FUNDAMENTALS OF SITUATED INTERACTION - 22 SEPTEMBER 2017

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UNIVERSITÉ PARIS-SUD

OF TOOLS AND INSTRUMENTS

INVENTION OF THE TOOL

- Humans are the only species that creates tools to shape their environment

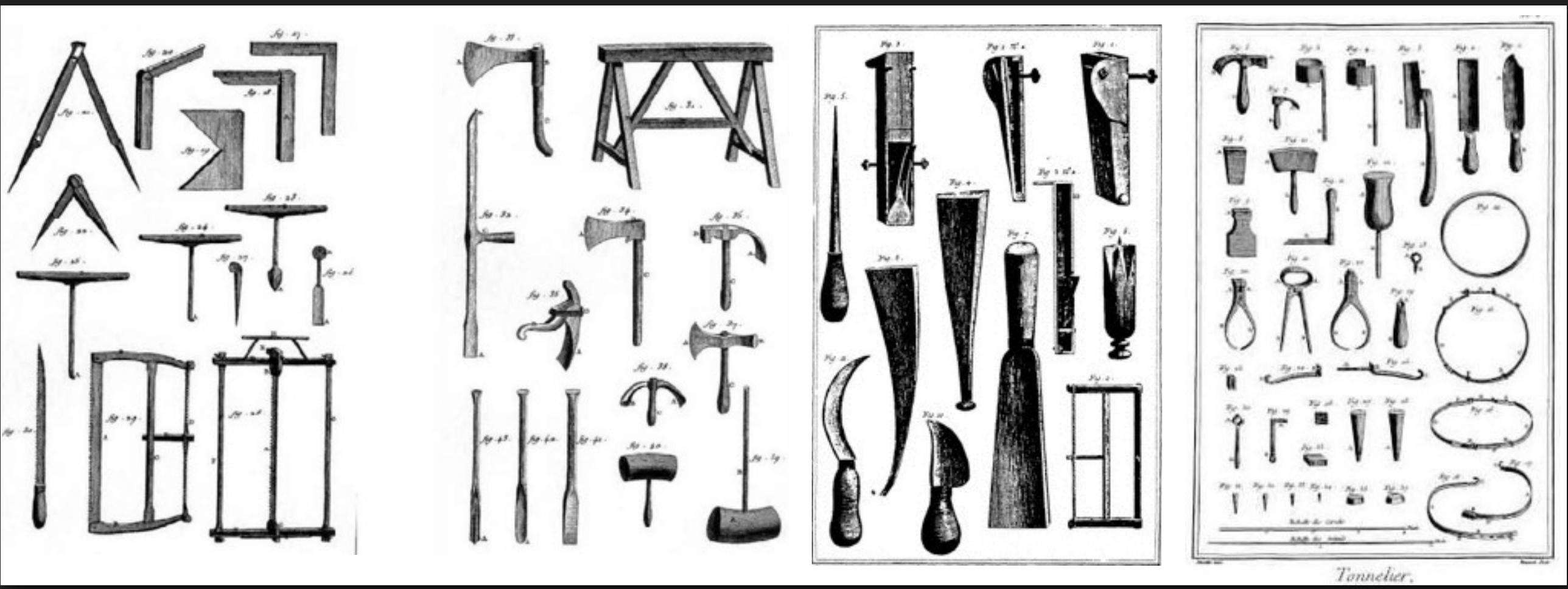
2001, A Space Odyssey

INVENTION OF TOOLS

- Traces of tools have been found as far back as 3.3 million years

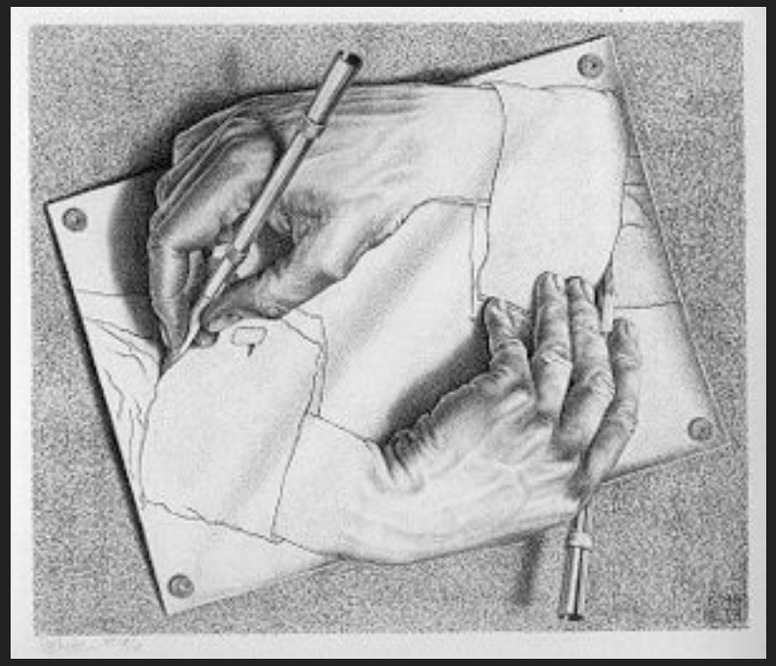
Sonia Harmand, anthropologist

