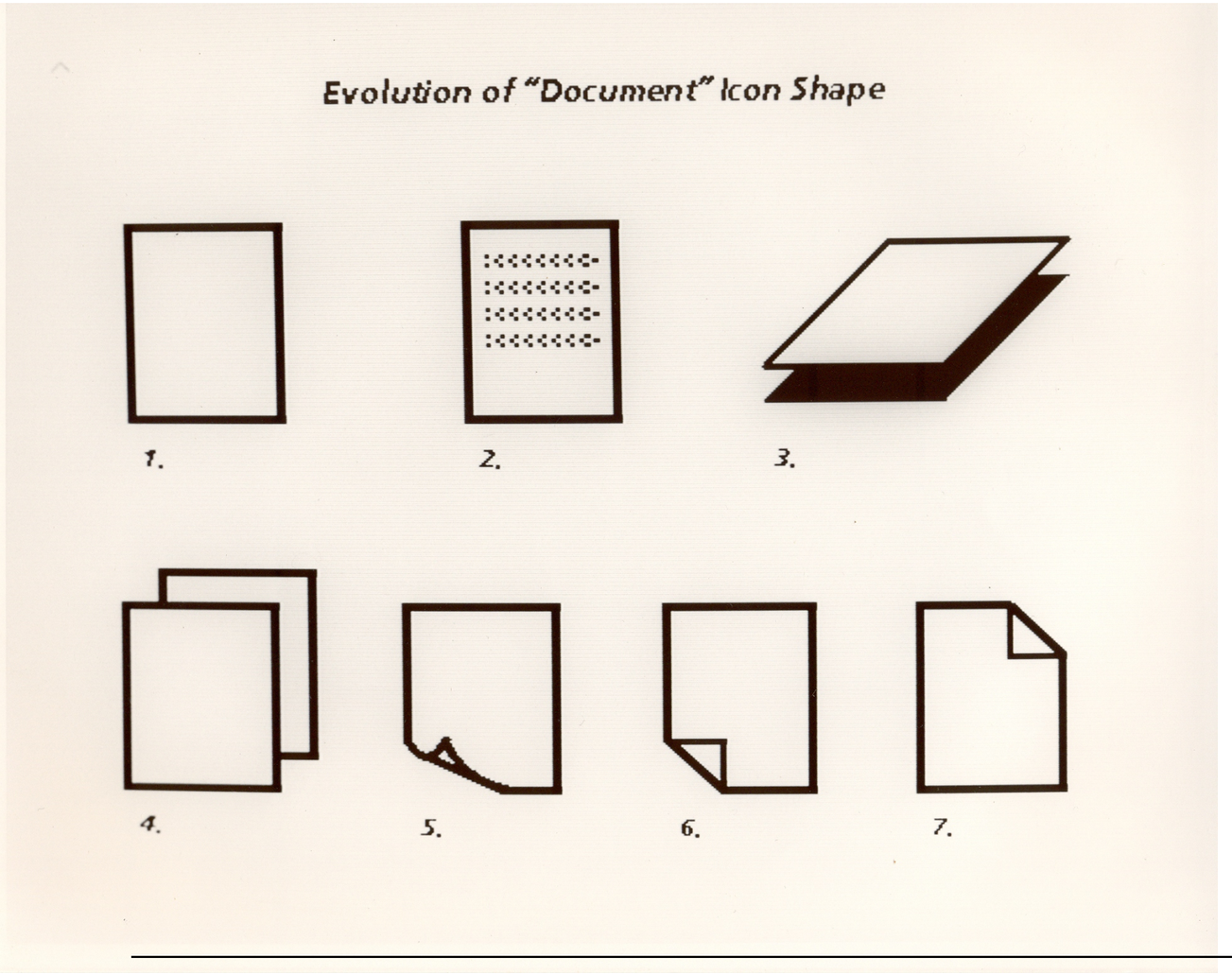
