#NewMacyMeetings
Cybernetics, AI, and Ethical Conversations

Appendices

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AiTech Agora
TU Delft
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pangaro.com/aitechagora2020/

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Appendices
Cybernetics vs. Artificial Intelligence

Cybernetics

"Performative Ontology"
- Design for action with emergent goals
- Embodied interaction
- Circular causality
- Evolutionary viability / resilience

- Could be applied anywhere
- Lost the competition with computers
- Stolen & elided by French intellectuals
- Reduced to the prefix "cyber-"
- Yet… undergoing a resurgence

Today's AI

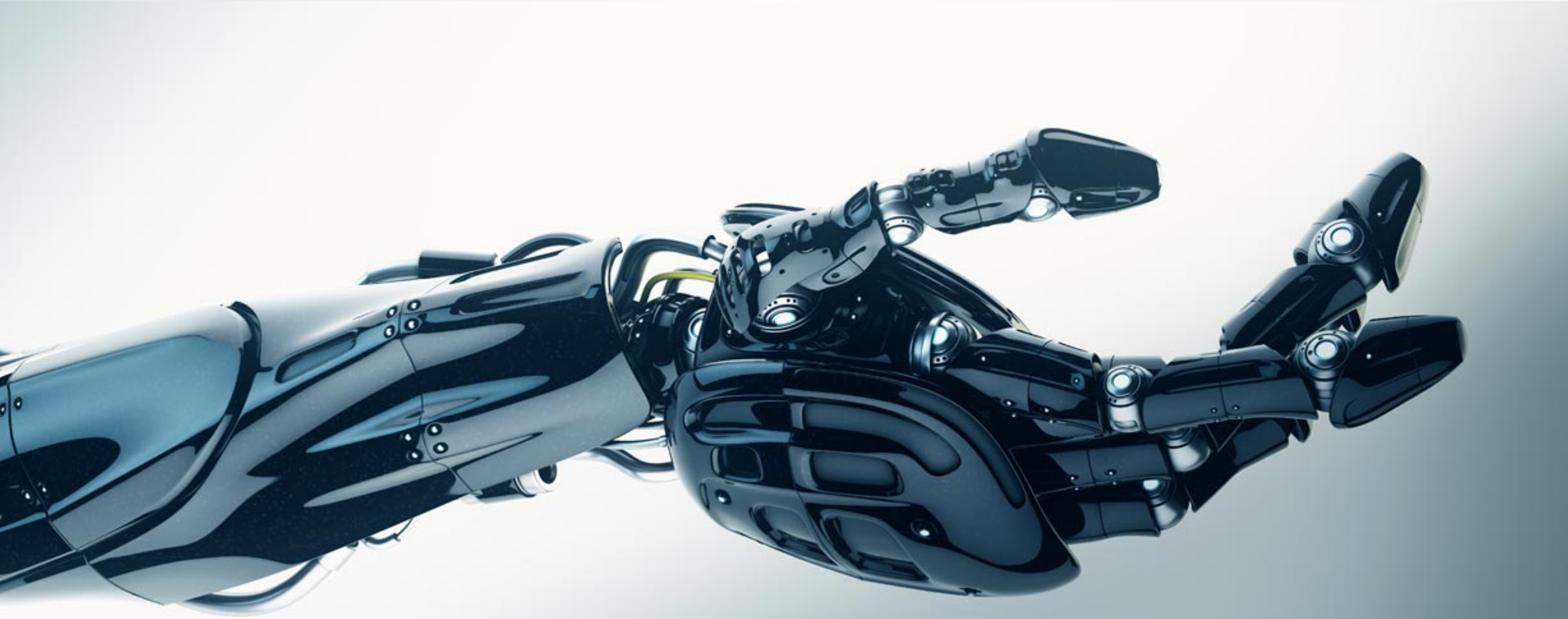
"Intelligence Inside"
- Design for efficiency & scale
- Transactional interaction
- Input / output fulfilment
- Consistency / reliability

- Limited to digital infrastructure
- Grew from "smaller, cheaper, faster"
- Became an industry, a market
- Makes alternatives unthinkable
- Overwhelms daily living

Cybernetics is not Robotics

https://en.wikipedia.org/wiki/Forbidden_Planet

Cybernetics is not Biomechatronics

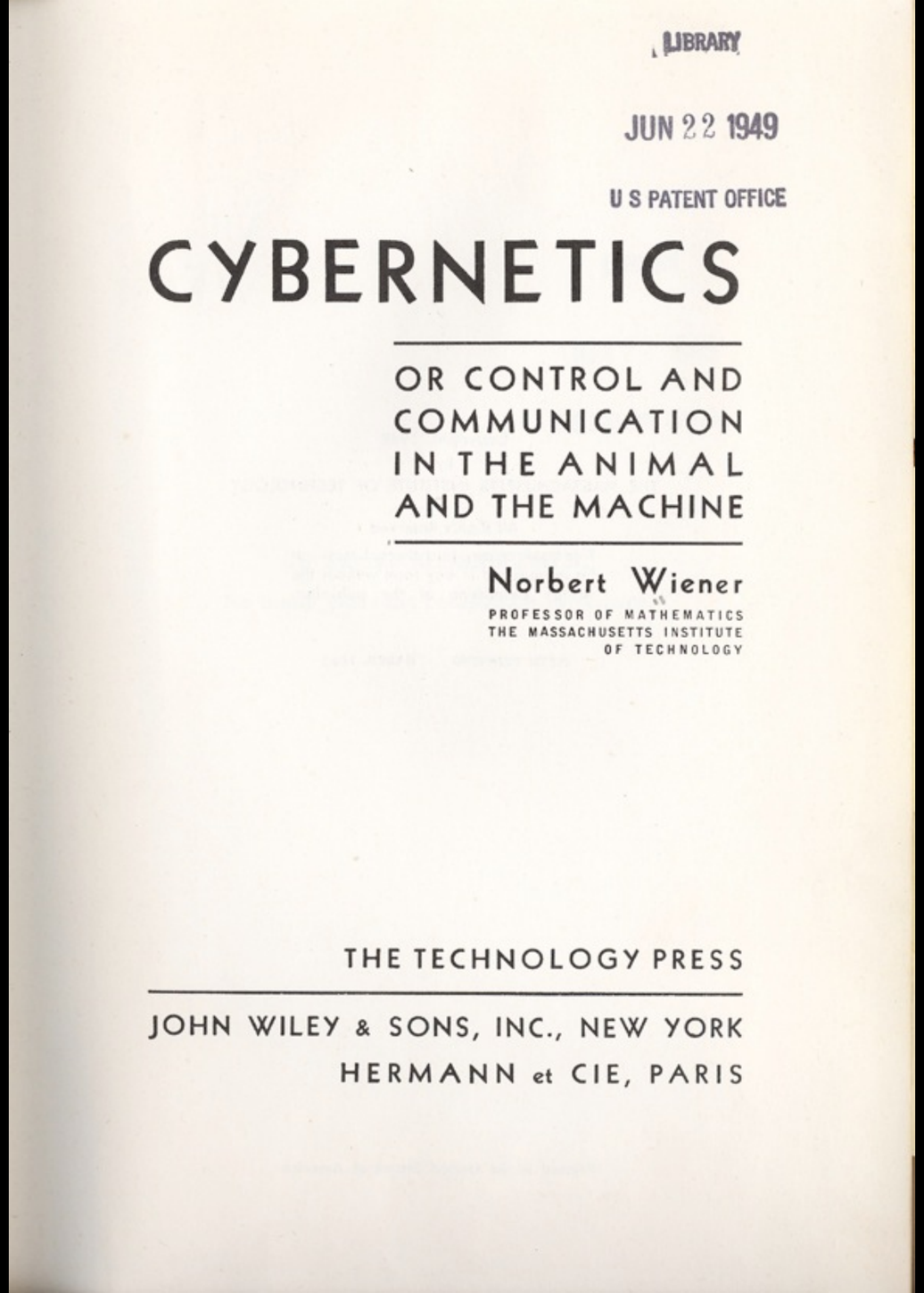


https://carleton.ca/mechatronics/

Cybernetics is not AI

Annapurna Pictures

Cybernetics is not AI
Cybernetics is not Biomechatronics
Cybernetics is not Robotics
Cybernetics is not Chips in Your Brain
… and Cybernetics is not Freezing Dead People!