MOST OF OUR INTERACTIONS WITH THE REAL WORLD ARE MEDIATED BY TOOLS AND INSTRUMENTS

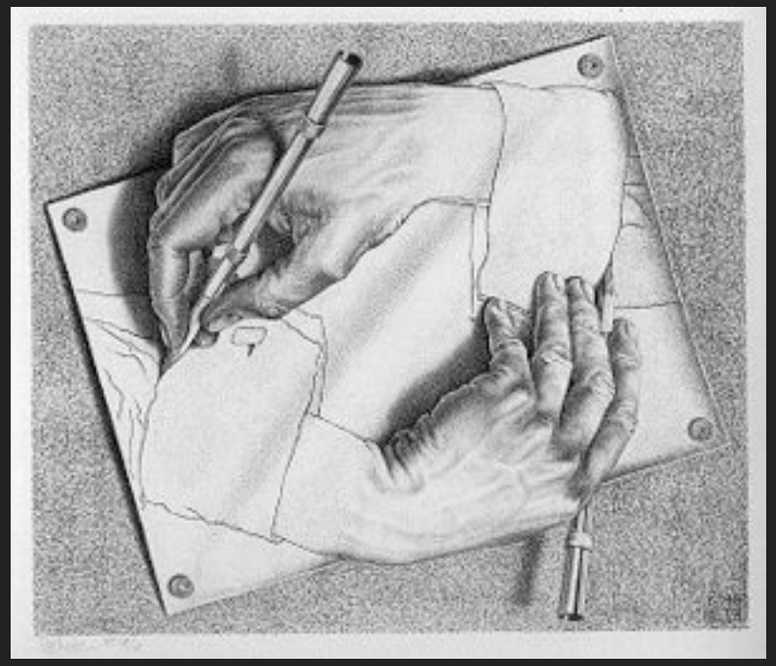


L’encyclopédie - Diderot & d’Alembert, 1751-1772

TOOLS TO SHAPE OUR ENVIRONMENT



BUT NOT ALWAYS EASY TO LEARN



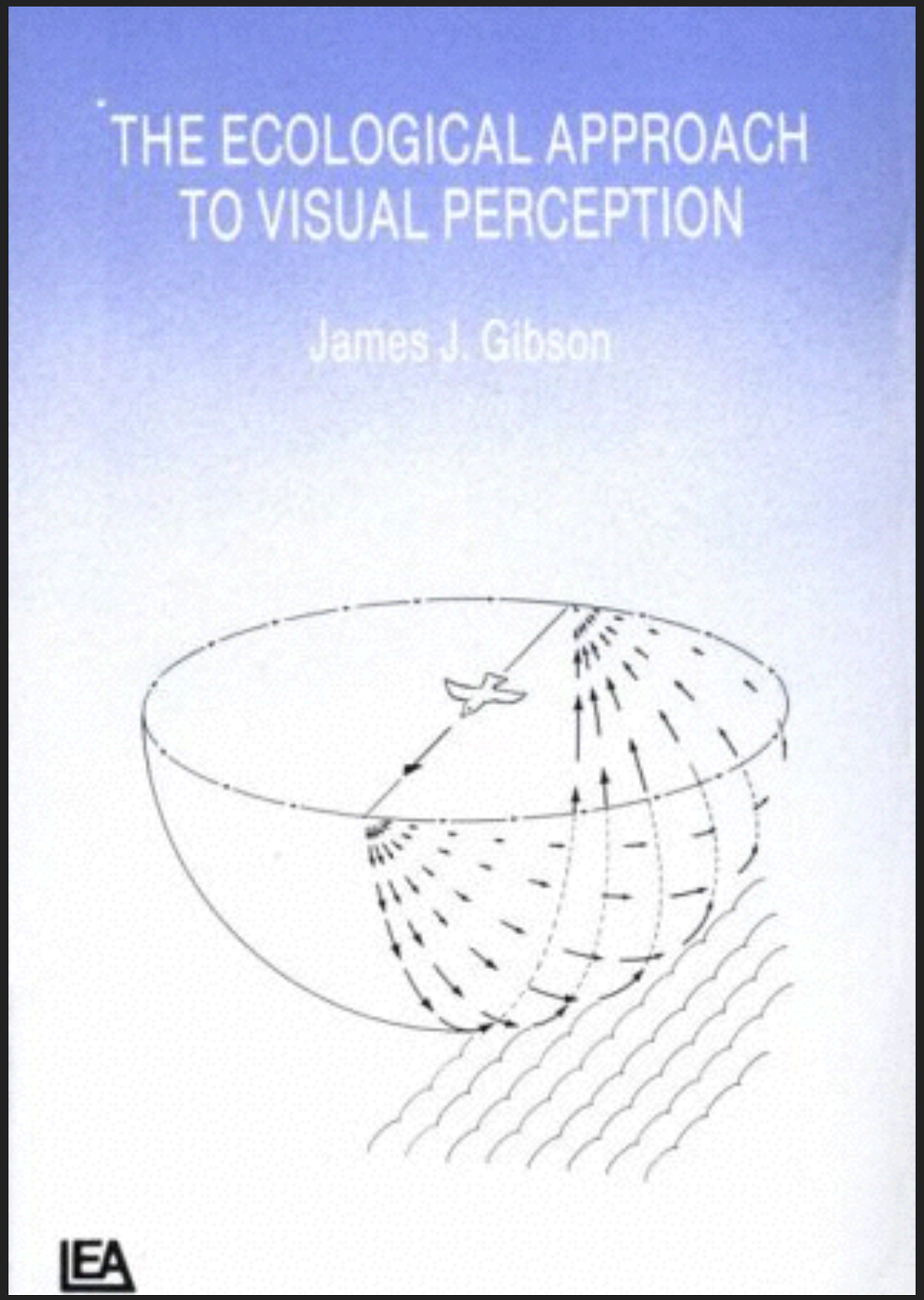
A BIT OF PSYCHOLOGY

AFFORDANCES

- We directly perceive the capabilities for action of an object

- "… the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill…"

  James Gibson



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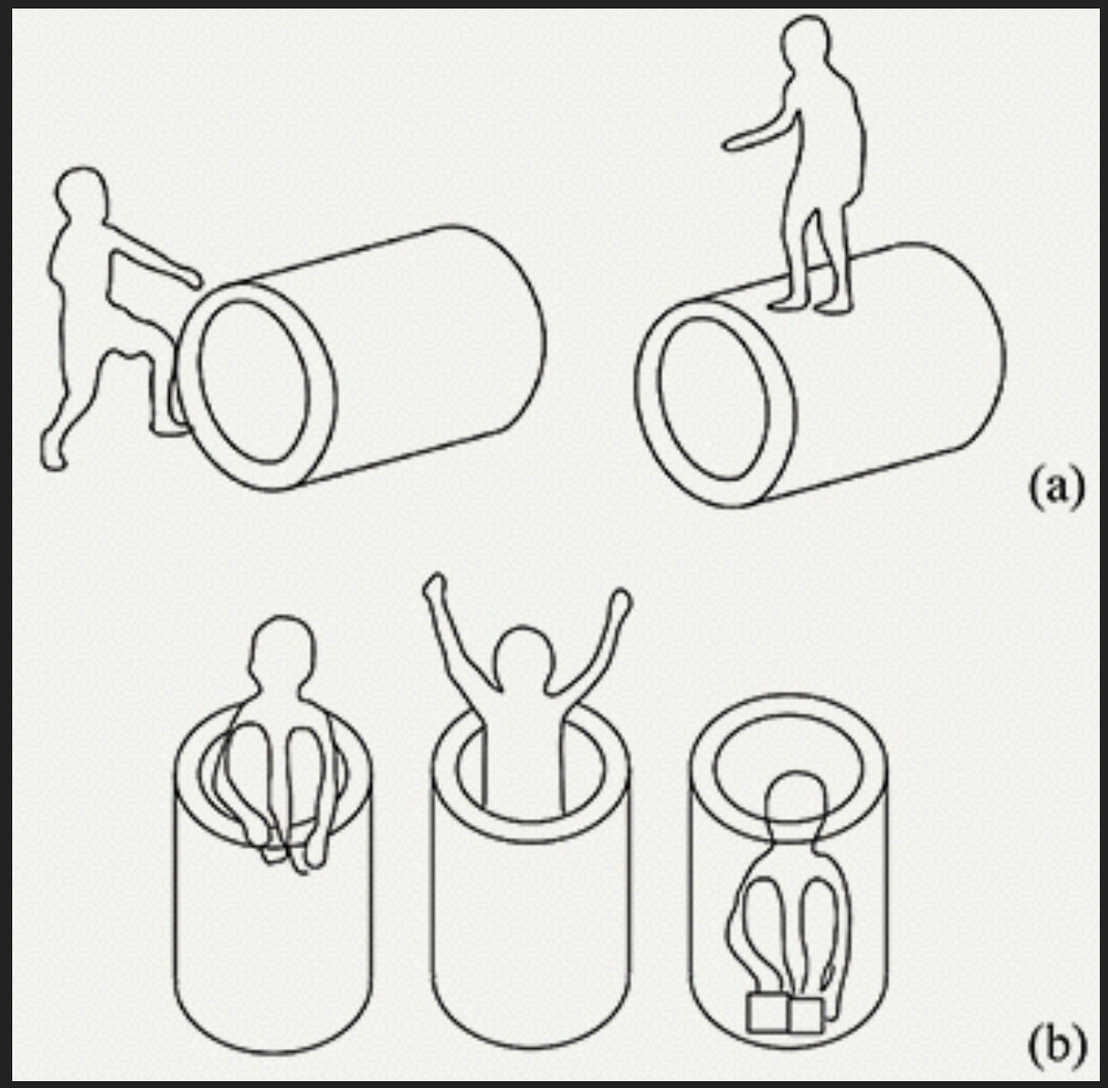


