

Foundations

MICHAEL BERNSTEIN

CS 376

THANKS TO JEFF HEER AND SCOTT KLEMMER

Course Overview

INTRO	week 1	Intro to Interaction; Intro to Social Computing
	week 2	Intro to Design; Interaction
DEPTH	week 3	Interaction; Social Computing
	week 4	Social Computing
	week 5	Design
BREADTH	week 6	AI+HCI; Media
	week 7	Foundations
	week 8	Access; Programming
	week 9	Collaboration; Visualization
	week 10	Education; Critiques of HCI

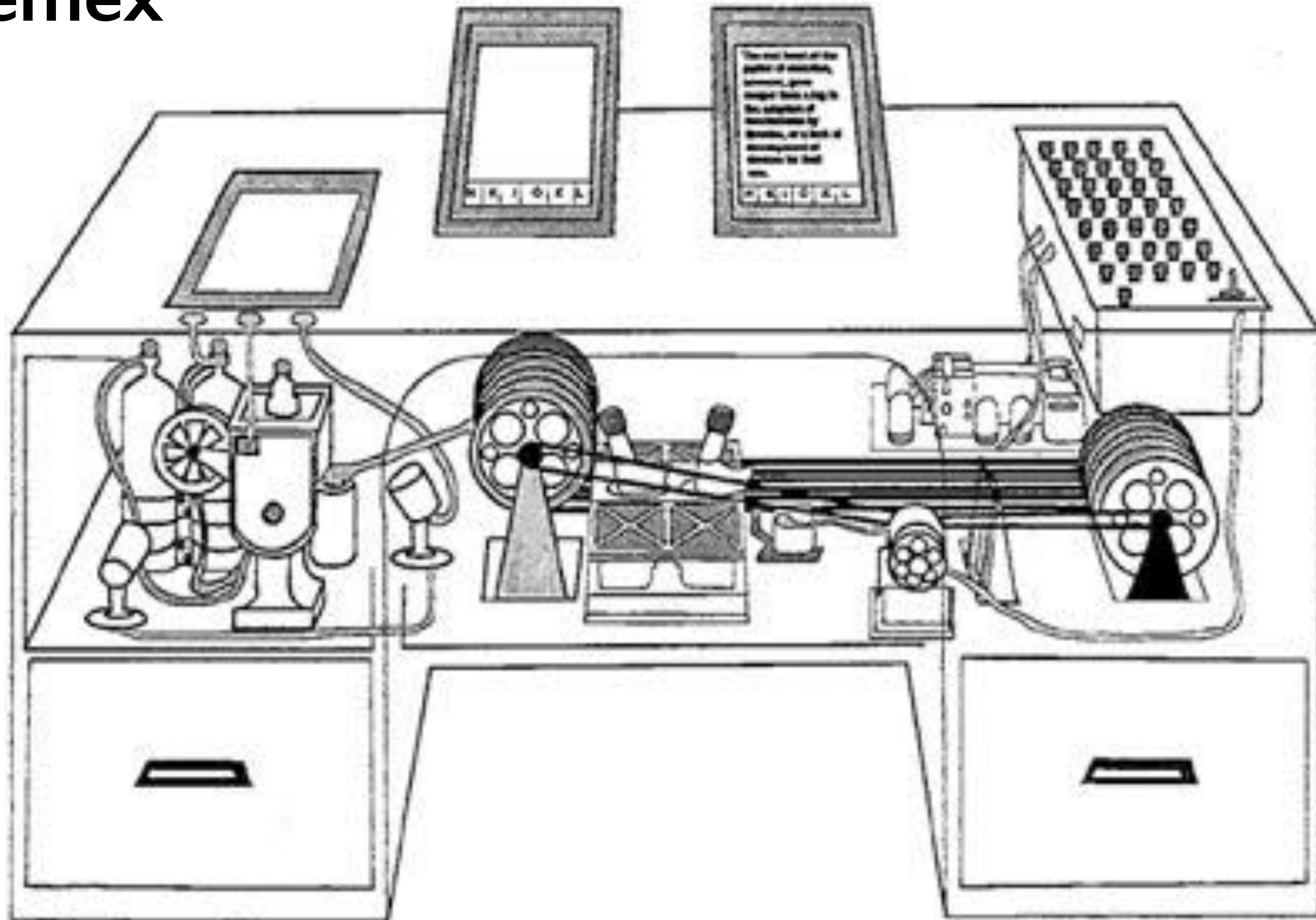
Today: an
incomplete history
of foundational HCI
research