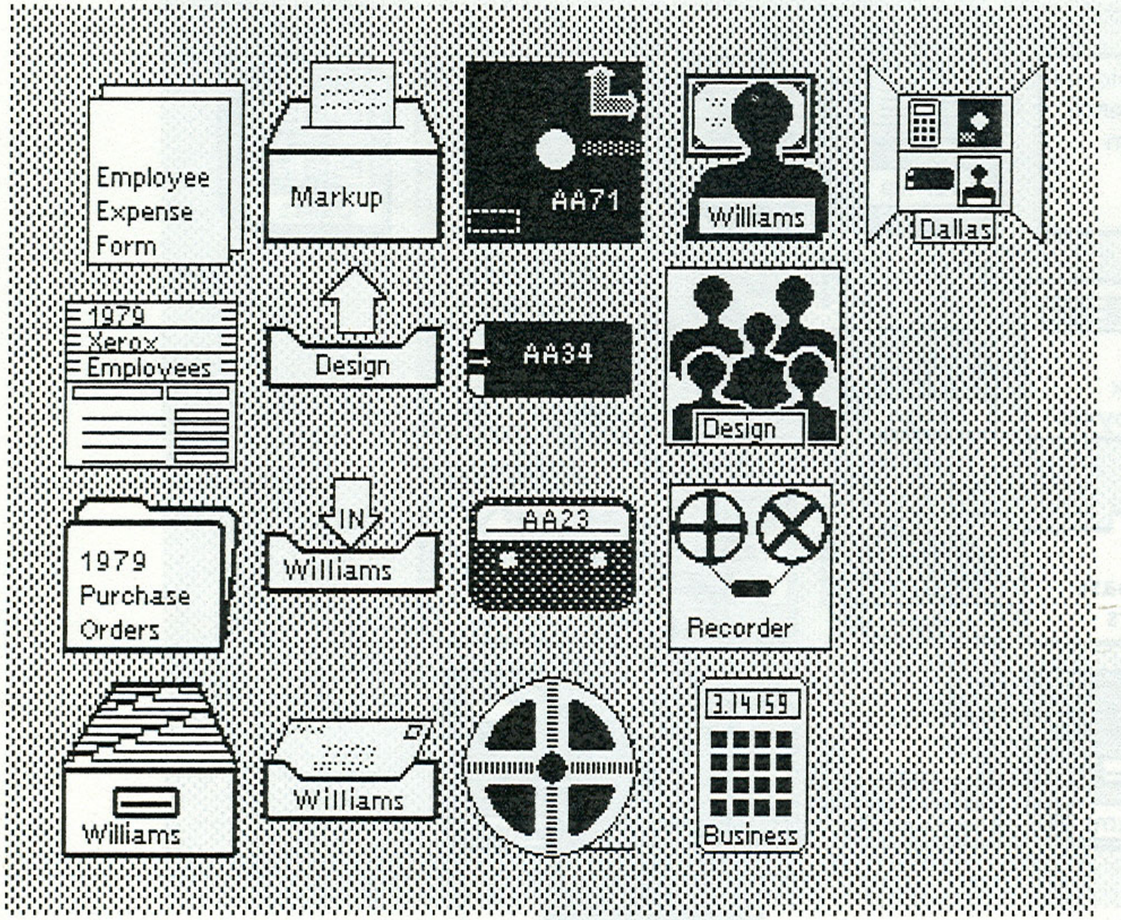