Space affordances, P. Atmodiwirjo

PERCEPTUAL LEARNING

- Learning to recognize affordances

- “We perceive to learn, as well as learn to perceive”

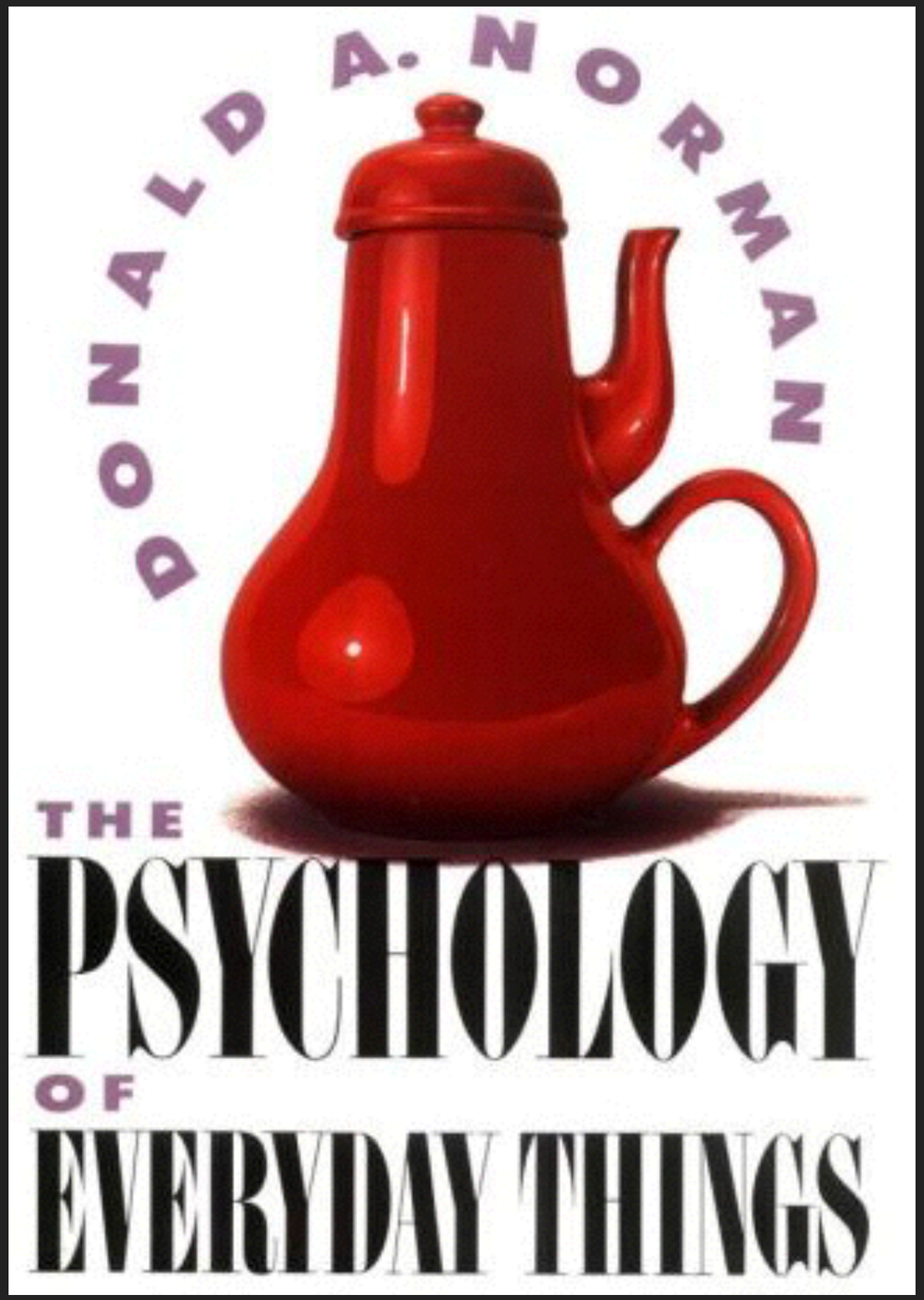
  Eleanor Gibson

JAMES & ELEANOR GIBSON

SIGNIFIERS

- Affordances as redefined by Don Norman

- To be perceived, an affordance must be visible



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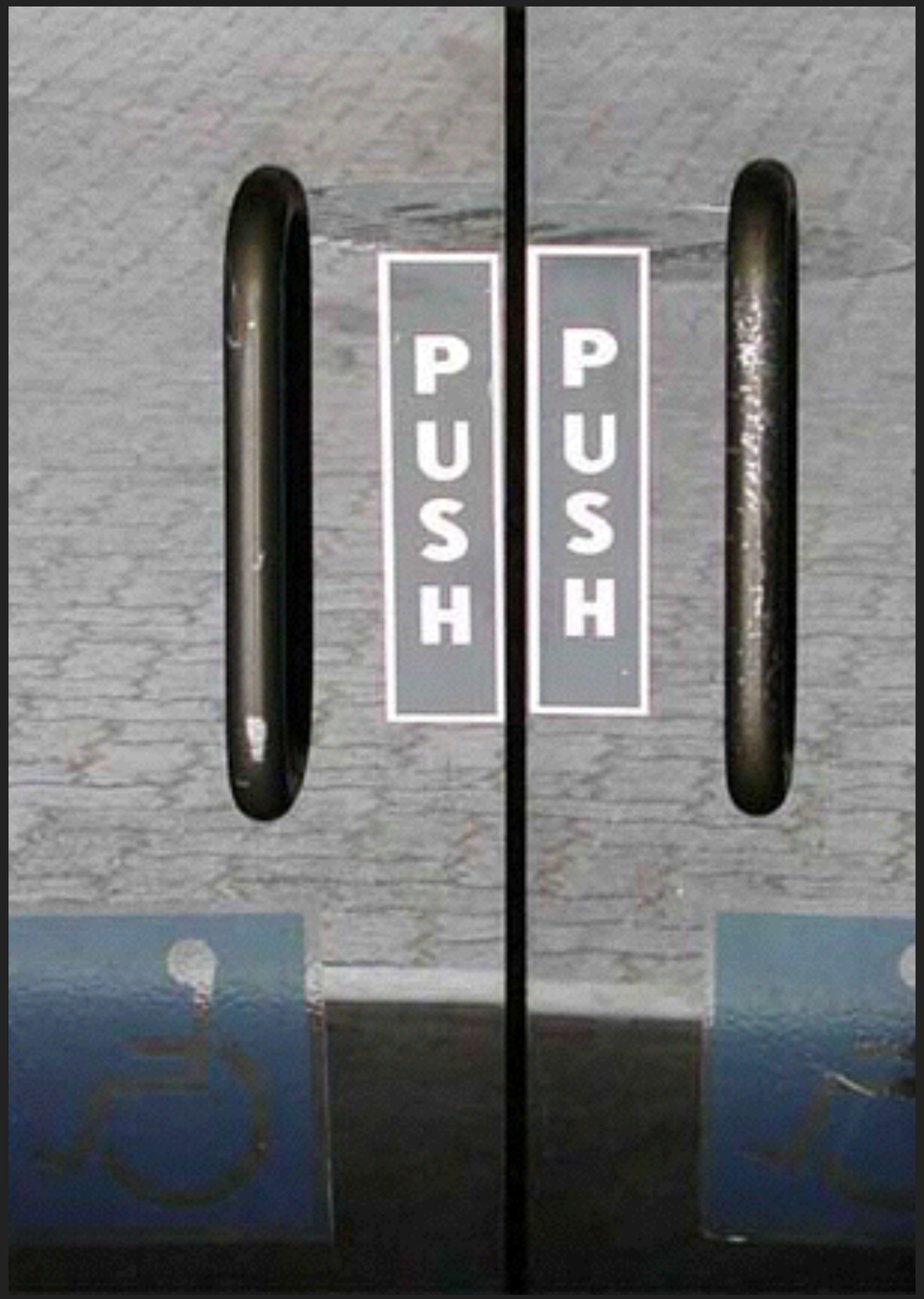