YOU READ THIS

As We May Think
Vannevar Bush, 1945

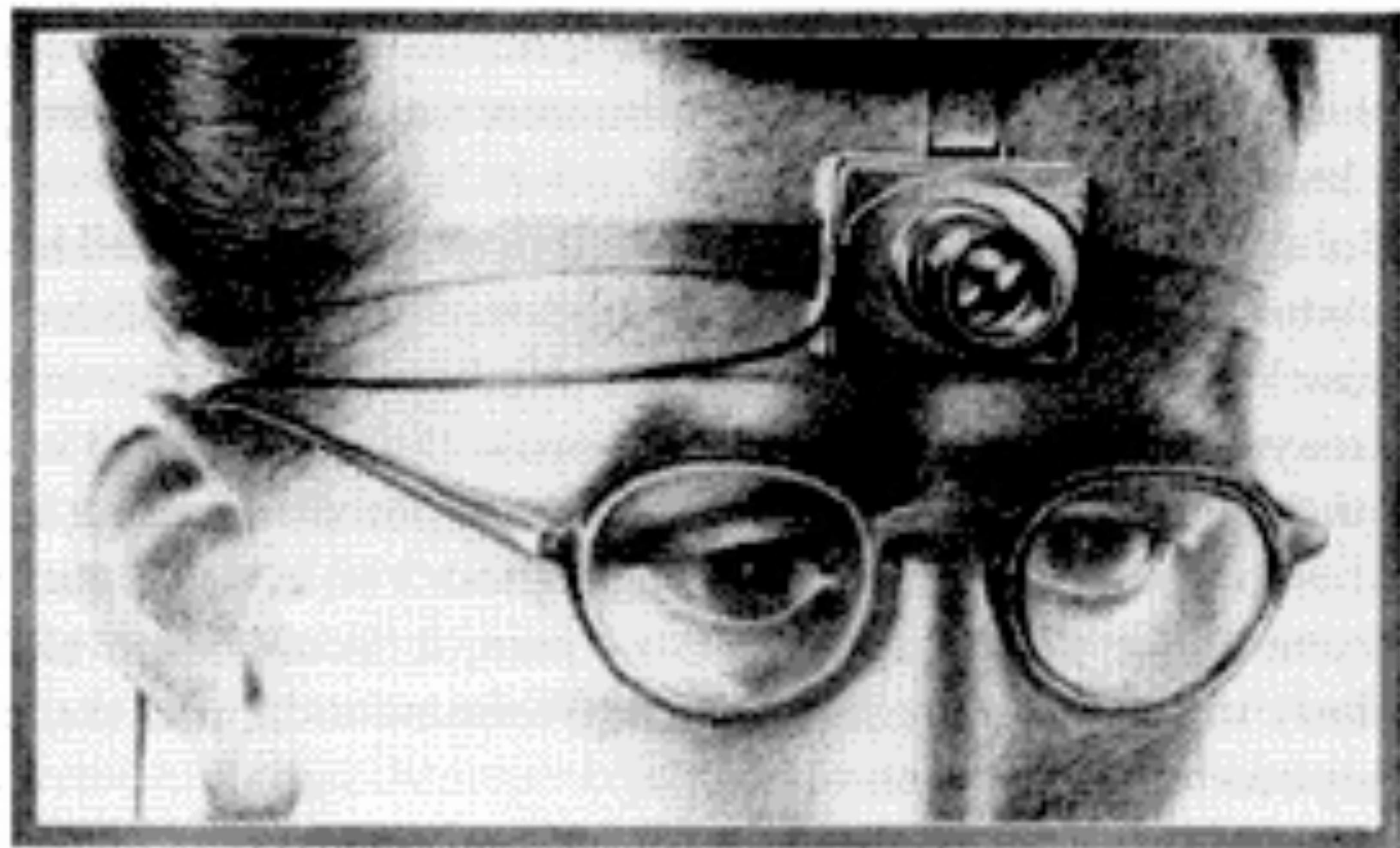


The Memex



YOU READ THIS

**What innovations
did Vannevar Bush
foresee?**



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 (*LIFE* 19(11), p. 112).

“There is a new profession of **trail blazers**, those who find delight in the task of establishing useful trails through the enormous mass of the common record. The **inheritance from the master becomes**, not only his additions to the world’s record, but **for his disciples the entire scaffolding** by which they were erected.”