Figure 4.
Set 4 (Judd)



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 [29]

User testing of Xerox Star

The design effort took more than six years .... The actual implementation involved from 20 to, eventually, 45 programmers over 3.5 years producing over 250,000 lines of high level code.

By the time of the initial Star release, the Functional Test Group had performed over 15 distinct human-factors tests, using over 200 experimental subjects and lasting for over 400 hours.

[29] Bewley et al.

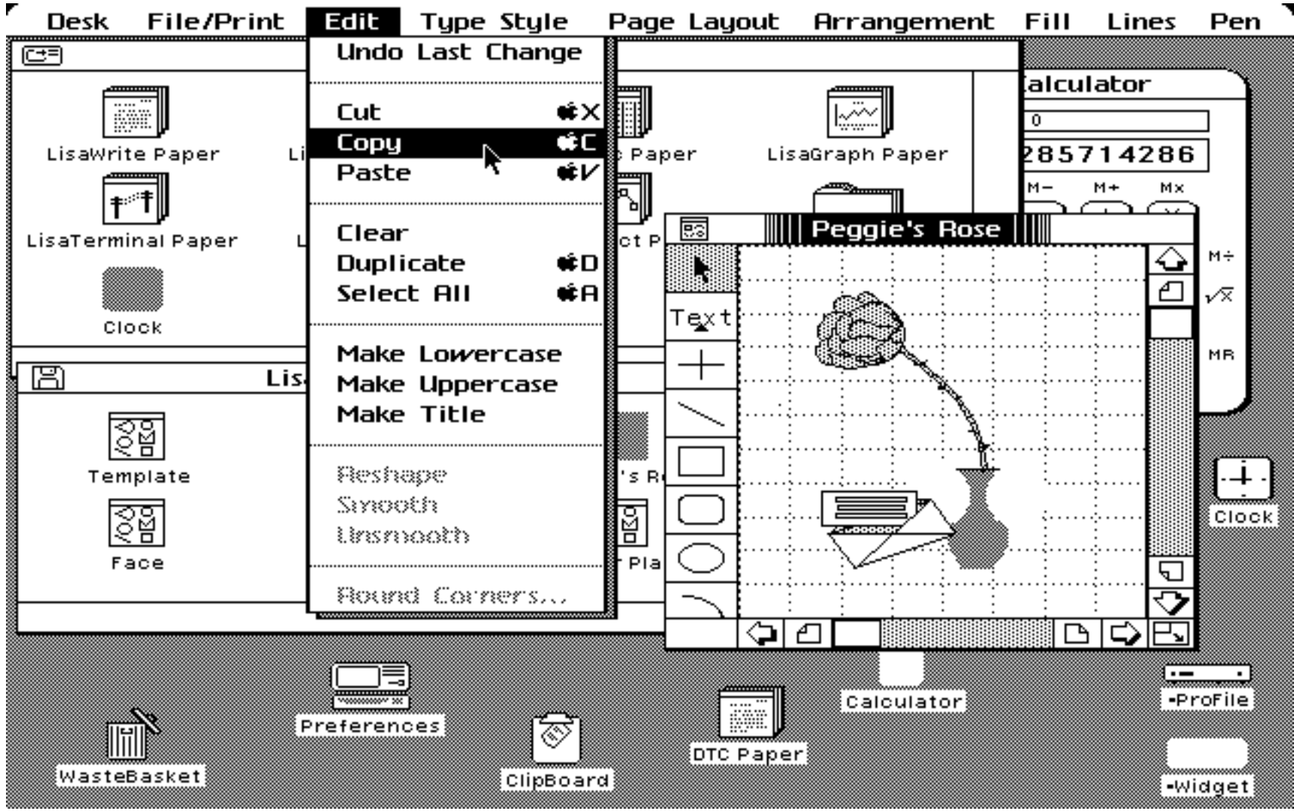
Test Topic	No. Sub	Tot. Hrs	Impact
Selection Schemes	28	64	Lead to new design; validated new scheme
Keyboard (6 layouts)	20	40	Led to design of keyboard
Display	20	10	Specified display phosphor and refresh rate
Tab-indent	16	16	Caused redesign of Tab and Indent functionality
Labels	12	6	Caused change in property sheet and keyboard labels
Property Sheets	20	40	Identified potential interface problems and redesigns
Fonts	8	6	Led to decision on screen-paper coordination
Icons	20	30	Led to design of icons
Initial Dialogue	12	36	Led to design of training facility and materials
HELP	2	6	Validated HELP design ideas
Graphics	10	65	Led to redesign; validated new design
Graphic Idioms	4	16	Contributed to redesigns
J-Star Labels	25	25	Led to design of keyboard labels for Japanese-Star

Figure 8. Partial listing of Star-1 Functional Tests

1980s [28]

Apple Lisa, 1983, Apple

Included many user interface innovations, including *pull-down menus, dialog boxes, one-button mouse*