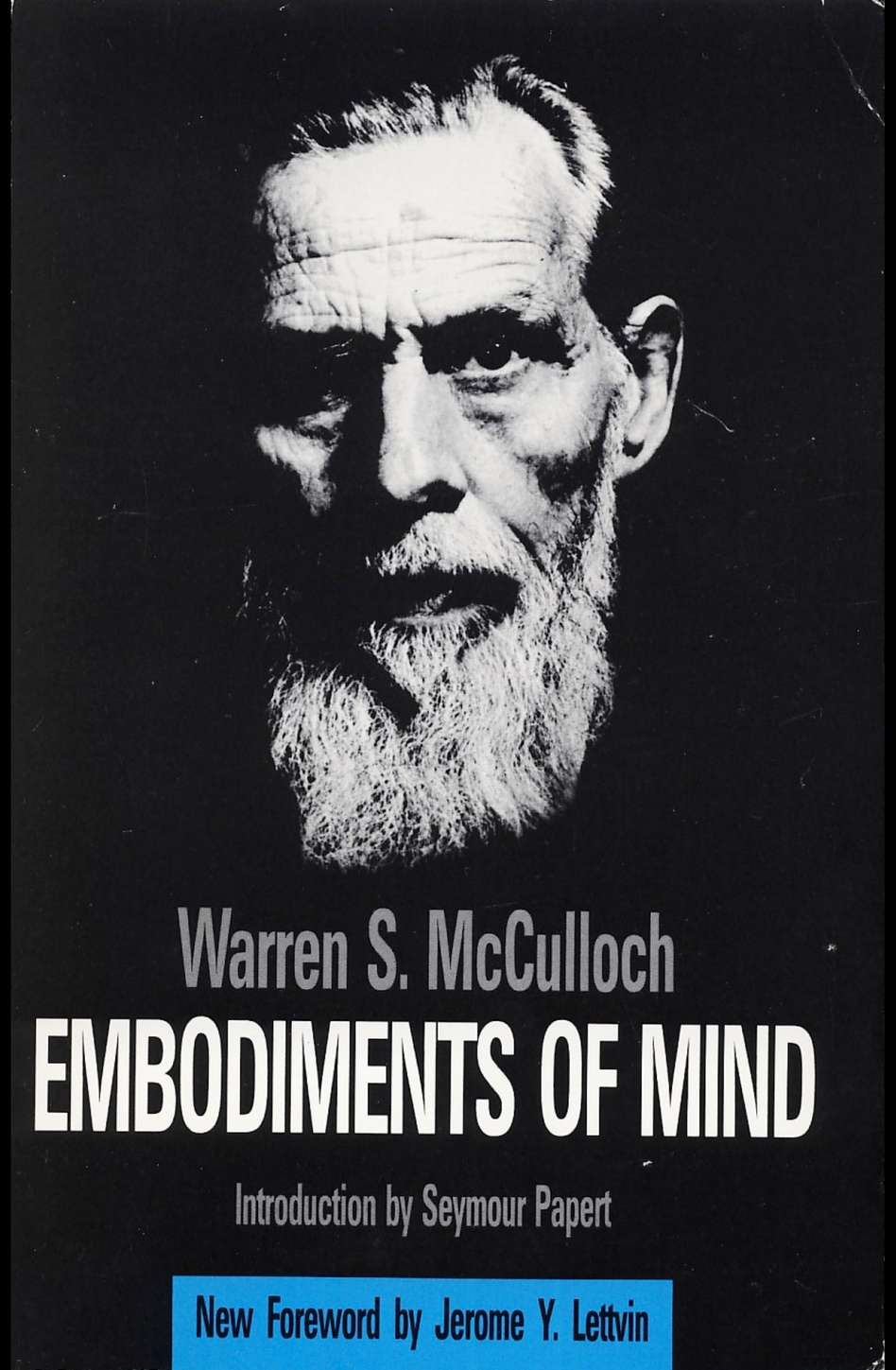


Cybernetics is the title of a book published in 1948 by Norbert Wiener.

Photo: MIT Archives

Wiener became world-famous for his work in cybernetics.

But he was not the only important figure at the origin of the field.



Warren McCulloch was a neurophysiologist and genius who gathered world-renowned scientists to a series of conferences.

CYBERNETICS

CIRCULAR CAUSAL AND FEEDBACK MECHANISMS
IN BIOLOGICAL AND SOCIAL SYSTEMS

Transactions of the Tenth Conference
April 22, 23, and 24, 1953, Princeton, N. J.

Edited by

HEINZ VON FOERSTER
DEPARTMENT OF ELECTRICAL ENGINEERING
UNIVERSITY OF ILLINOIS
CHAMPAIGN, ILL.

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AMERICAN MUSEUM OF NATURAL HISTORY
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NEW YORK UNIVERSITY COLLEGE OF MEDICINE
NEW YORK, N. Y.

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McCulloch organized the Macy Meetings that founded the trans-disciplinary field of cybernetics.

Margaret Mead was heavily involved at the founding of cybernetics.

Margaret Mead was a world-renowned scholar who revolutionized anthropology.

Photo via UN Multimedia

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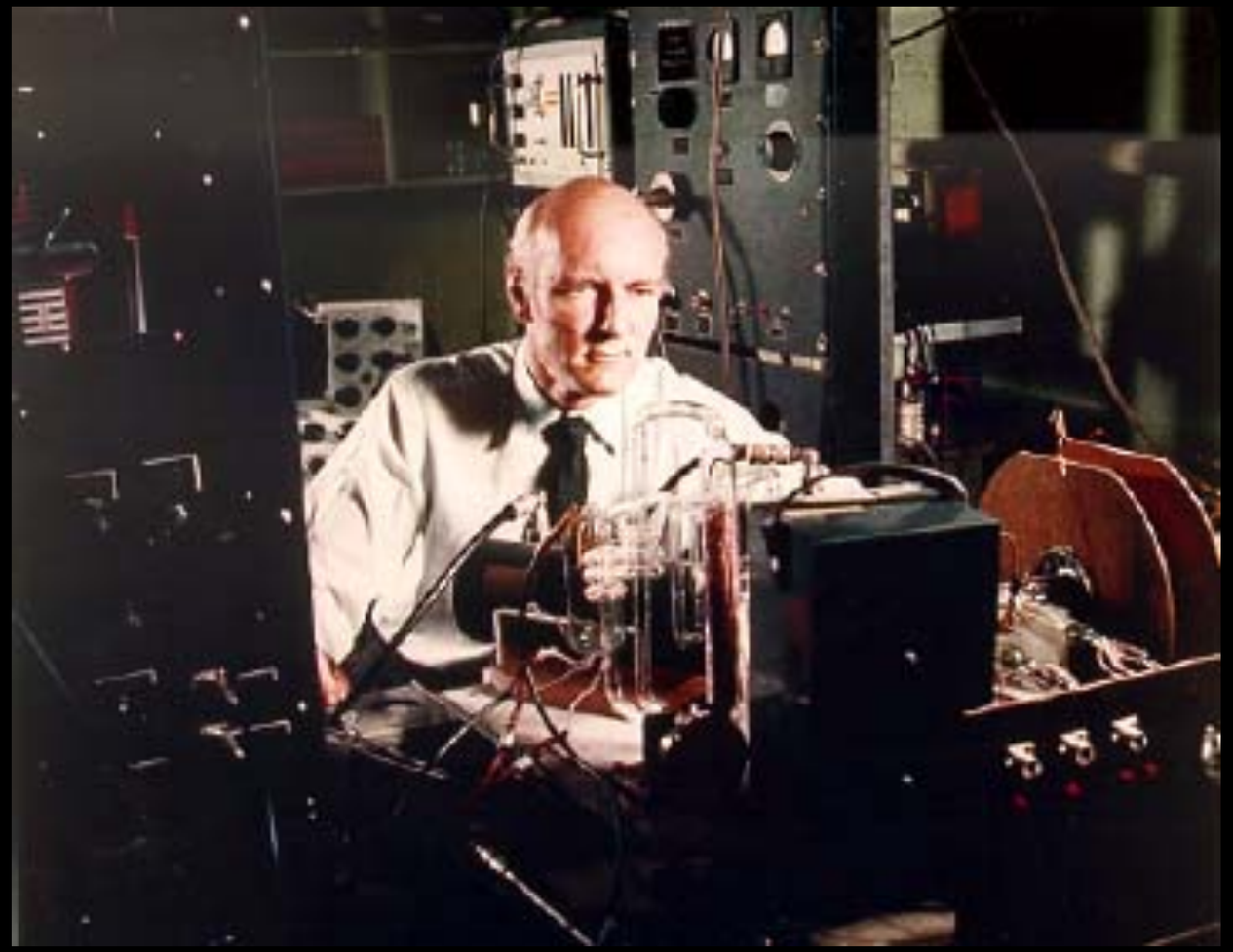
Heinz von Foerster was a physicist and charismatic personality who was also deeply involved.



Von Foerster ran the renowned Biological Computer Lab in Urbana from the 1950s to the 1970s.

He influenced generations of cyberneticians.

Photo: BCL Archives
University of Illinois
Urbana-Champaign

1982

Heinz von Foerster

OBSERVING SYSTEMS

THE SYSTEMS INQUIRY SERIES

PUBLISHED BY INTERSYSTEMS PUBLICATIONS

Understanding Understanding

Essays on Cybernetics and Cognition

Heinz von Foerster

2002

1953

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* This is the final conference.
† Absent.