THE POWER OF TOOLS

- We internalize the tool
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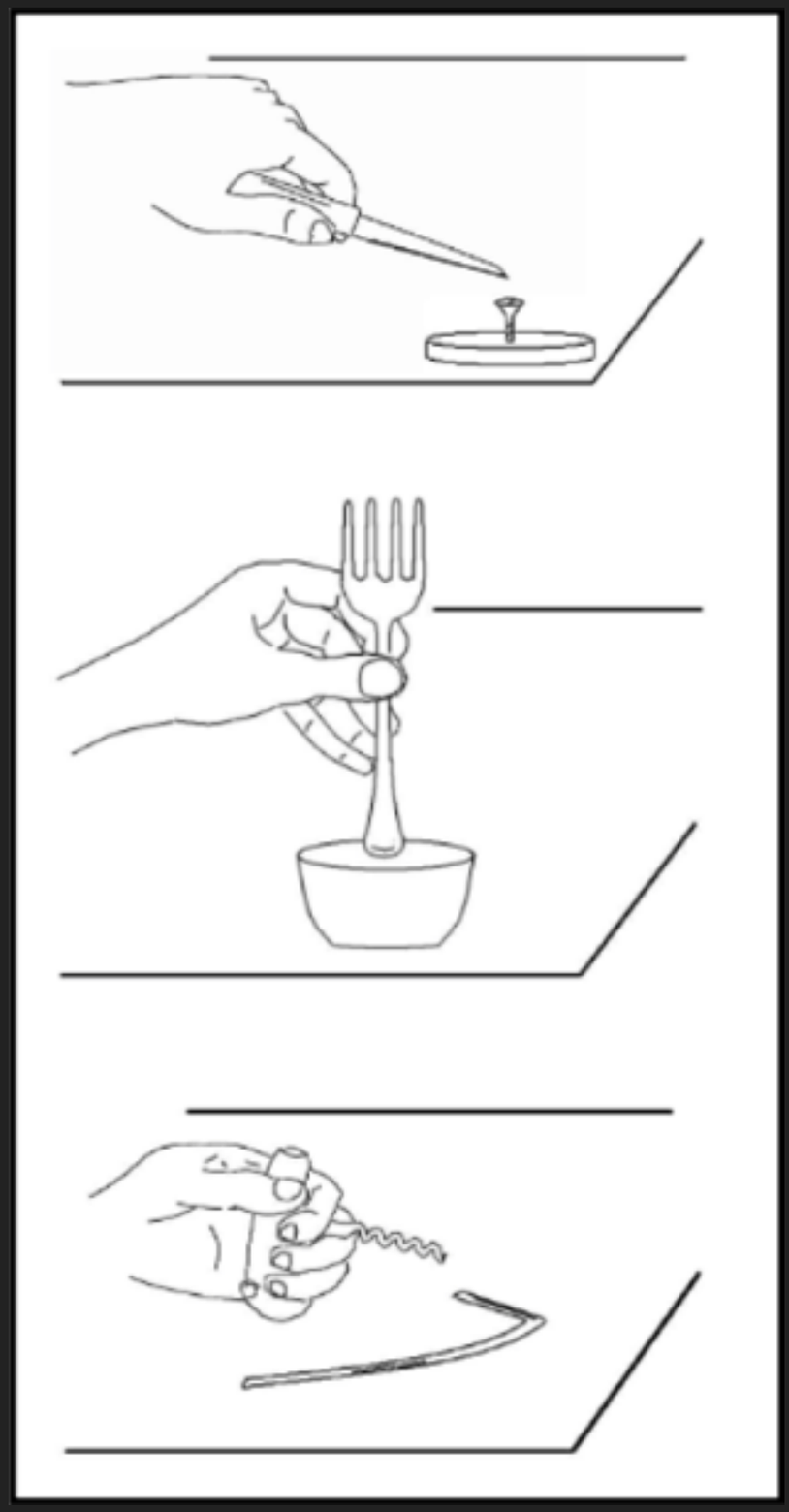
TECHNICAL REASONING

- We simulate in our head the physical mechanism to solve a problem
- We appropriate the objects at hands



François Osiurak

APPROPRIATION

- A pen or a ruler?

- A mug or a compass?

WHEN YOU HAVE A HAMMER...