Memex
inspires Ivan
Sutherland



Sketchpad
Ivan Sutherland, 1963

INK



Memex also
inspires Doug
Engelbart

NLS: Mouse, Hypertext



CONTROL TECHNIQUES
CONTROL DEVICES
CONTROL DIALOGUE
CONTROL METALANGUAGE

1

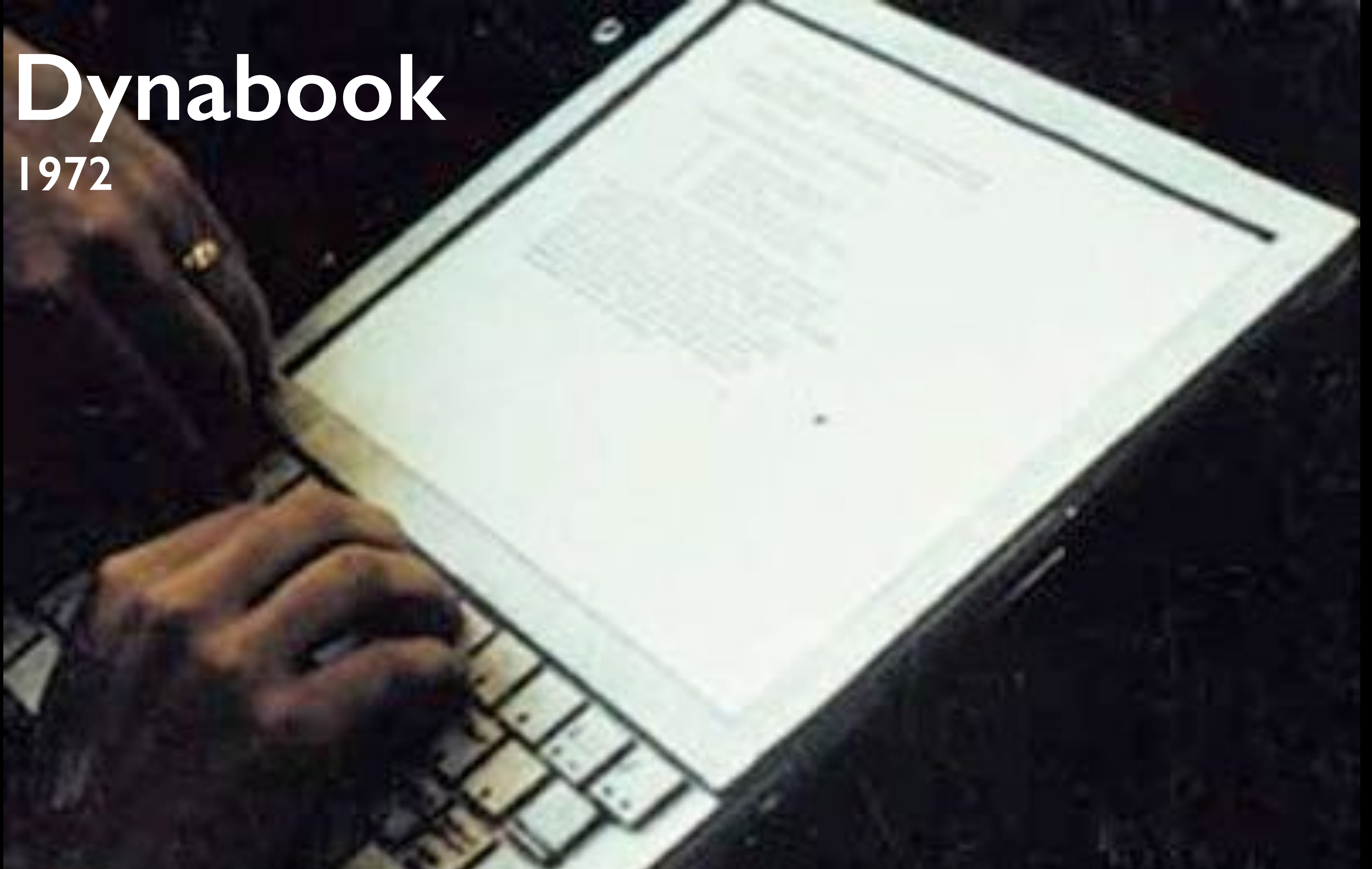
The Mother of All Demos
Doug Engelbart, 1968