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FRANK FREMONT-SMITH, *Medical Director*
JANET FREED LYNCH, *Assistant for the Conference Program*

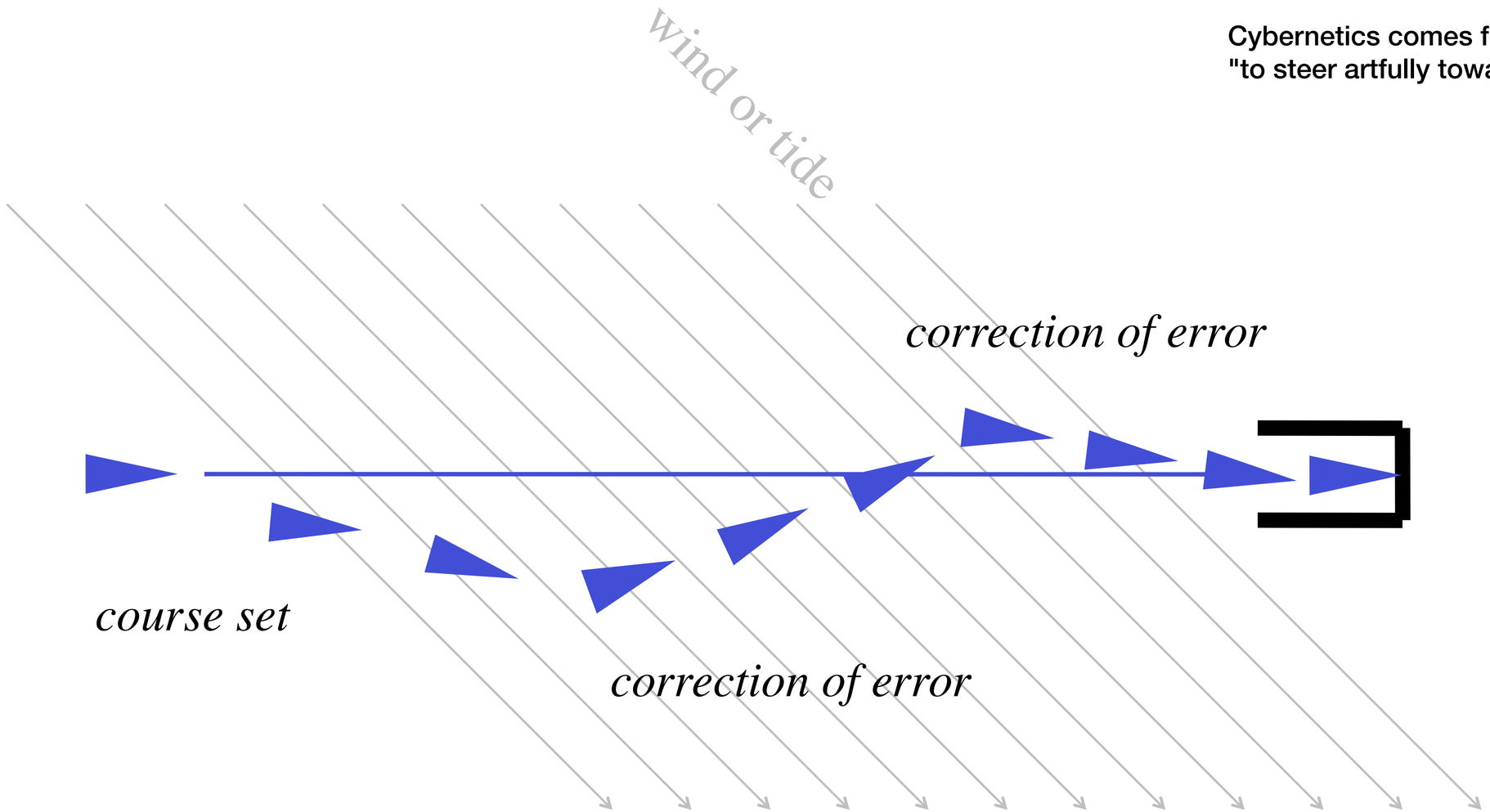
† Absent.

Great thinkers from all the major disciplines were involved in conversations that created cybernetics.

This list from 1953 is from one of 10 meetings held between 1946 and 1953.

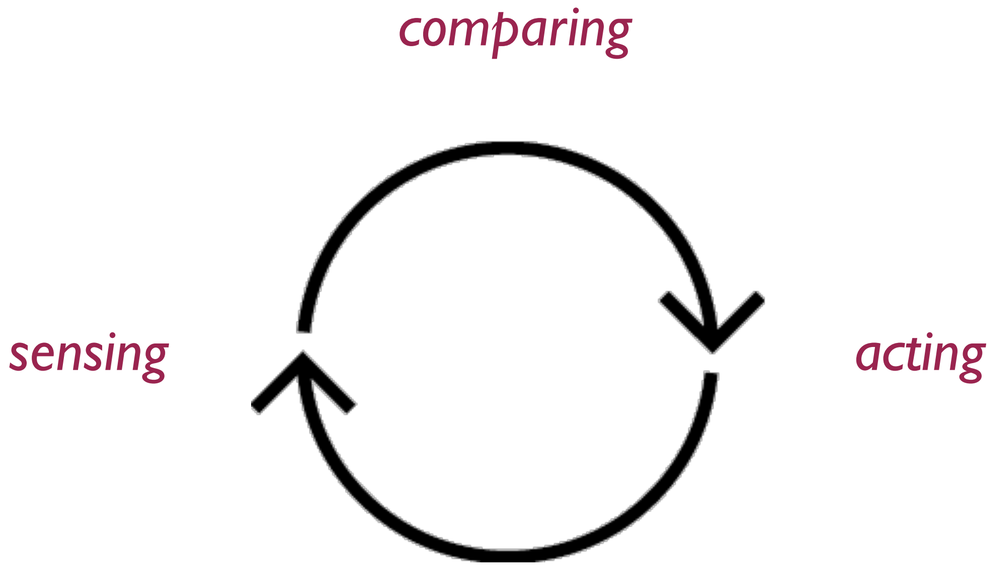
the art of steering

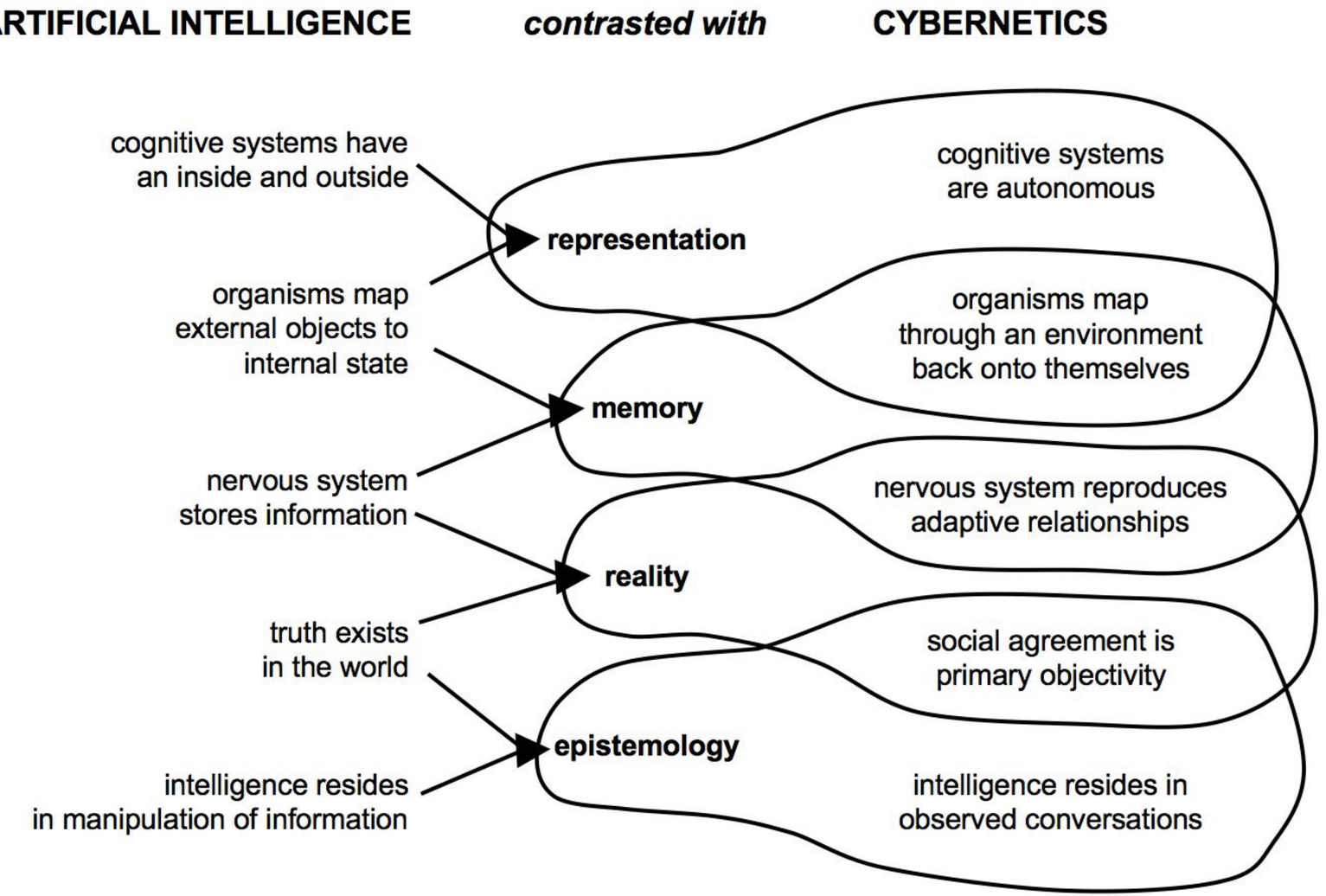
Cybernetics comes from the Greek,
"to steer artfully toward a goal."



the art of steering

Cybernetics is the art and science of feedback and goals.