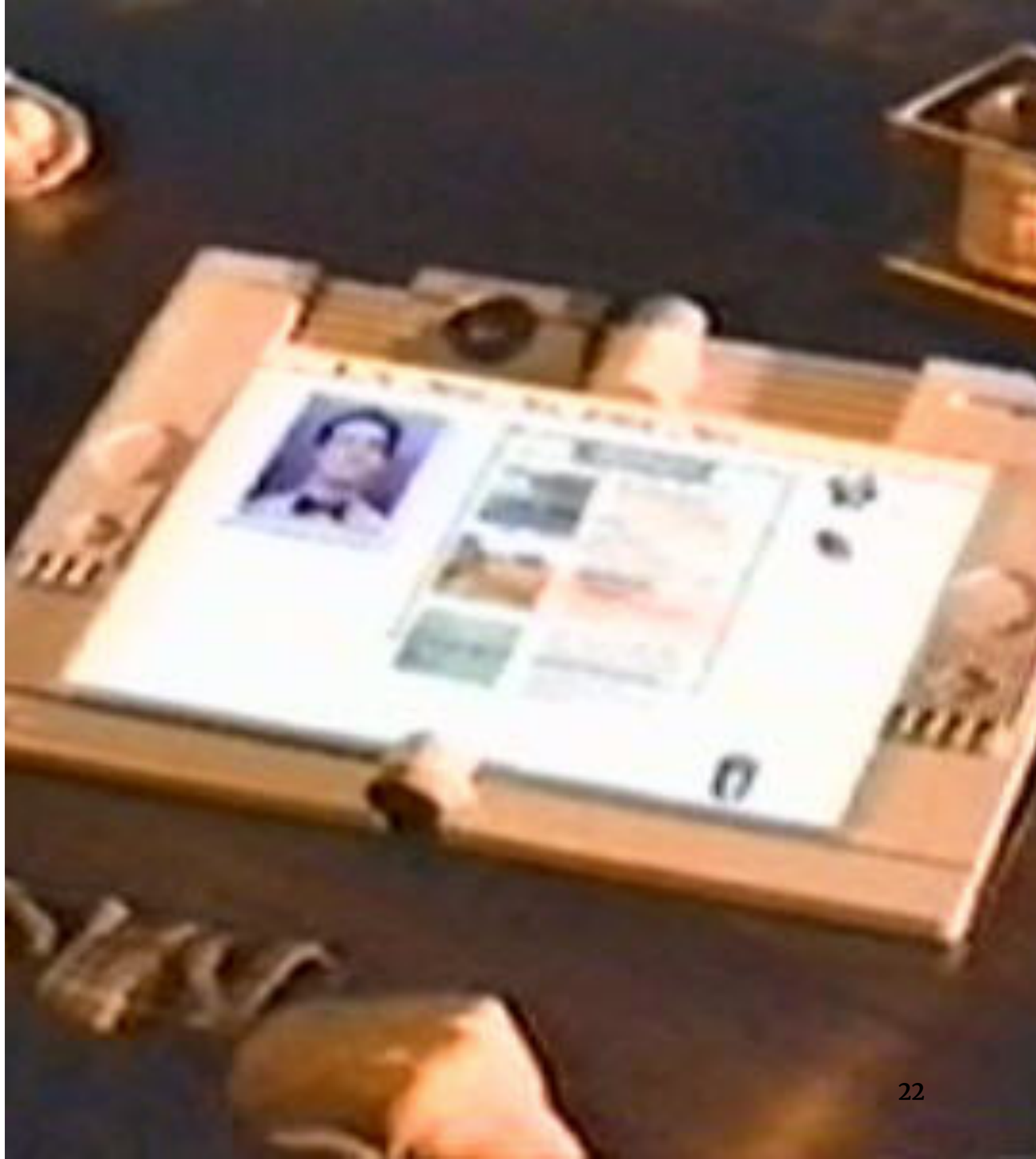


[28] Ars Technica

1980s [20]