The NLS inspires
Sutherland's PhD
student, Alan Kay

*“The best way to
predict the future is
to invent it”*

Dynabook

1972



**Xerox PARC
draws on
Engelbart and
Kay's ideas**

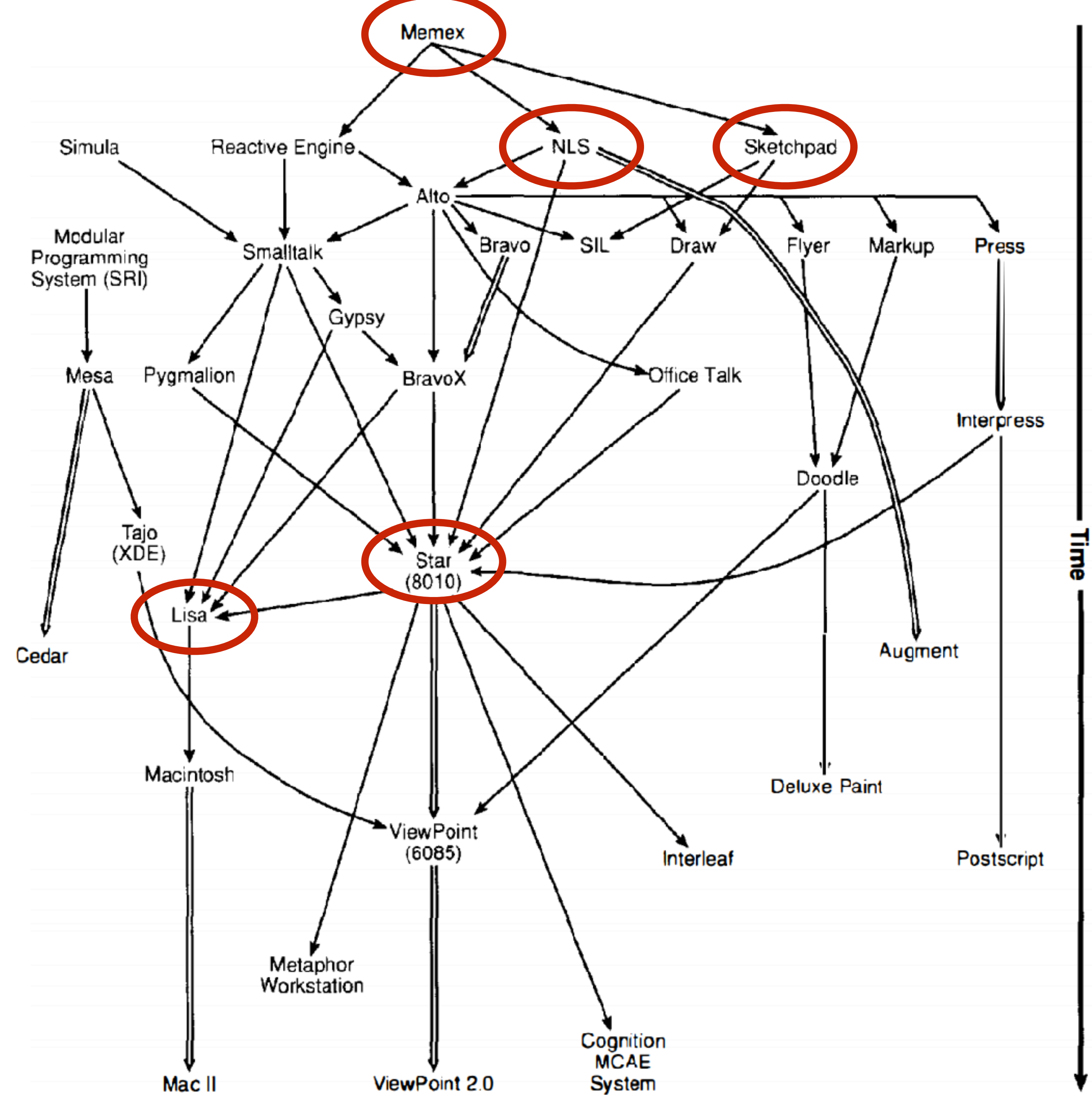
Xerox Star

- 1981
- Invented or popularized:
 - Desktop metaphor
 - Direct manipulation
 - Bitmapped display
 - Windows
 - WYSIWYG
 - Two-button mouse



Xerox Star

- Its inheritance, as described by Johnson et al.



Meanwhile, in
Pittsburgh...

AI magazine



Note 1
(Correction Copy)

Allen Newell
(retyped 11 Feb 73)

Notes on a Proposal for a Psychological Research Unit

The purpose of these notes, of which this is the first, is to act as a working vehicle to explore the notion of a psychological laboratory within a computer science oriented industrial research laboratory. The specific context is the Xerox Research Laboratory in Palo Alto.

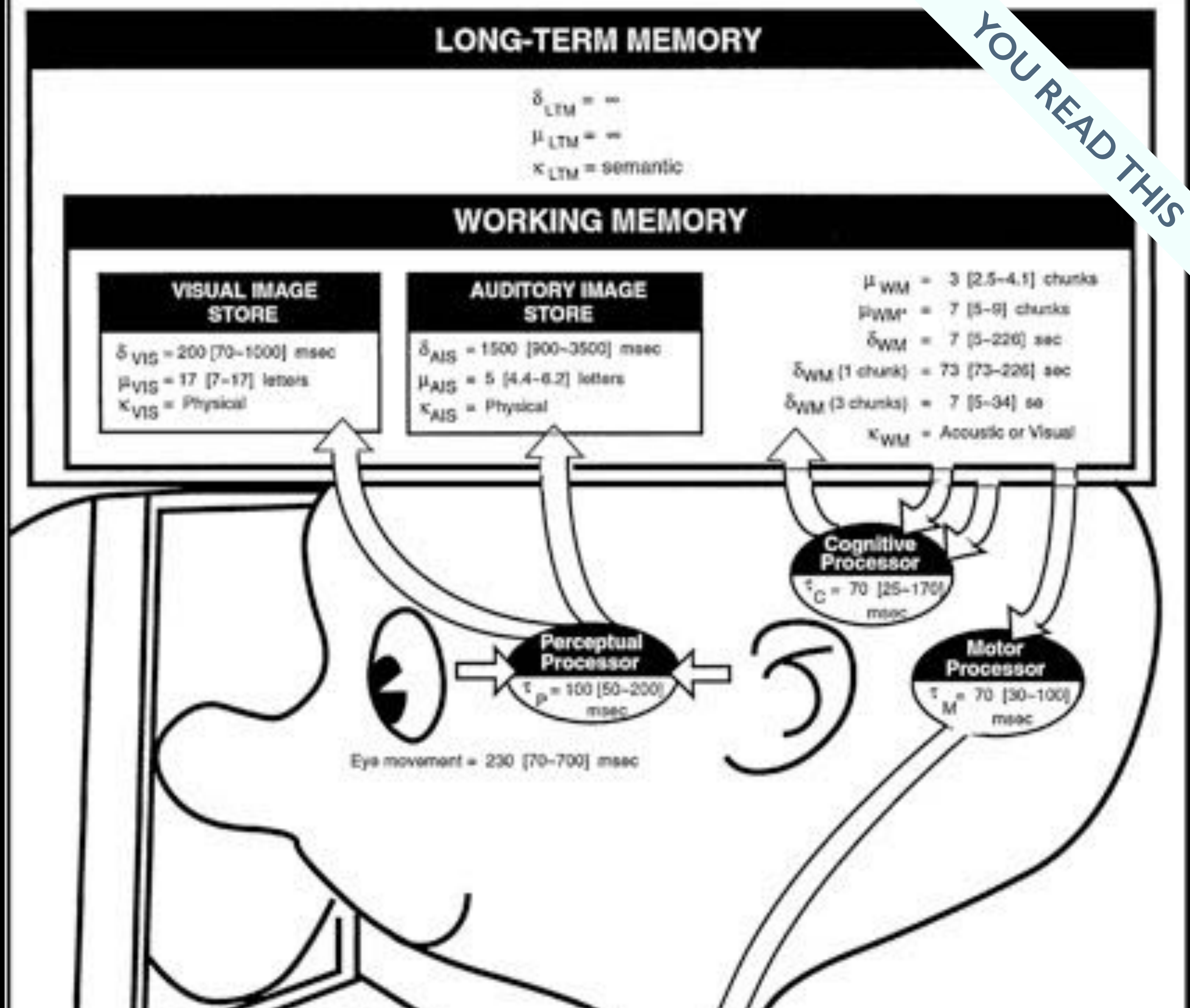
I consider these notes to be working documents -- not the record of prior analysis, but an integral part of an analysis in progress. Hence ideas expressed in them may be exploratory or stipulative, to be contradicted by ideas expressed subsequently. They may also be somewhat discursive.