Cybernetics on pangaro.com

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Second-order Design & Ethical Interfaces

Placing Conversation at the Heart of Interaction

Second-order Design = Design for Conversation

The goal of second-order design is to facilitate the emergence of conditions in which others can design — to create conditions in which conversations can emerge — and thus to increase the number of choices open to all.

— Dubberly & Pangaro, 2019: Cybernetics and Design: Conversations for Action

Placing Conversation at the Heart of Interaction

Designers, can we enable conversation for others?
Can we design for interaction that…

- ***asks great questions***
- ***offers different ways to achieve your goal***
- ***collaborates with you to define new goals***
- ***helps you to be what you want to be… or to become.***

“As a designer, I shall act always so as to increase the total number of choices for a user.”

— Ethical Imperative, Interaction Designers

a. Recommendation Engines

Recommendations are based on who the user was — recommendations are based on the past.

At worst, the interface presumes a non-evolving, non-living user.

b. Search Engines

Search results are based on who the user was — search results are grounded in the past.

Search results are "of the past" – they are "dead on arrival."

Recommendations & Search Results = Looking Backward

These engines deliver outcomes based on the past — treating us as we used to be, as if we are dead.

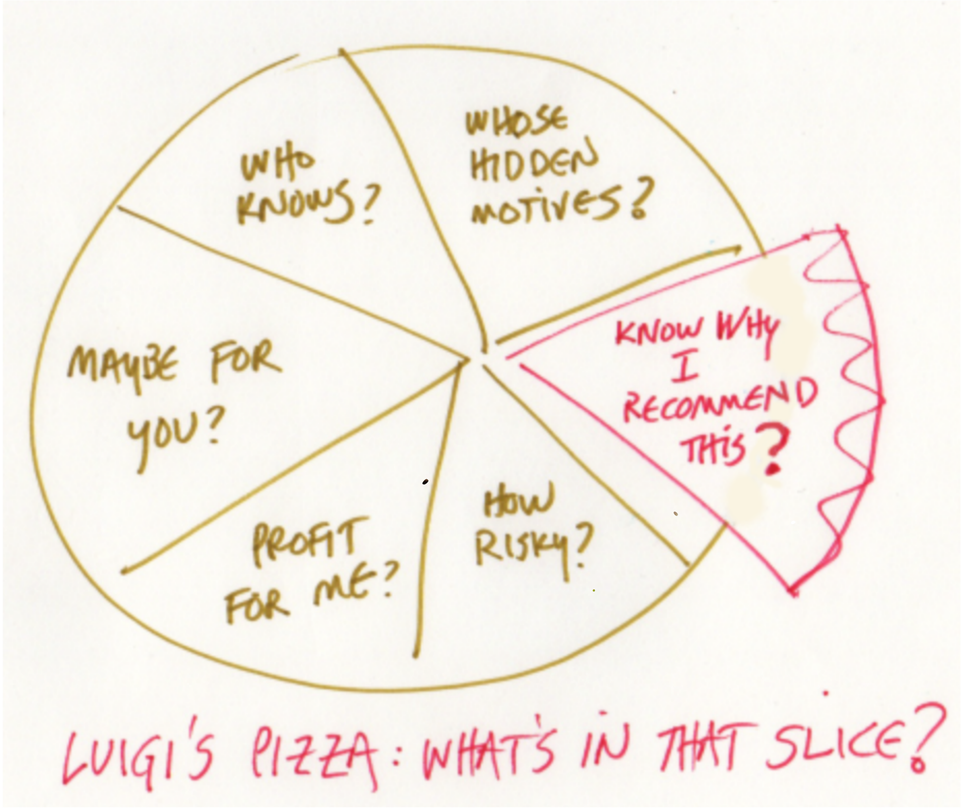
Questions are alive — questions are "of the now."

How would a user manifest as *alive* in these interactions?

Design Prototype #1: Build Question Engines

Compute relevant questions that invite a generative conversation such that novel, forward-seeing choices may be explored.

Luigi’s Pizza — A Parable



More about Luigi's Pizza

Design Prototype #2 — Universal Dialog UI

Always incorporate a dialogical interface so that a user can question the computed offering of any recommendation or result.

"Why did you recommend that? Where did that result come from?"

"Did you consider this (objective) factor or this (subjective) concern?"

Design Prototype #3 — "Intelligent Conversation" Metric

Implement a heuristic to evaluate a conversation in terms of its intelligence and value, in order to draw human attention to generative interactions.

In contrast to the "Turing Test", let's build a "Turning Test."

Click for more

Design & Prototyping – Research Questions

#1. Question Engine – Do users evolve better understanding?

#2. Universal Dialog UI – Do users increase their agency?

#3. Turning Test – Do users improve their focus of attention?

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Social Graph of Cybernetics

Dubberly & Pangaro, 2015: How cybernetics connects computing, counterculture, and design