The Knowledge Navigator, 1987, Hugh Dubberly, Apple ATG

Vision introduced *speech interfaces*, *virtual agents*



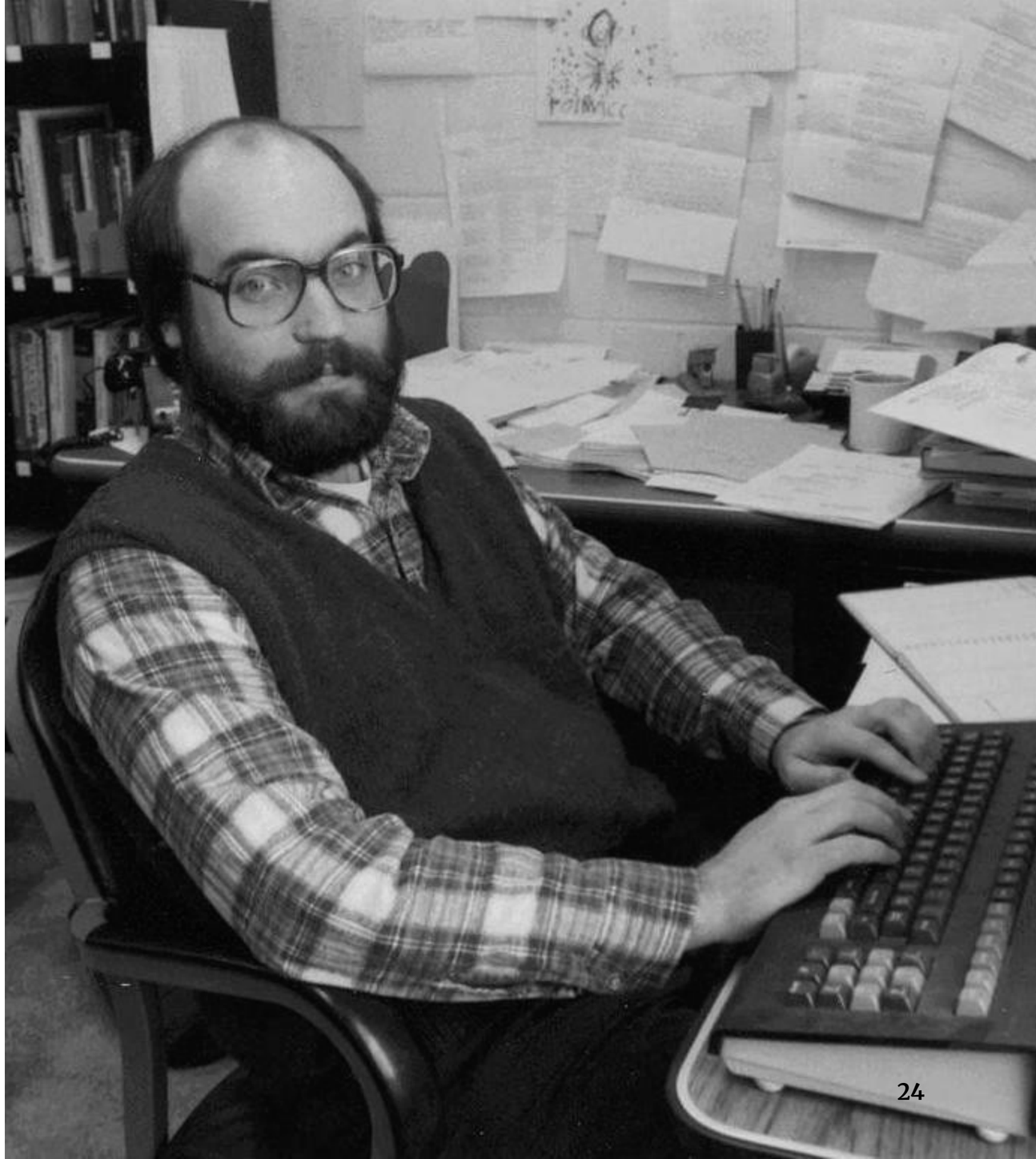
[20] Image source

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."