François Osiurak

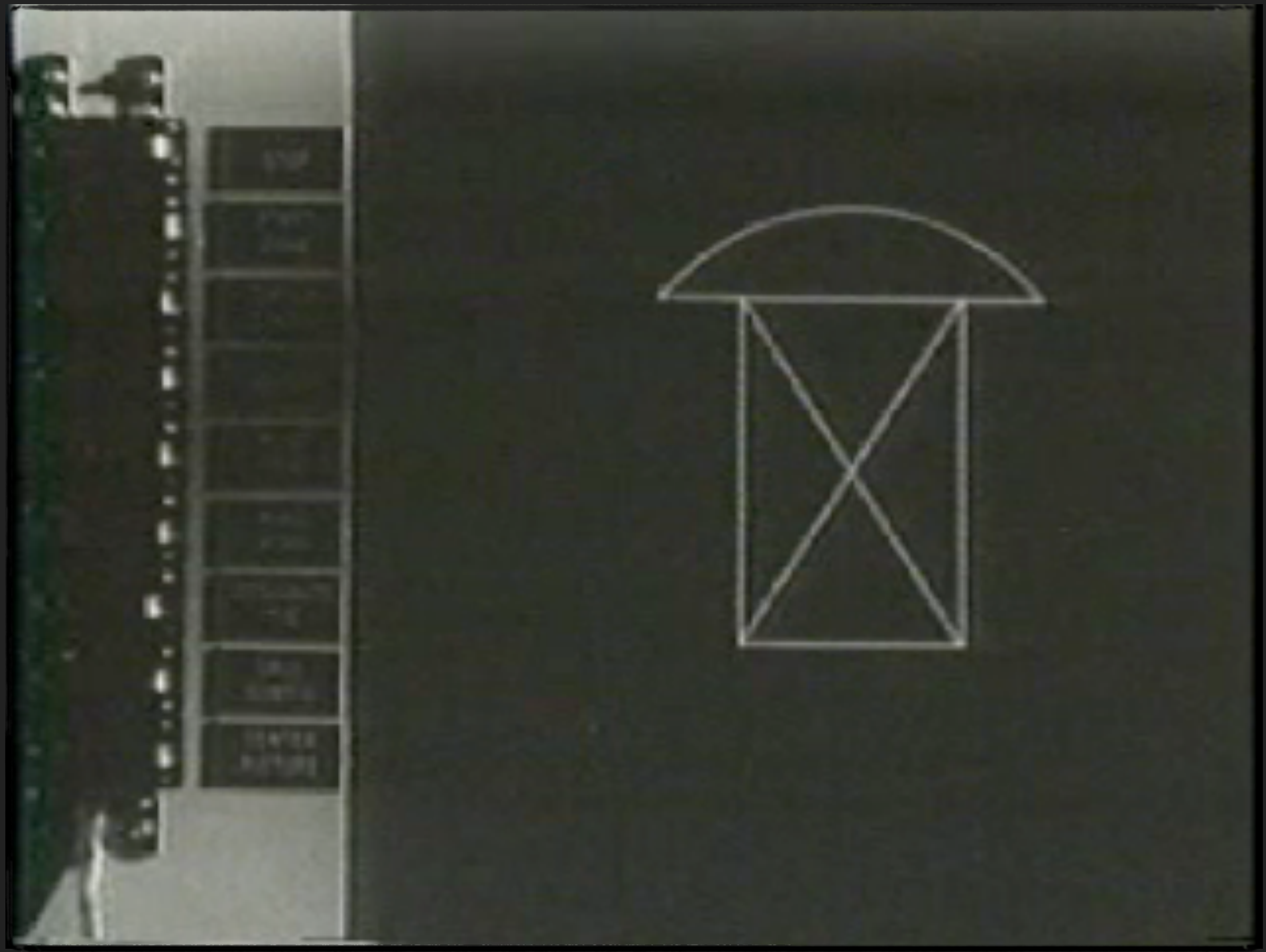
- We create tools because we overestimate their capabilities

WHAT ABOUT DIGITAL TOOLS?

SKETCHPAD

IVAN SUTHERLAND, 1963

GRAPHICAL INTERACTION



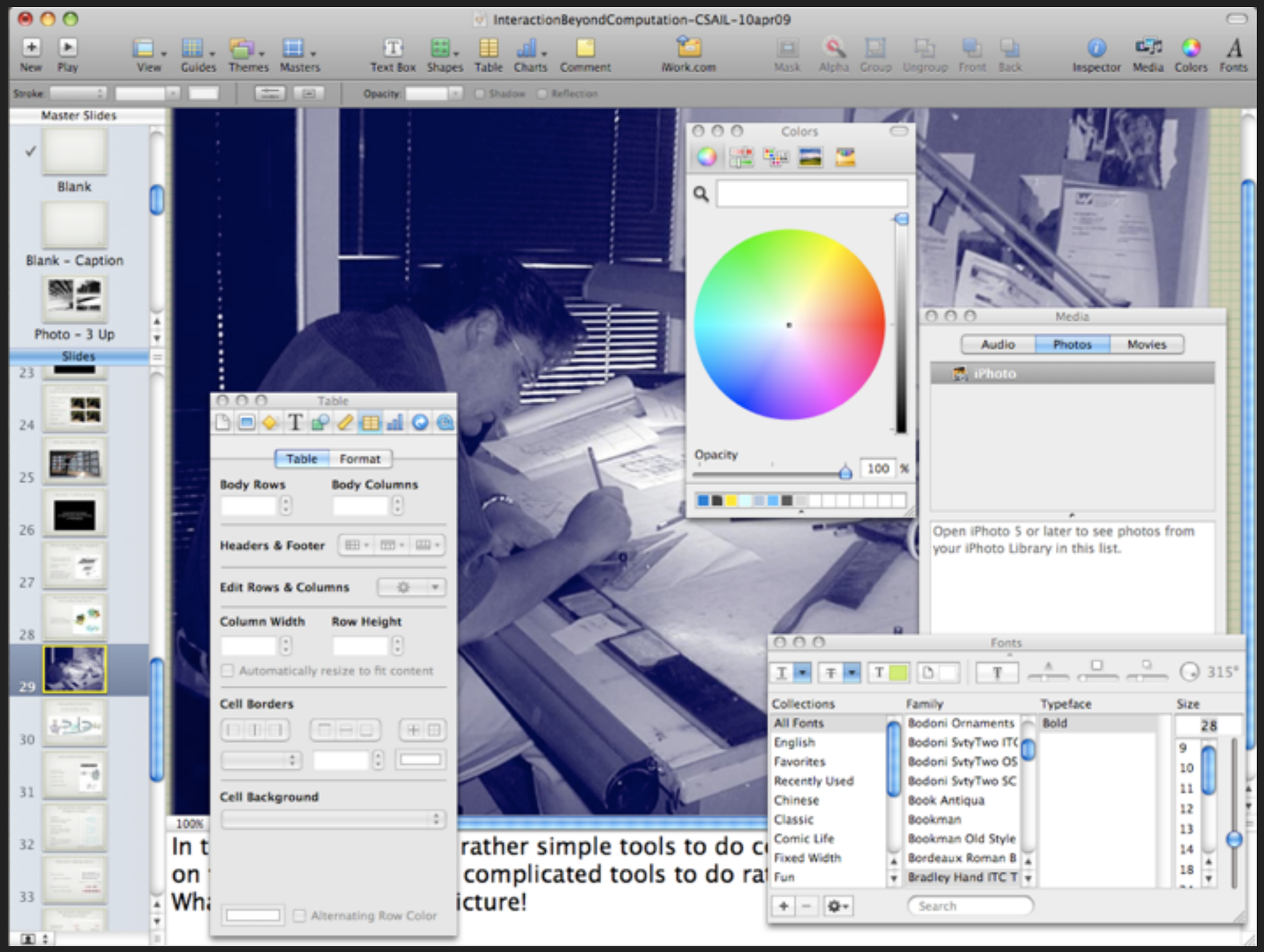
https://www.youtube.com/watch?v=57wj8diYpgY

COMPUTER AS TOOL

- “Computers are like a bicycle for our minds”
  Steve Jobs

FROM PHYSICAL TOOLS . . .