Macy Conferences

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Warren McCulloch, Chair

Margaret Mead

Walter Pitts

Claude Shannon

Heinz von Foerster

John von Neumann

Norbert Wiener

R.D. Laing

Ivan Sutherland

BCL

Ross Ashby

Humberto Maturana

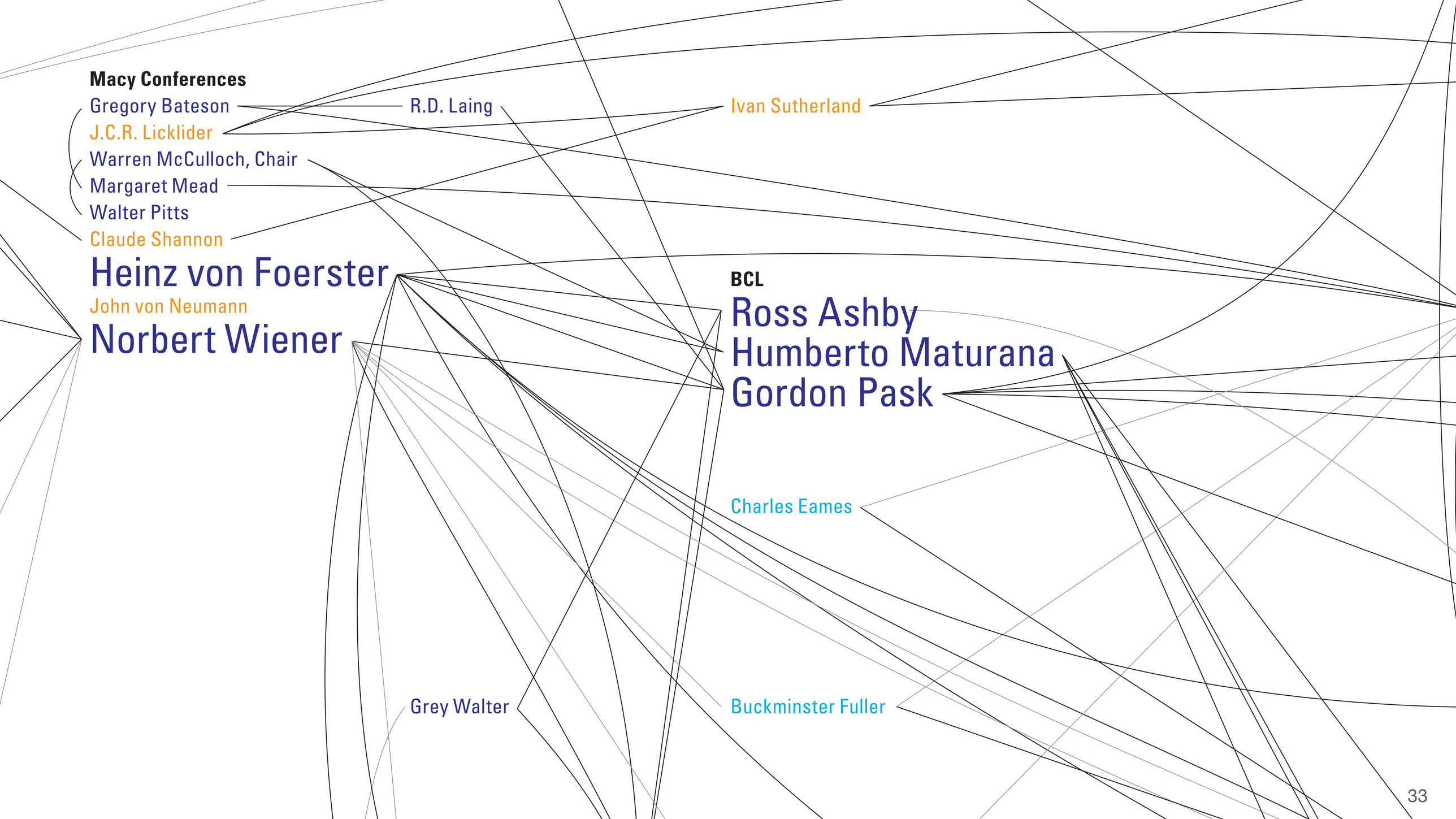
Gordon Pask

Charles Eames

Buckminster Fuller

Grey Walter

There is a larger story to tell about the influence of cybernetics on the history of design and especially interaction design.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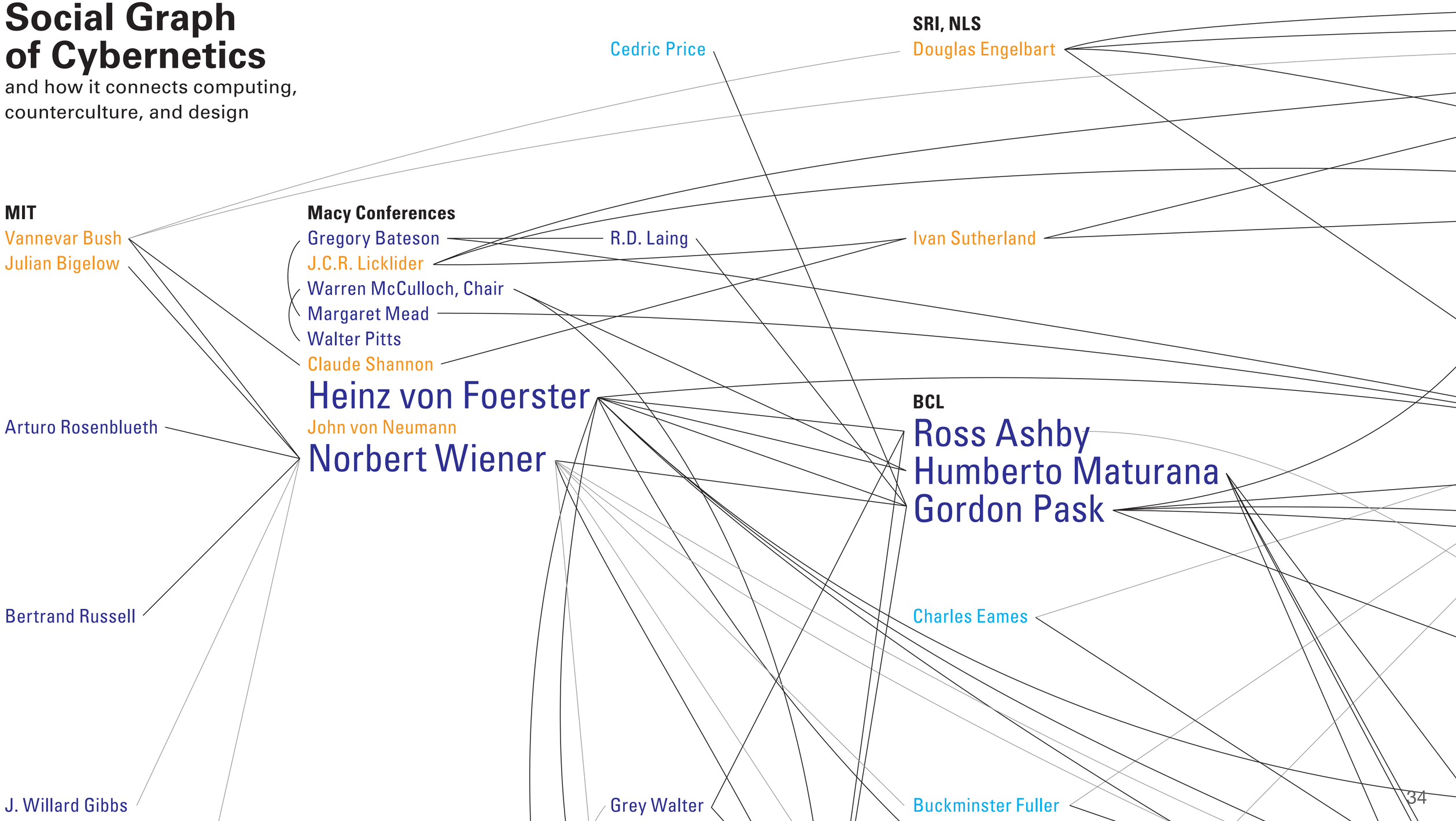
Social Graph of Cybernetics

and how it connects computing, counterculture, and design



Graph
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connects computing,
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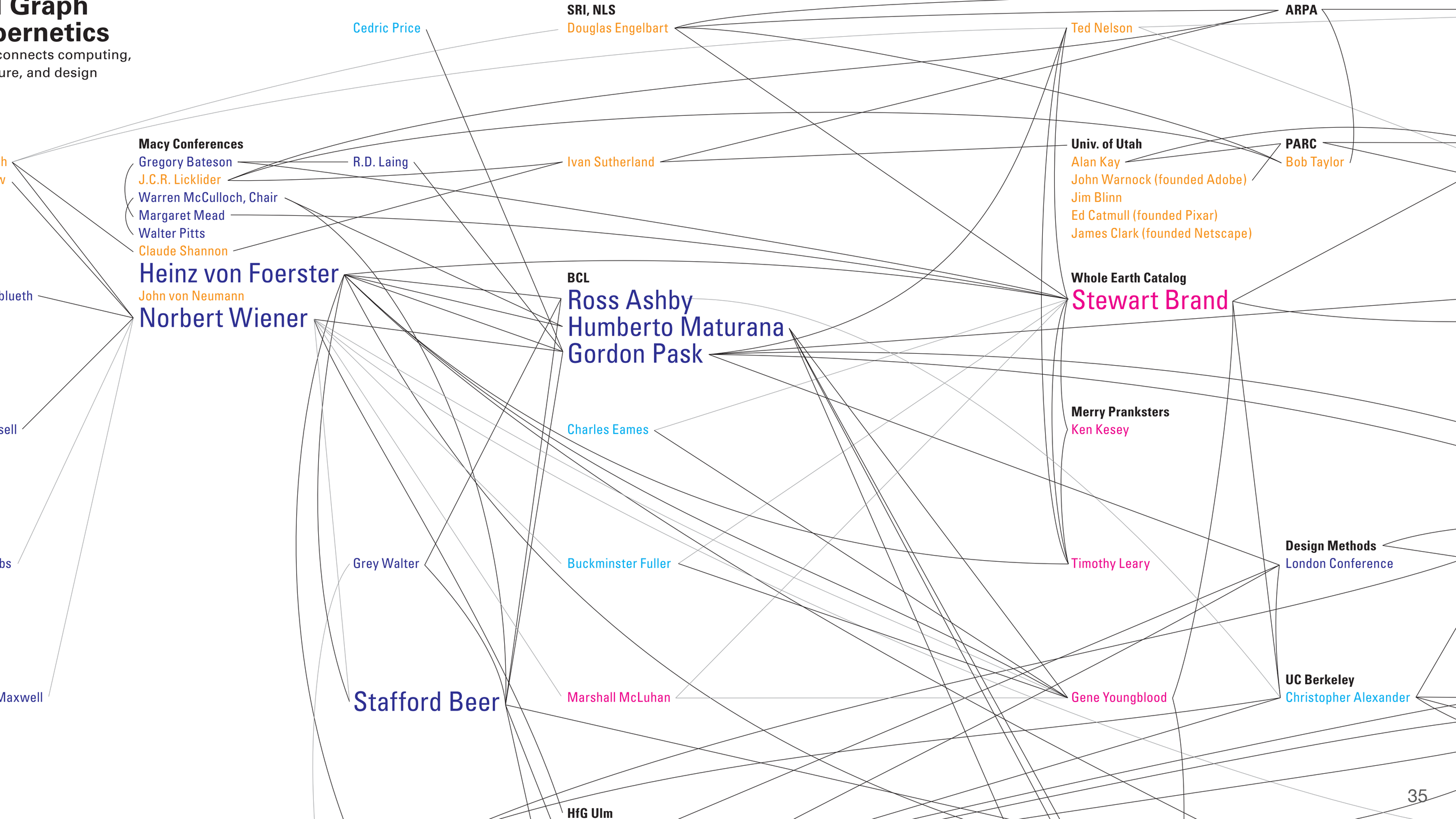