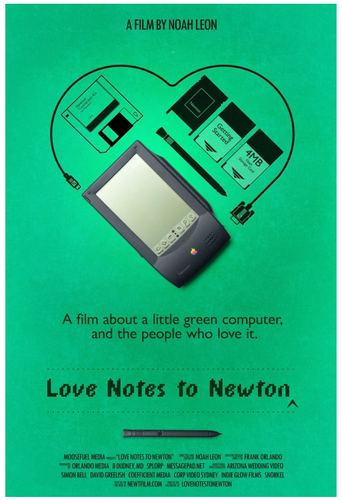


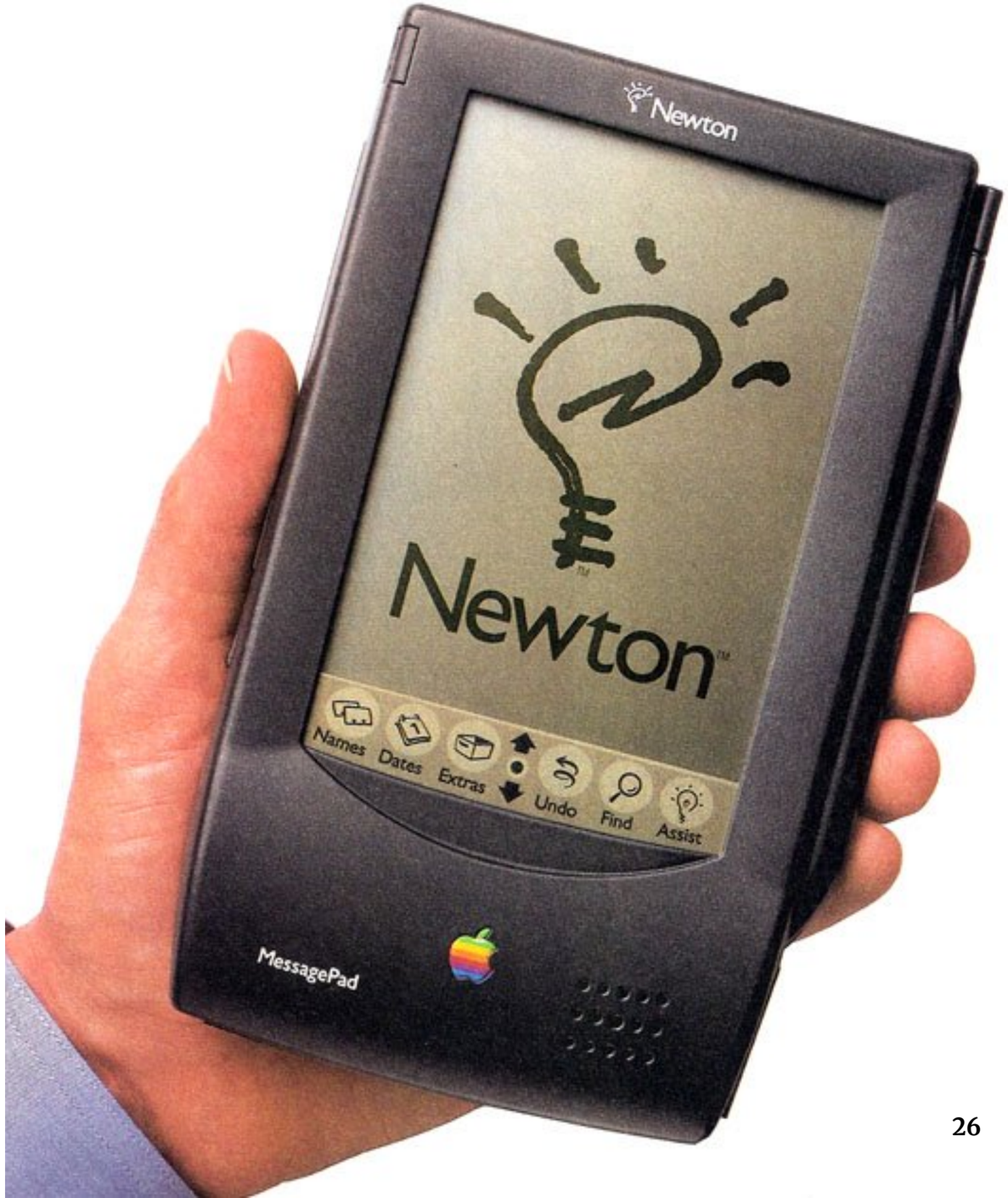
[22] Image source

1990s[24]

Apple Newton, 1992, Apple

The first handheld, wireless communication assistant; interaction using a stylus; $699!





[24] IMDb, The Register UK

1990s[26]