. . . TO DIGITAL TOOLS



INSTRUMENTAL INTERACTION

INTERACTION IS MEDIATED BY A TOOL

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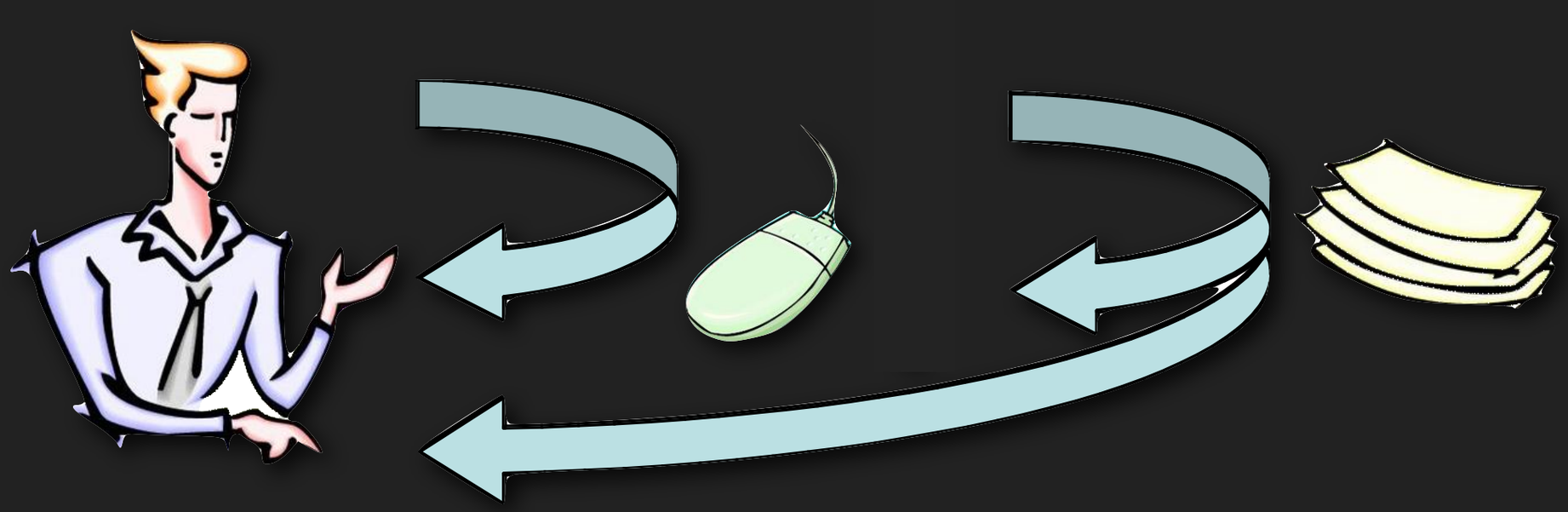

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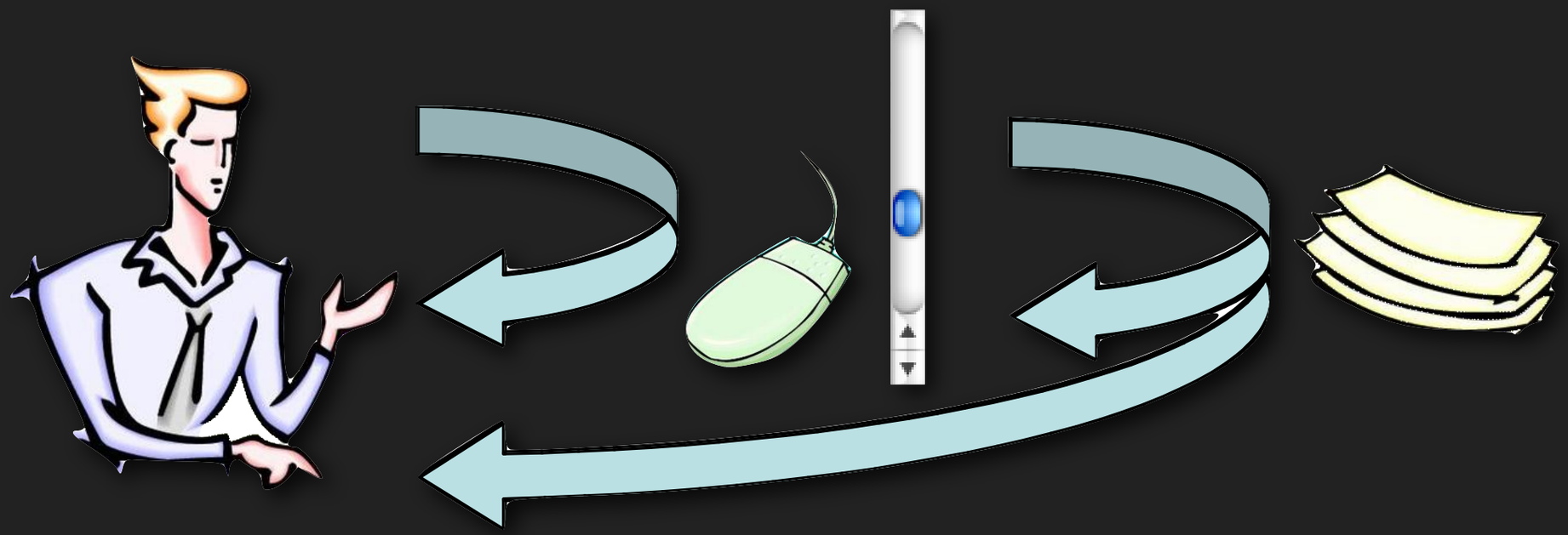