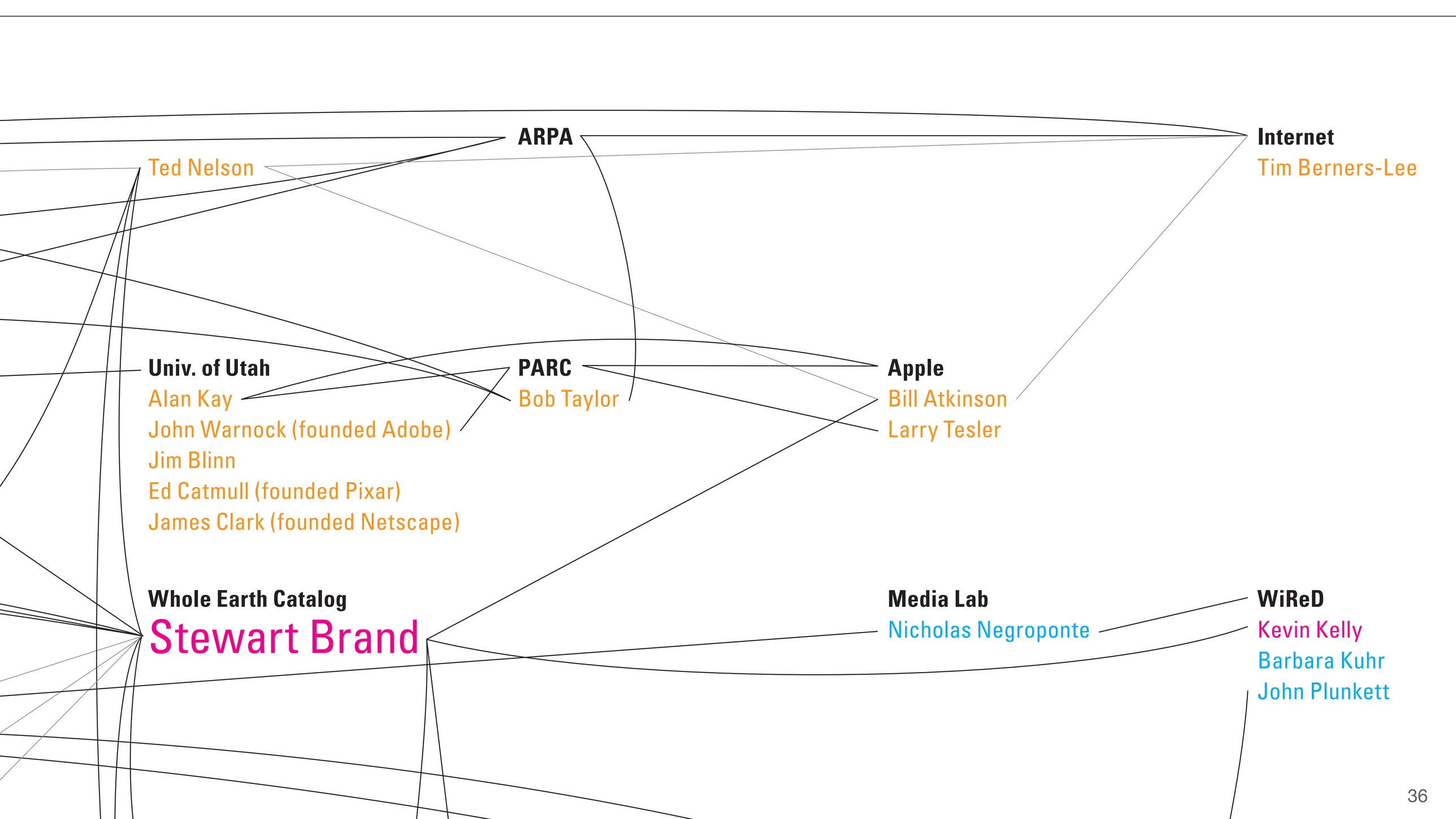
ARPA
Internet
Tim Berners-Lee
Ted Nelson
Univ. of Utah
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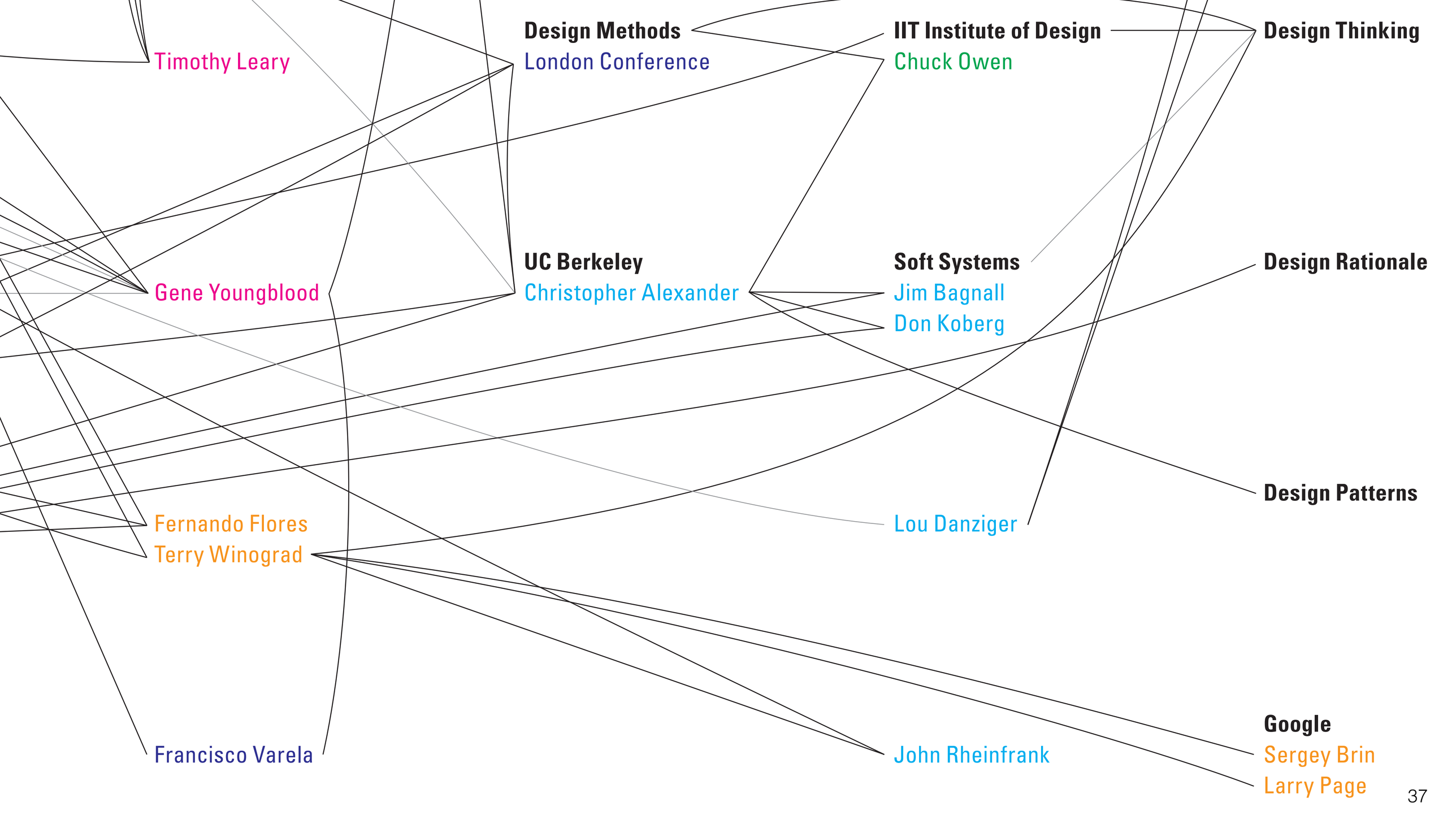
Jim Blinn
Ed Catmull (founded Pixar)
James Clark (founded Netscape)
PARC
Bob Taylor
Apple
Bill Atkinson
Larry Tesler
Whole Earth Catalog
Stewart Brand
Media Lab
Nicholas Negroponte
WiReD
Kevin Kelly
Barbara Kuhr
John Plunkett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UC Berkeley
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Soft Systems
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Don Koberg
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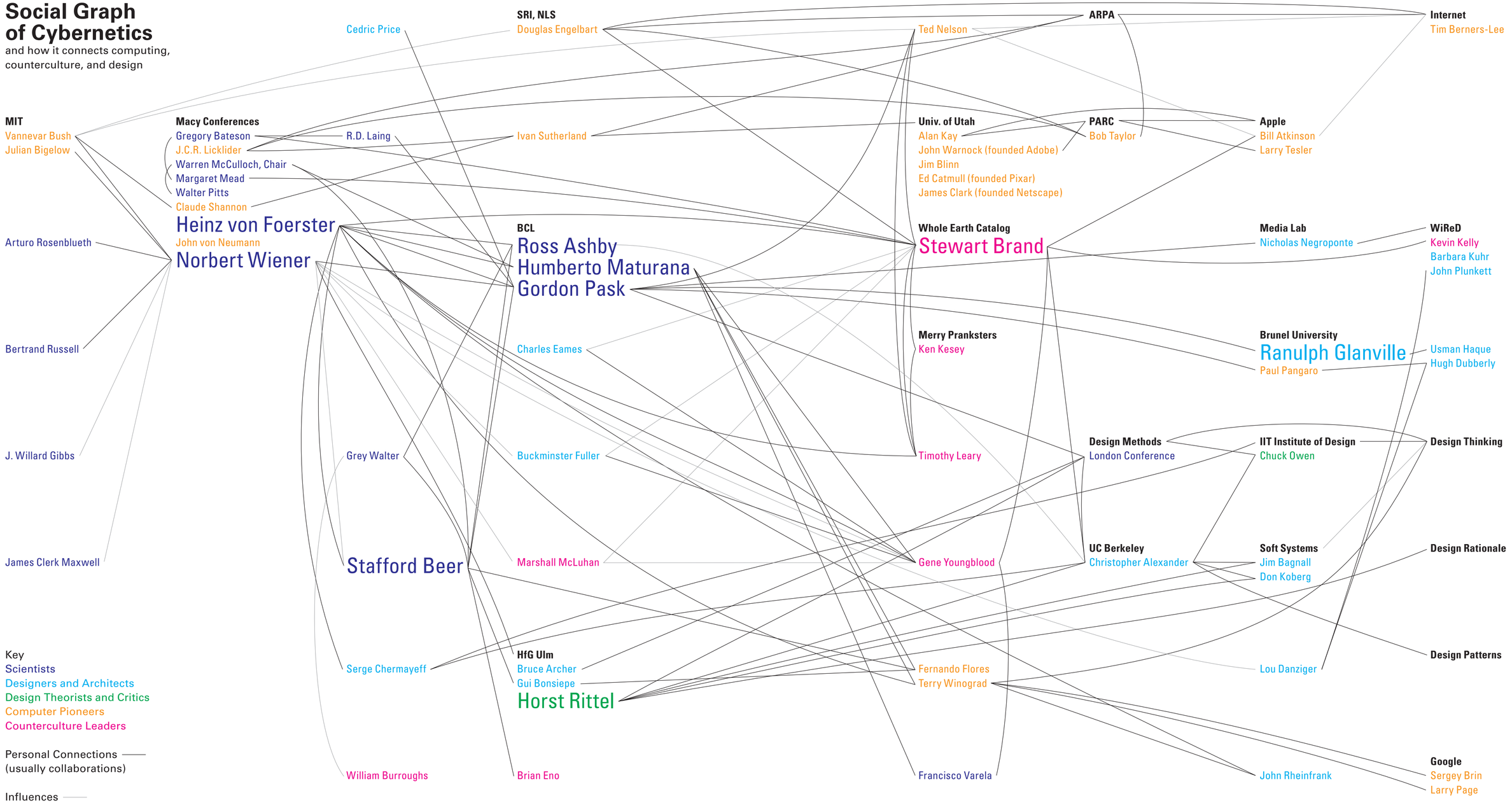
Social Graph of Cybernetics