Basic proposition. The central idea that these notes are to explore is contained in a set of somewhat independent propositions:

- (1) There is emerging a psychology of cognitive behavior that will permit calculation of behavior in new situations and with new humans (called information processing psychology currently).
- (2) Several of the tasks that are central to the activities of computing -- programming, debugging, etc. -- are tasks that appear to be within the early scope of this emerging theory.
- (3) Computer science in general is extremely one-sided (for under-

Stu Card does
his PhD with
Allen Newell...

Model human processor



The inheritance of the Memex

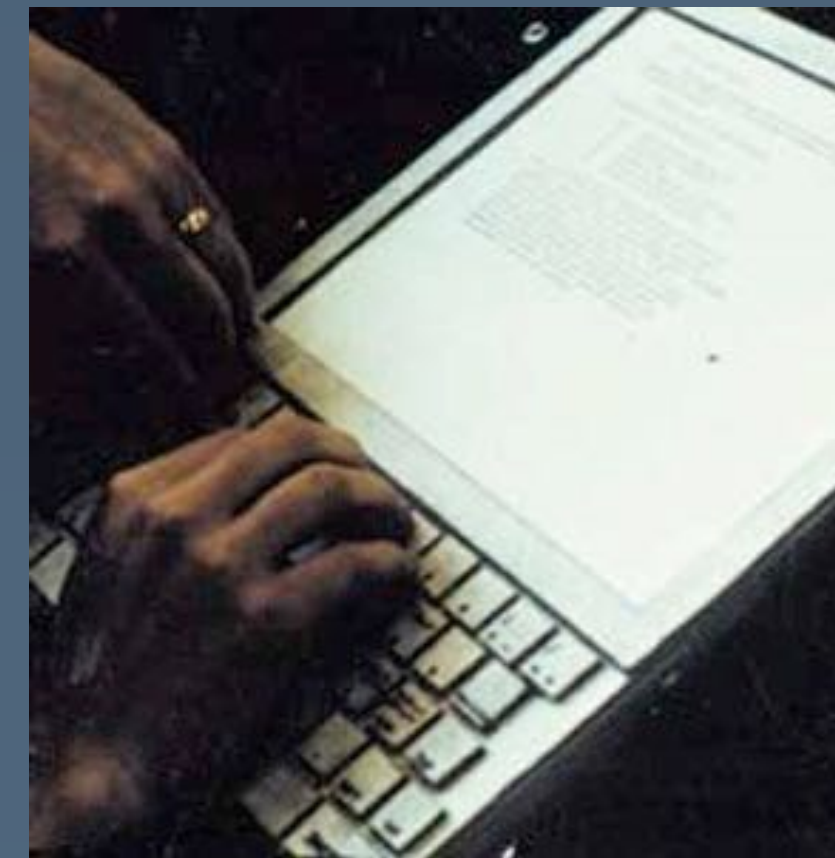
Sketchpad [Sutherland]