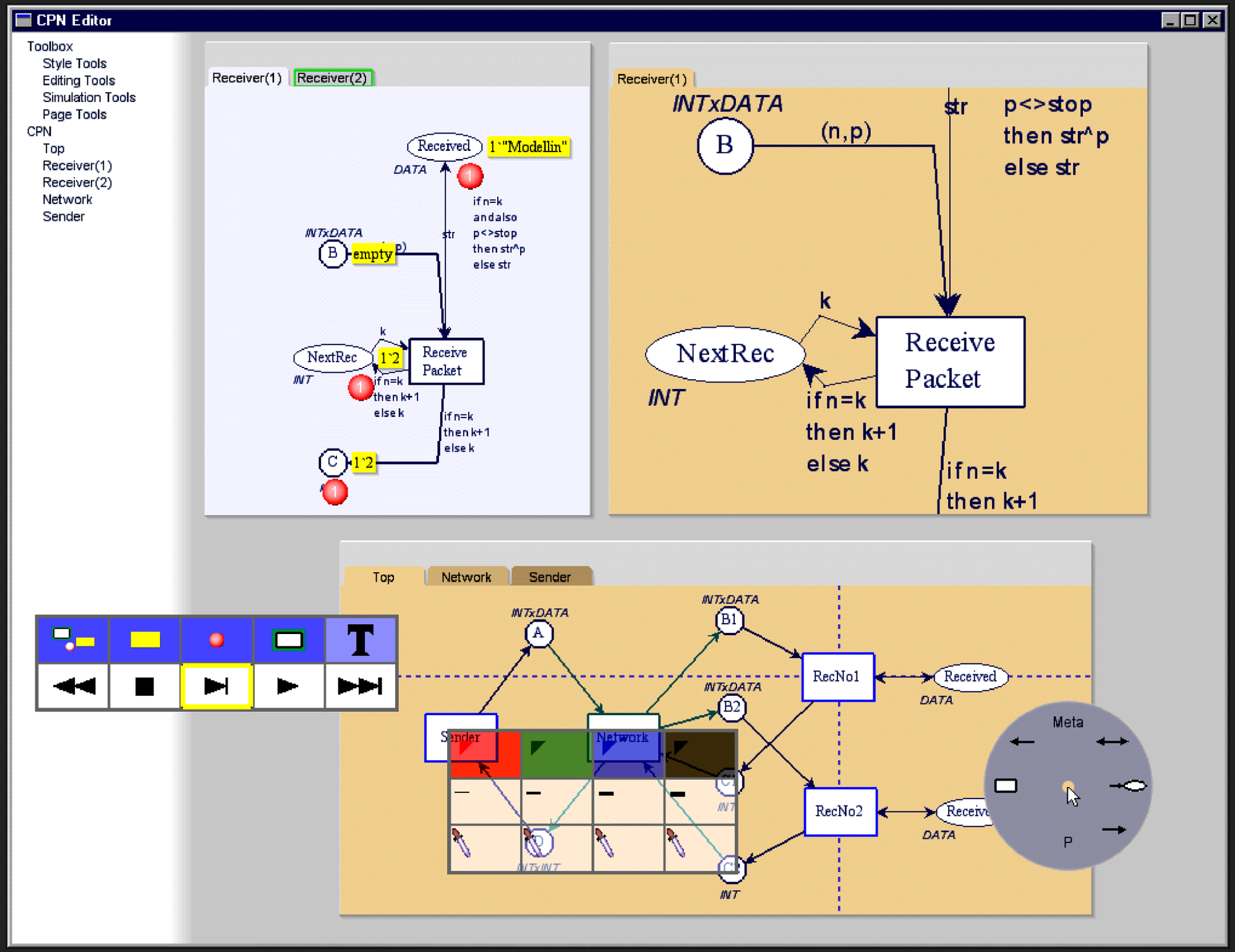
A DESCRIPTIVE MODEL

- From direct manipulation
- To tangible interaction

- But not universal:
- Voice-based interaction?
- Gesture-based interaction?

Reactable

CPN2000


CPN Editor
Toolbox
Style Tools
Editing Tools
Simulation Tools
Page Tools
CPN
Top
Receiver(1)
Receiver(2)
Network
Sender
Receiver(1)
Receiver(2)
Received
1`"Modellin"
DATA
if n=k
andalso
p<>stop
then str^p
else str
INTxDATA
B
empty
str
NextRec
1`2
INT
Receive
Packet
if n=k
then k+1
else k
C
1`2
Receiver(1)
INTxDATA
B
(n,p)
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B1
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RecNo1
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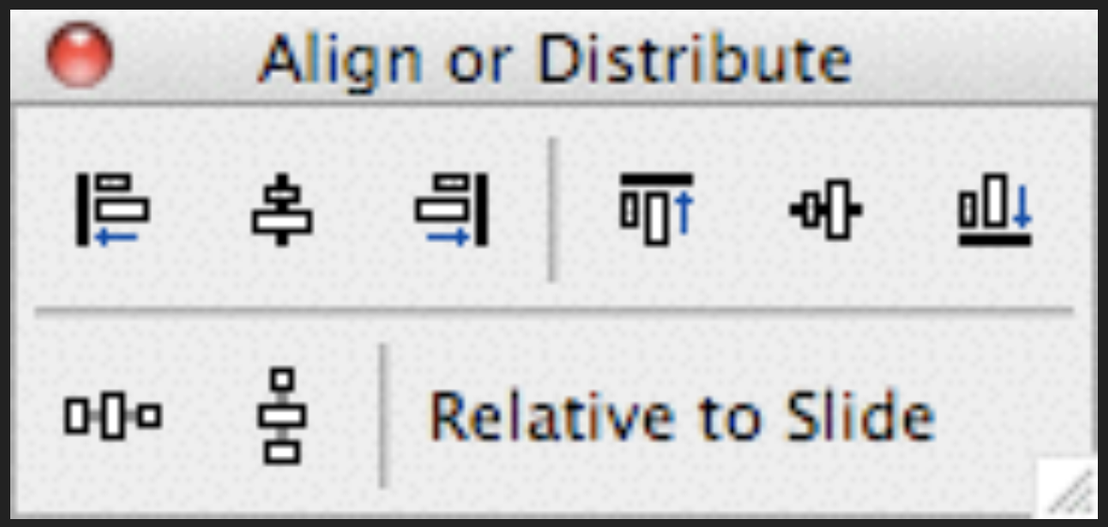
Received
DATA
Meta
P
INT

REIFICATION

- Transform a command into an object that can be directly manipulated
- Example : alignment