and how it connects computing, counterculture, and design

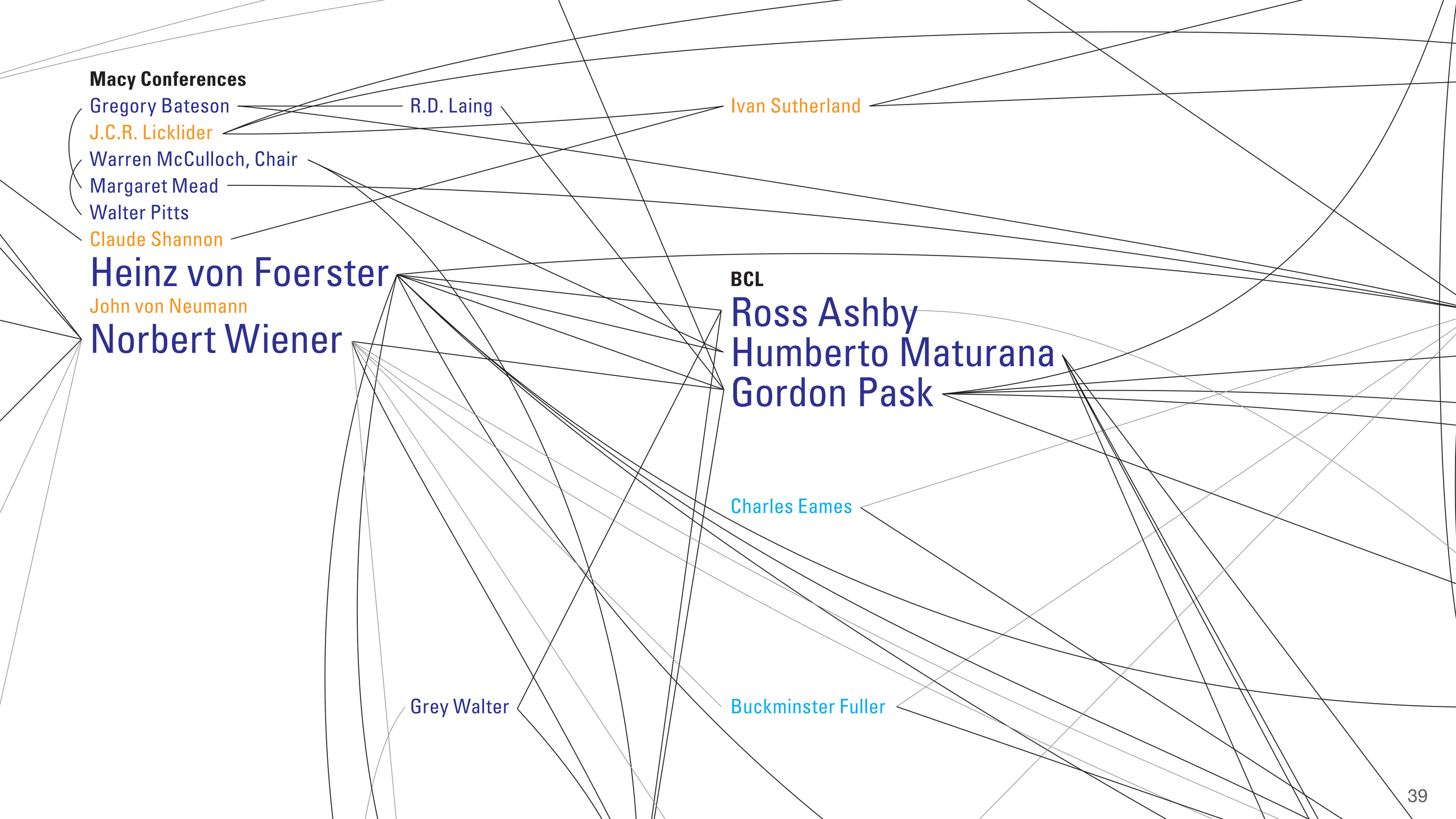


Key
Scientists
Designers and Architects
Design Theorists and Critics
Computer Pioneers
Counterculture Leaders

Personal Connections ——
(usually collaborations)

Influences ——
(usually publications)

Interactive version at
http://cybergraph.dubberly.com/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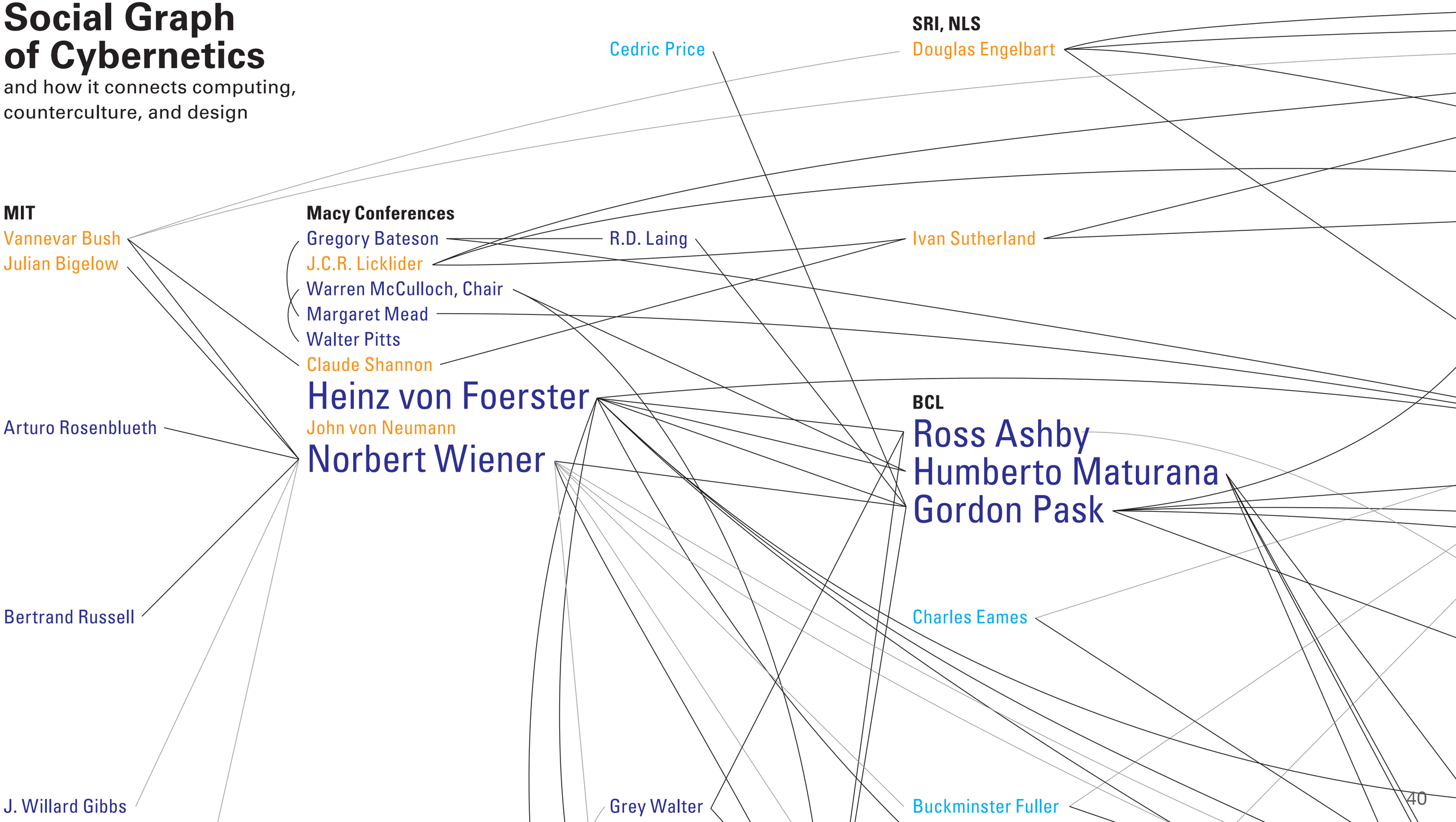