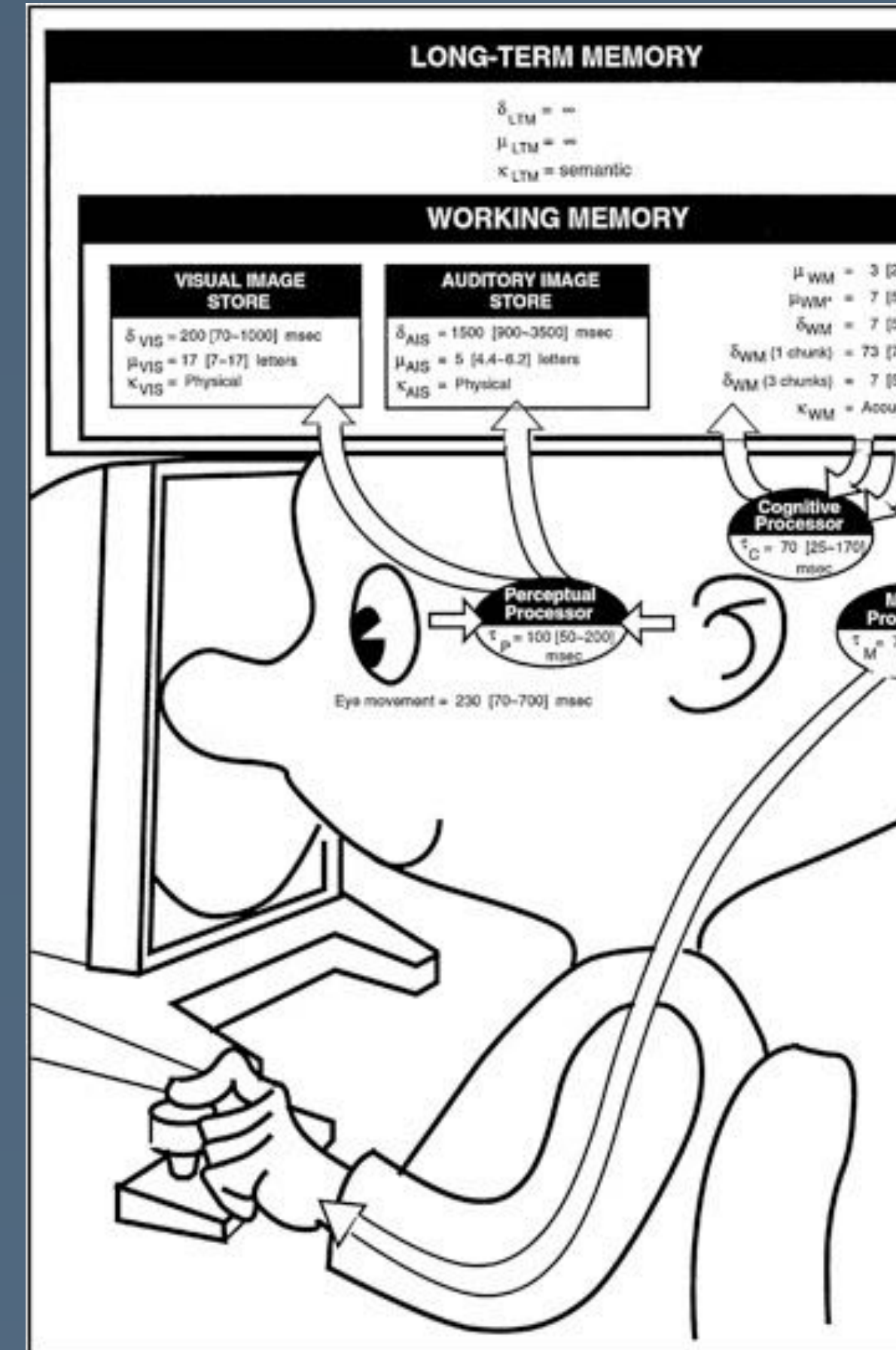
NLS [Engelbart]



Dynabook [Kay]



Model Human Processor [Card et al.]



And further...

[Bodker 2015]