Clearboard, 1992, Hiroshi Ishii, NTT

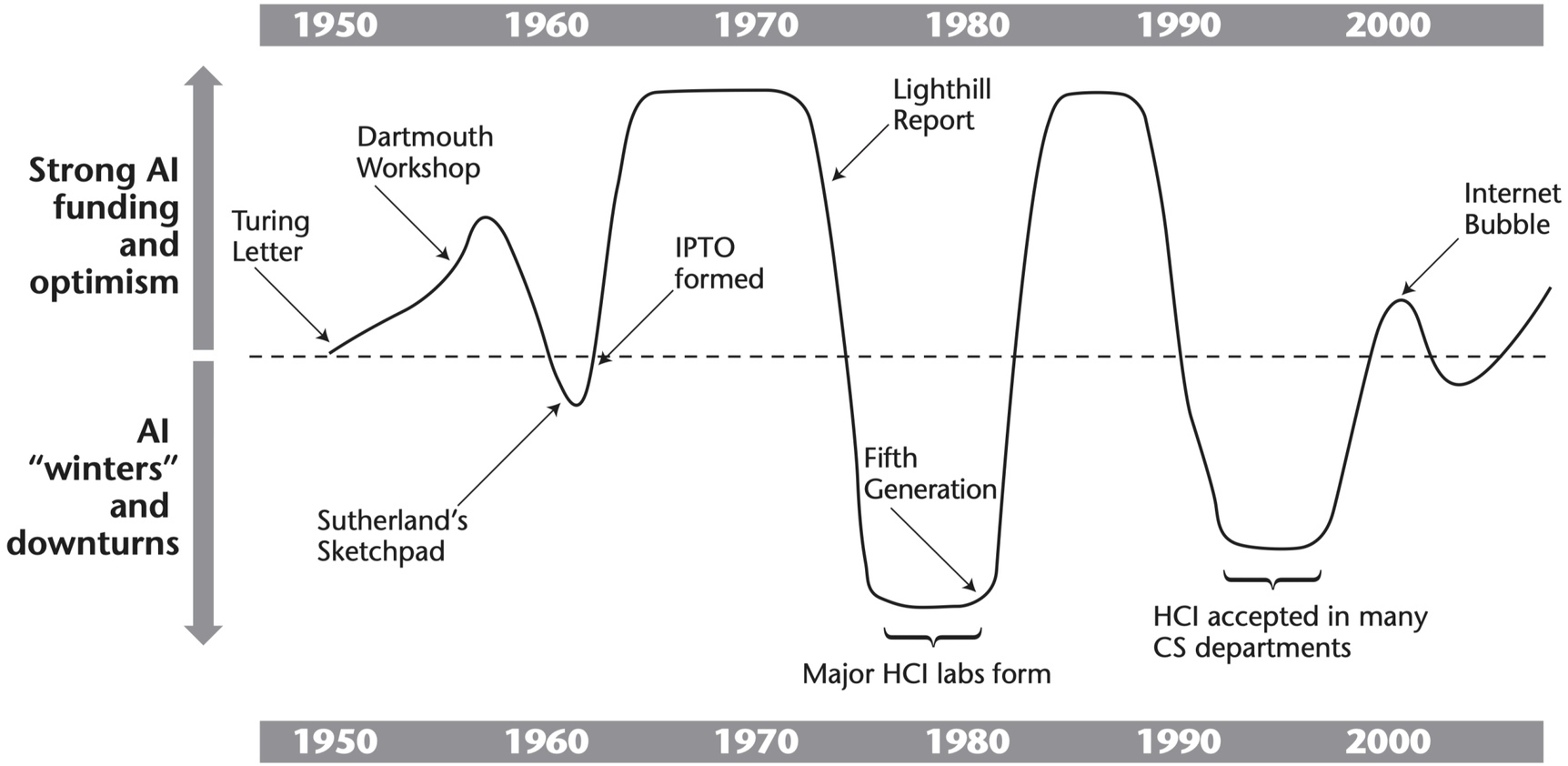
Prototype introduced *shared visual workspace*, *matched reference points*, *videoconferencing*