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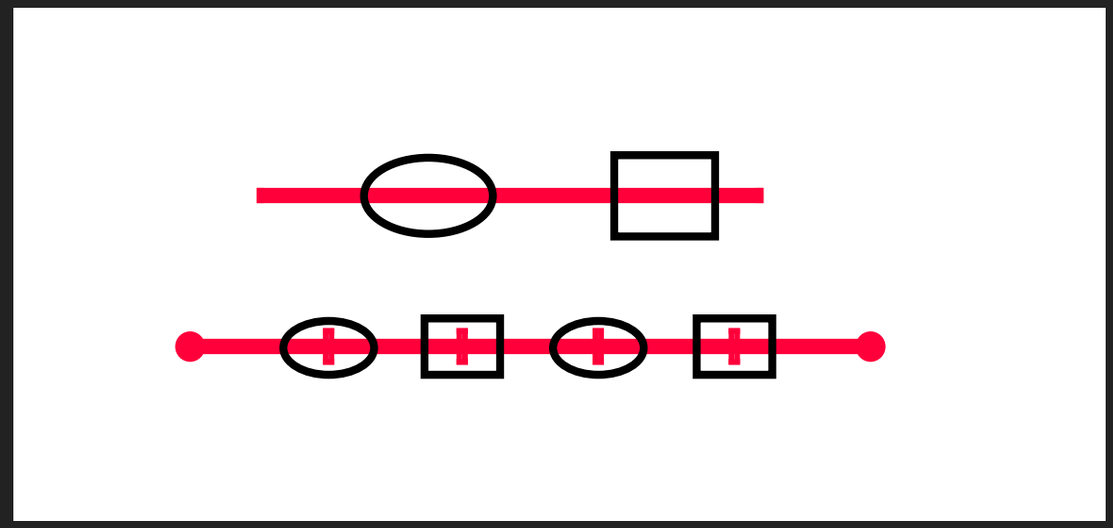
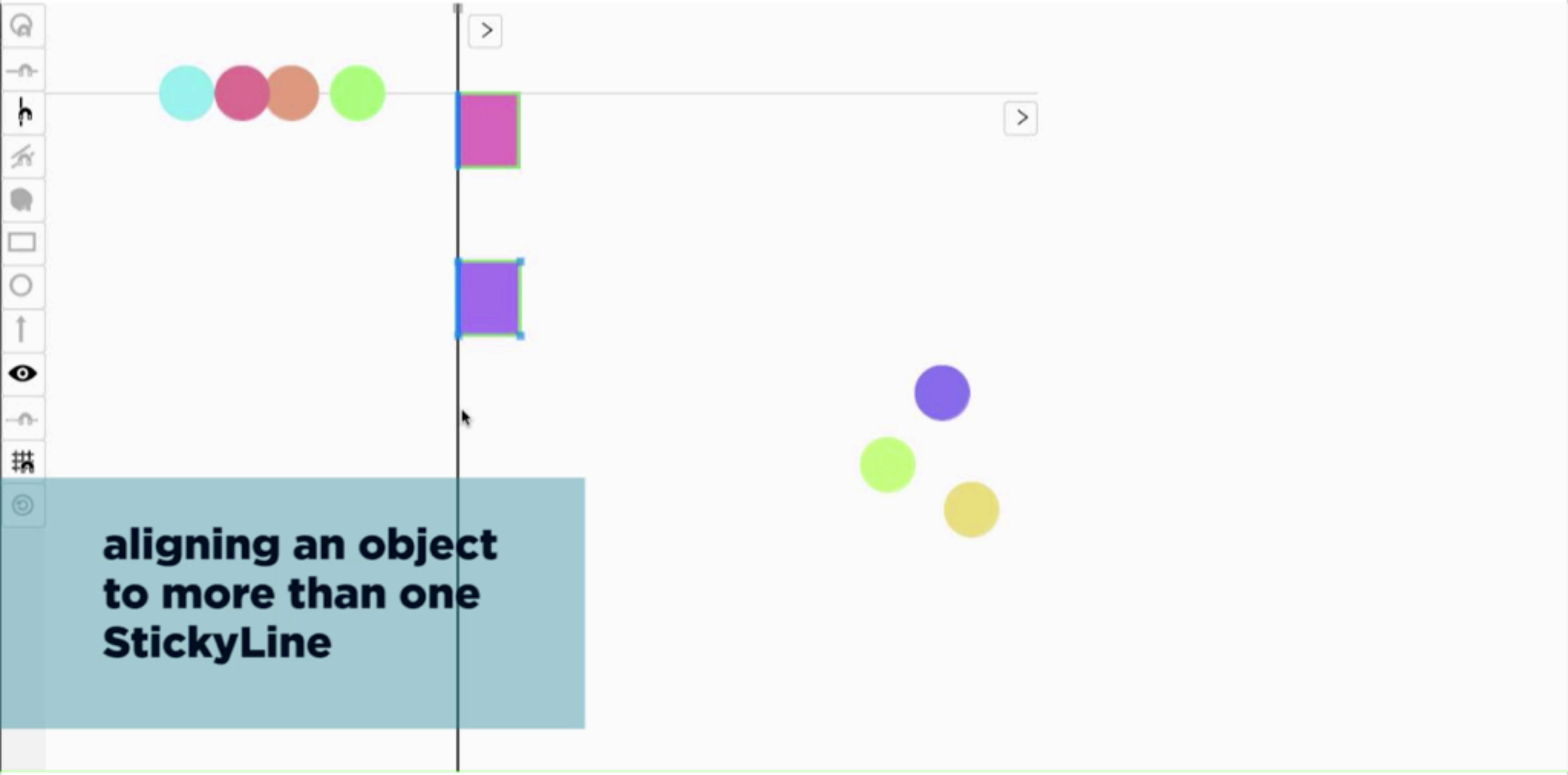


STICKYLINES

M. Ciolfi, N. Maudet, W. Mackay, M. Beaudouin-Lafon



POLYMORPHISM

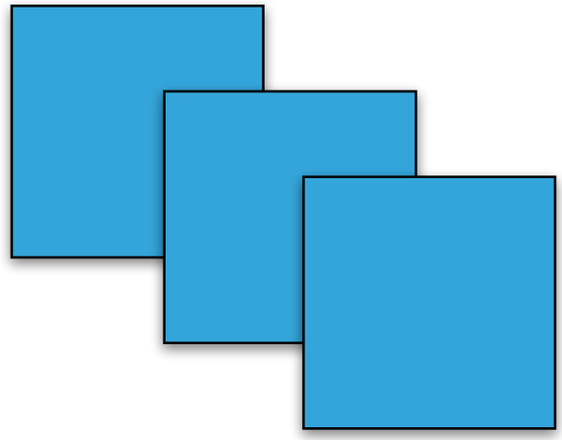
- The same tool can be used in different contexts

- Example : color selector

- Free the tools from the applications where they are trapped!

REUSE

- Output reuse (objects)
- Example : copy-paste



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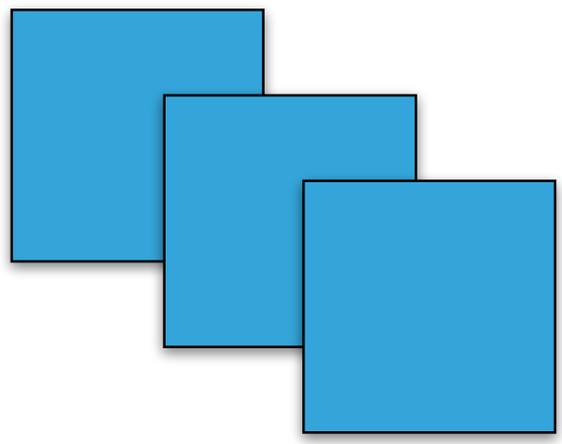

- Input reuse (commands)
- Example : redo, macros