First wave HCI
80s-90s

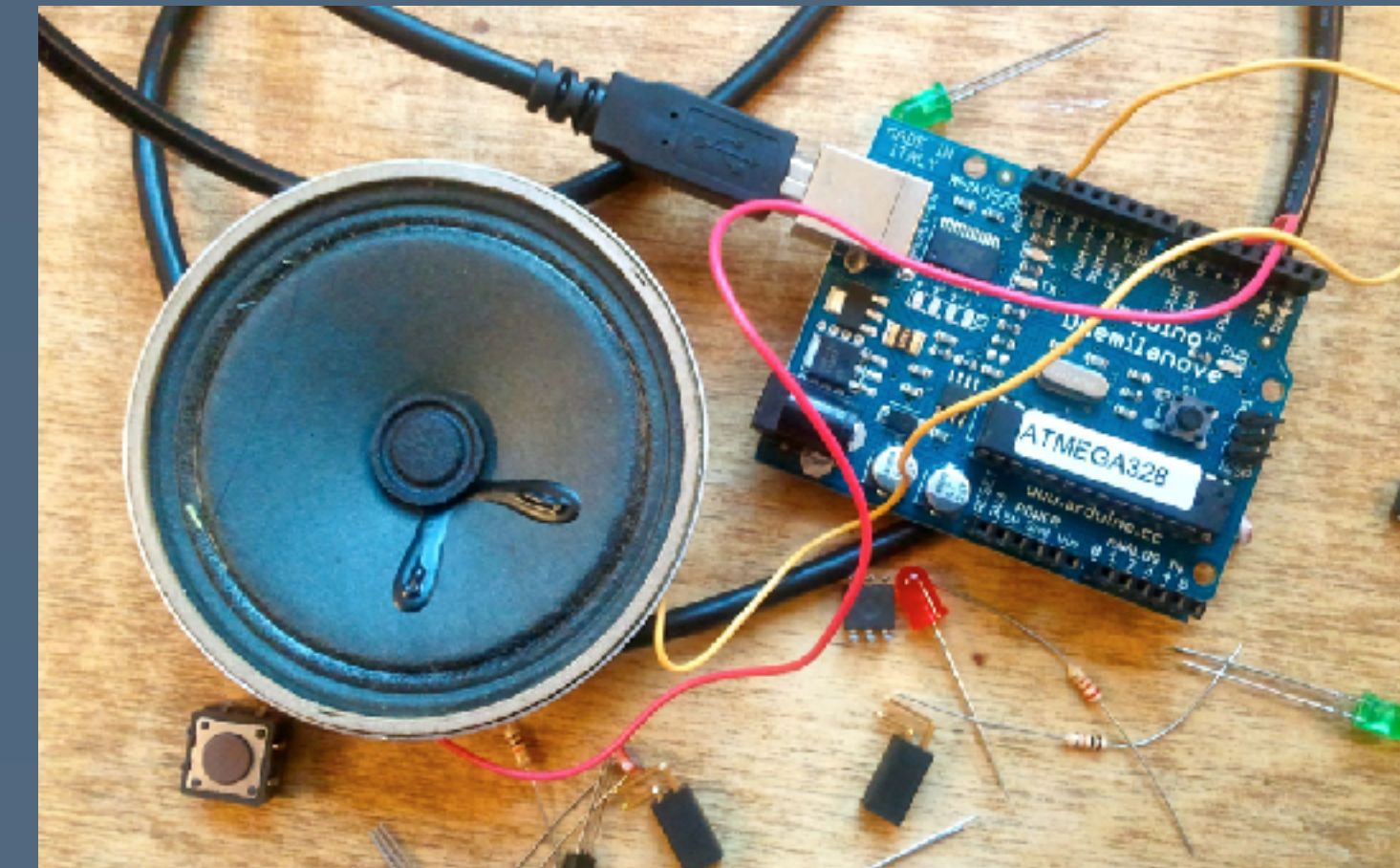
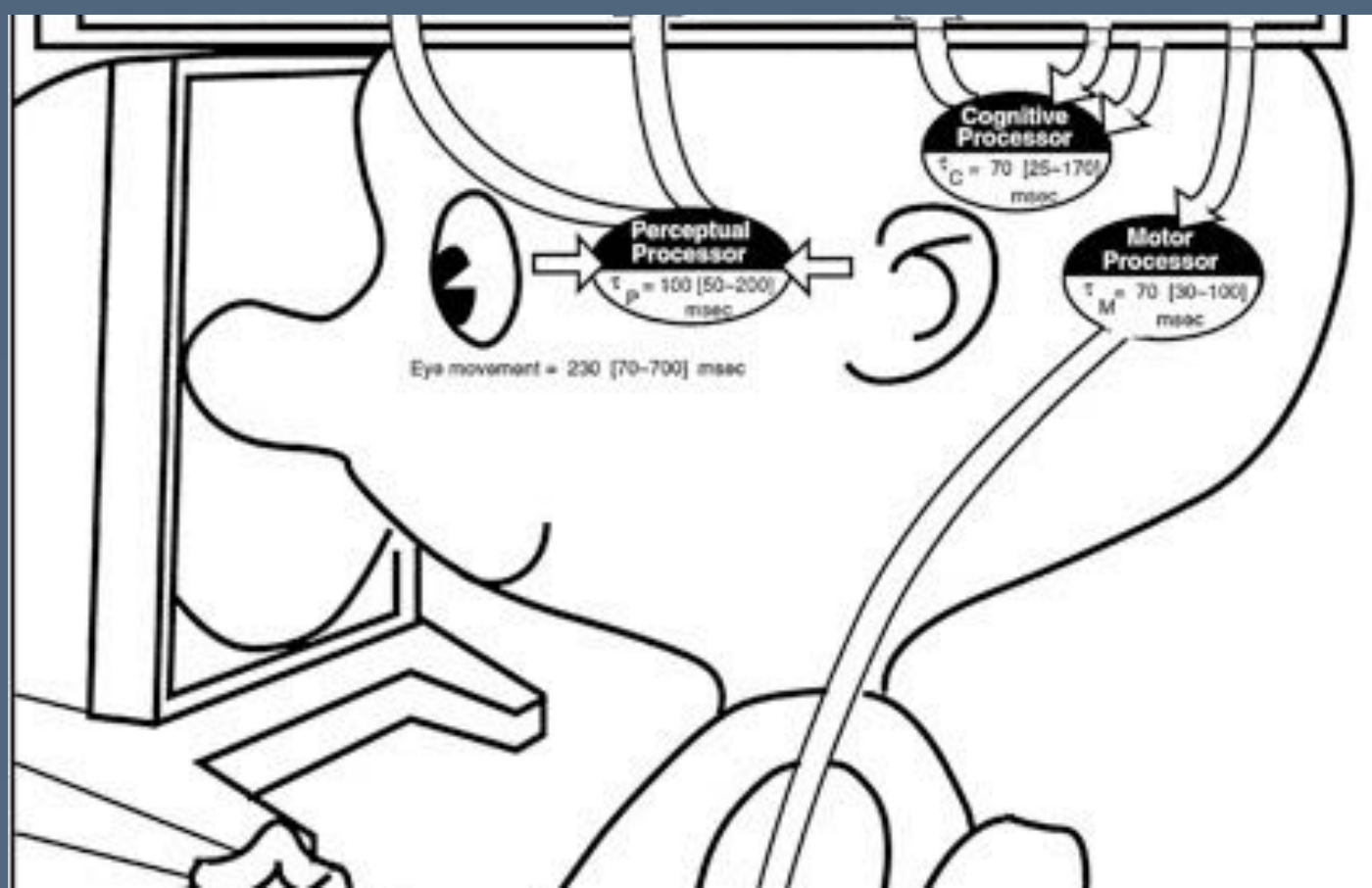
Cognitive science
Human factors
Models, pointing