[26] Image source

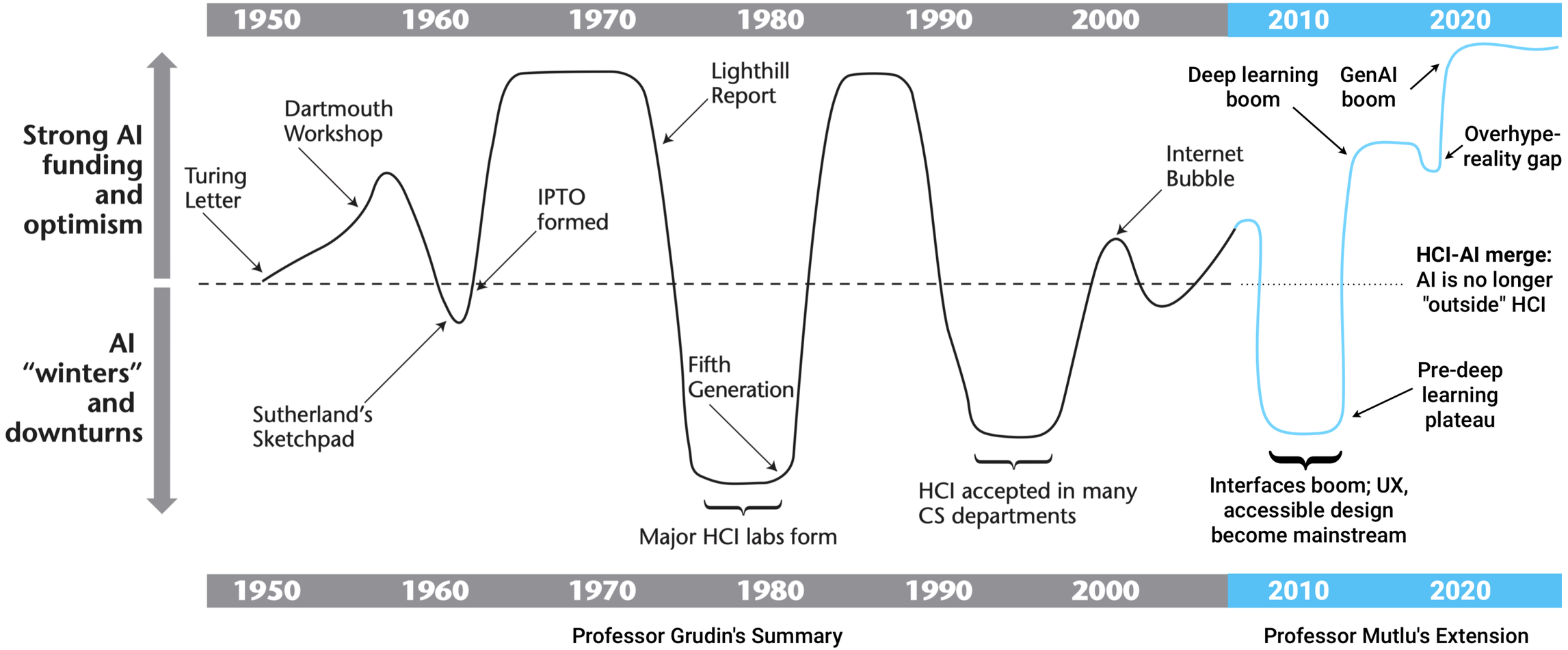
27

[27] Vimeo

But what about *AI*?



[30] Grudin, 2009, AI and HCI: Two fields divided by a common focus. *AI Magazine*.


1950
1960
1970
1980
1990
2000
2010
2020
Strong AI funding and optimism
AI "winters" and downturns
Turing Letter
Dartmouth Workshop
IPTO formed
Lighthill Report
Sutherland's Sketchpad
Fifth Generation
Major HCI labs form
Internet Bubble
HCI accepted in many CS departments
Deep learning boom
GenAI boom
Overhype-reality gap
HCI-AI merge: AI is no longer "outside" HCI
Pre-deep learning plateau
Interfaces boom; UX, accessible design become mainstream
1950
1960
1970
1980
1990
2000
2010
2020
Professor Grudin's Summary
Professor Mutlu's Extension

HCI-AI Convergence

- **Integration of Strengths:** AI now provides the adaptive, predictive, and generative capabilities; HCI ensures these are usable, understandable, and trustworthy.
- **Human–AI Partnership:** Systems are increasingly designed with humans in the loop, blending automation with interaction, explanation, and co-creation.
- **Shared Responsibility:** Both fields converge around ethics, accessibility, and societal impact, making value-sensitive design central to AI's future.

👉 AI needs HCI to succeed in practice, and HCI increasingly depends on AI as its material

Discussion

Discussion Format

- We'll let AI randomly pick 3-5 names
- In the selected order, students:
  - Present their provocation/critical artifact/policy or design recommendation (30 secs)
  - Lead class discussion (5-8 min)

What's Next?

- **Wednesday:**
  - Read *Chapter 1 - Introduction to HCI research* from textbook
  - Be prepared to choose a research topic and a team