Second wave HCI
90s-00s

Focus on work
Groups of people using
a collection of applications
Ubicomp, CSCW

Third wave HCI
00s-10s

Multiplicity: of use contexts
and application types
Makers, crowds, religion,
assistive, ICT4D, ...



And further...

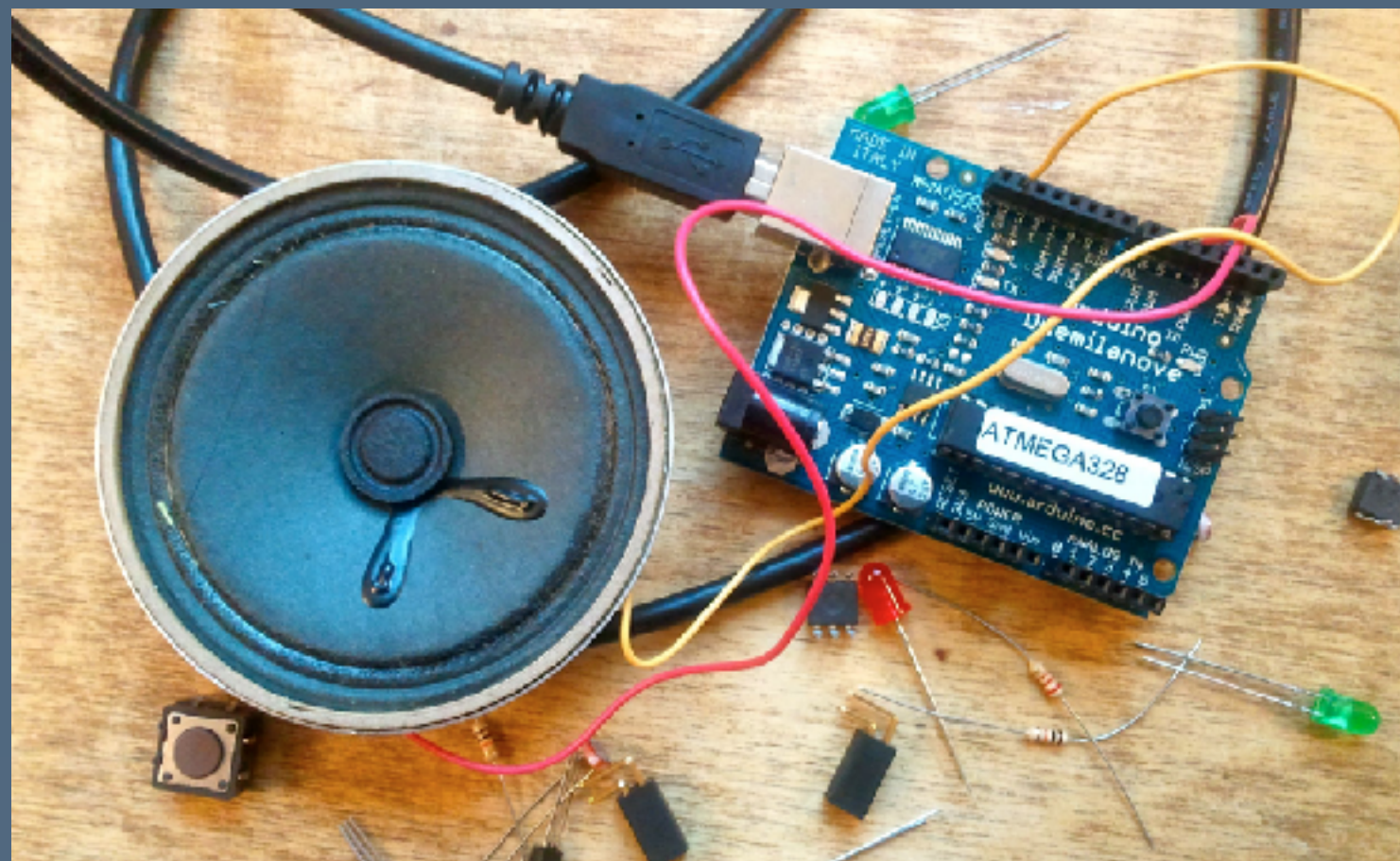
[Bodker 2015]

Third wave HCI
00s-10s

Multiplicity: of use contexts
and application types
Makers, crowds, religion,
assistive, ICT4D, ...

Fourth wave HCI
?

?



**What components
of Bush's Memex
vision are still
missing?**