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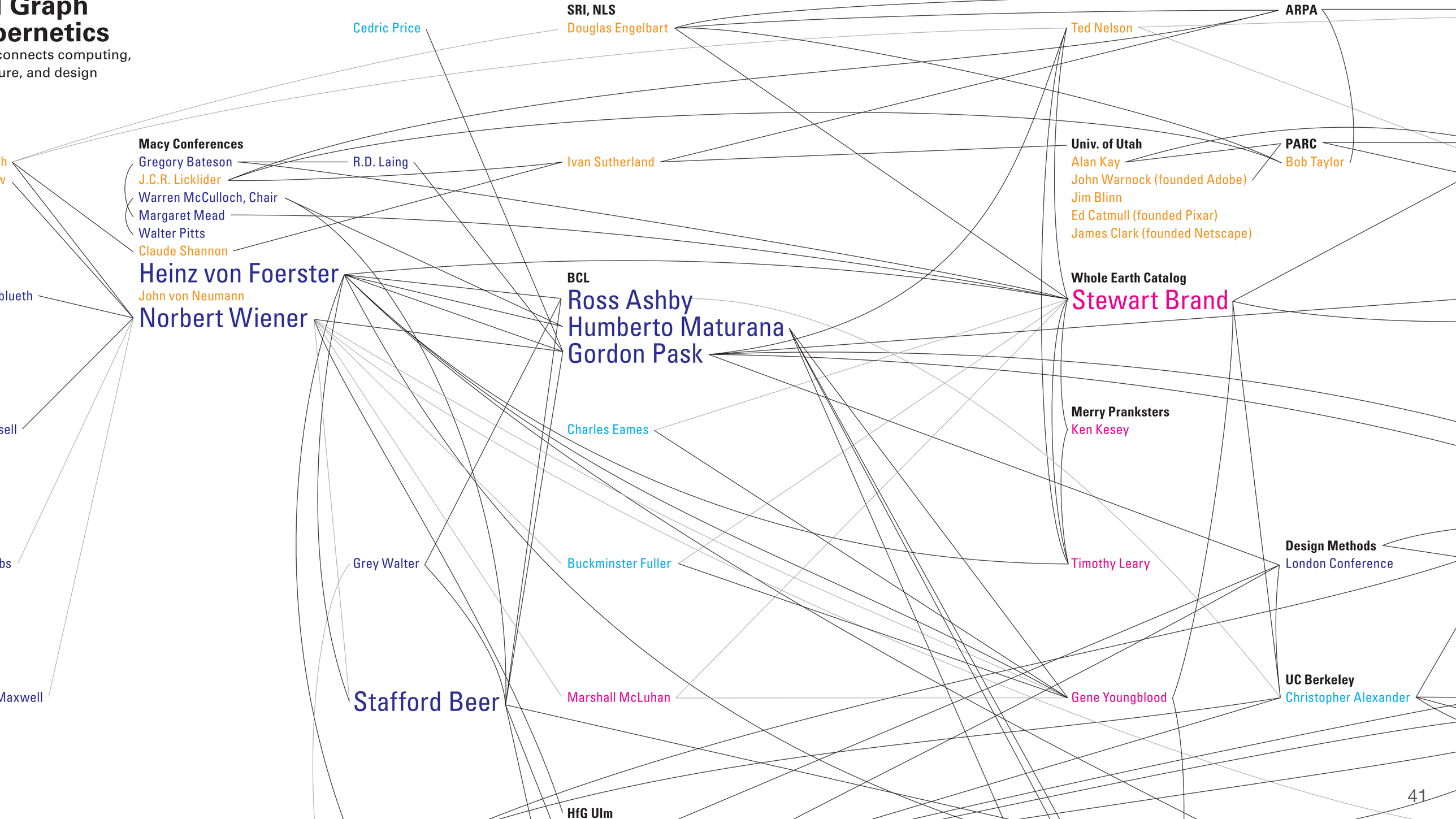

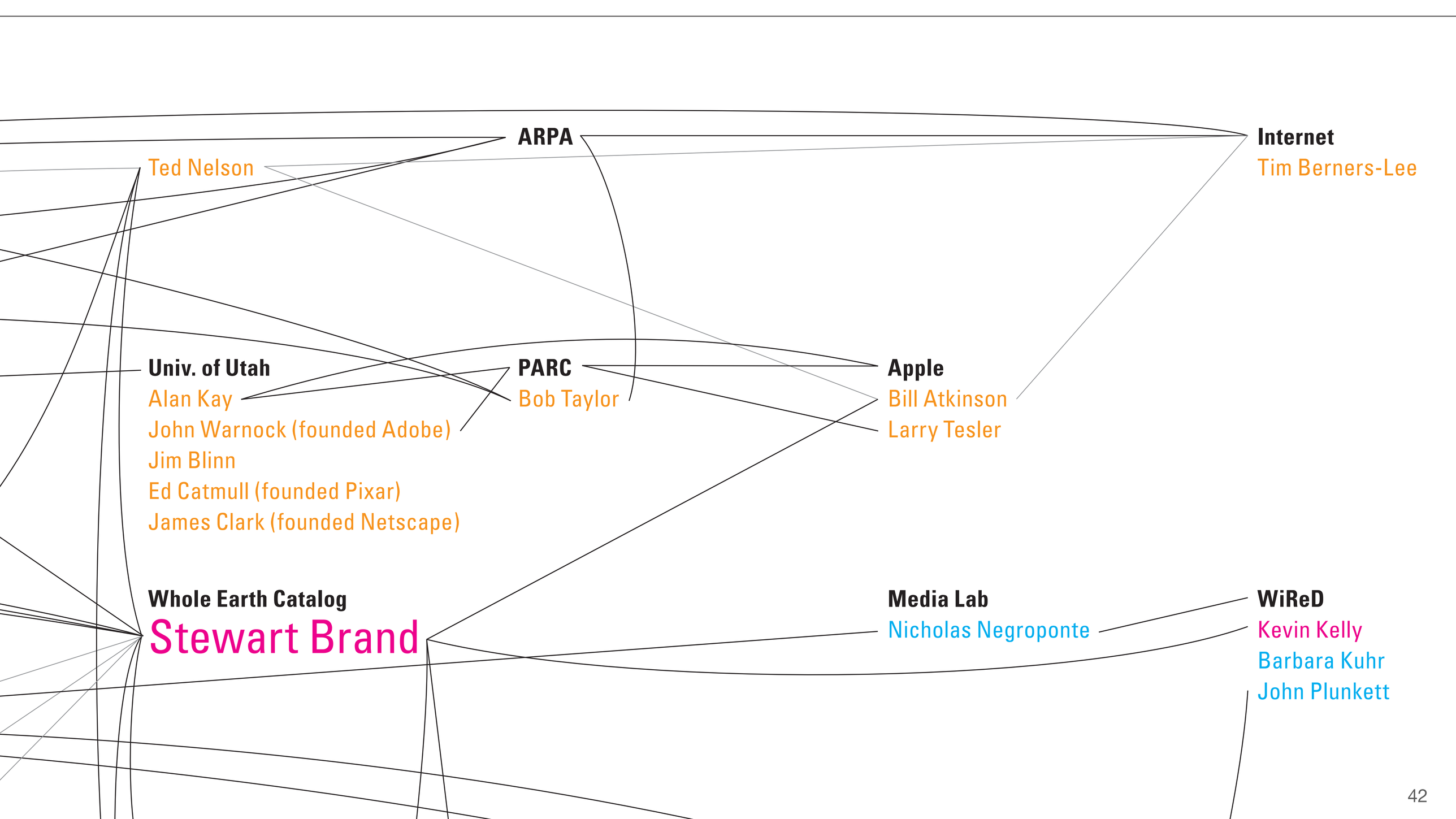
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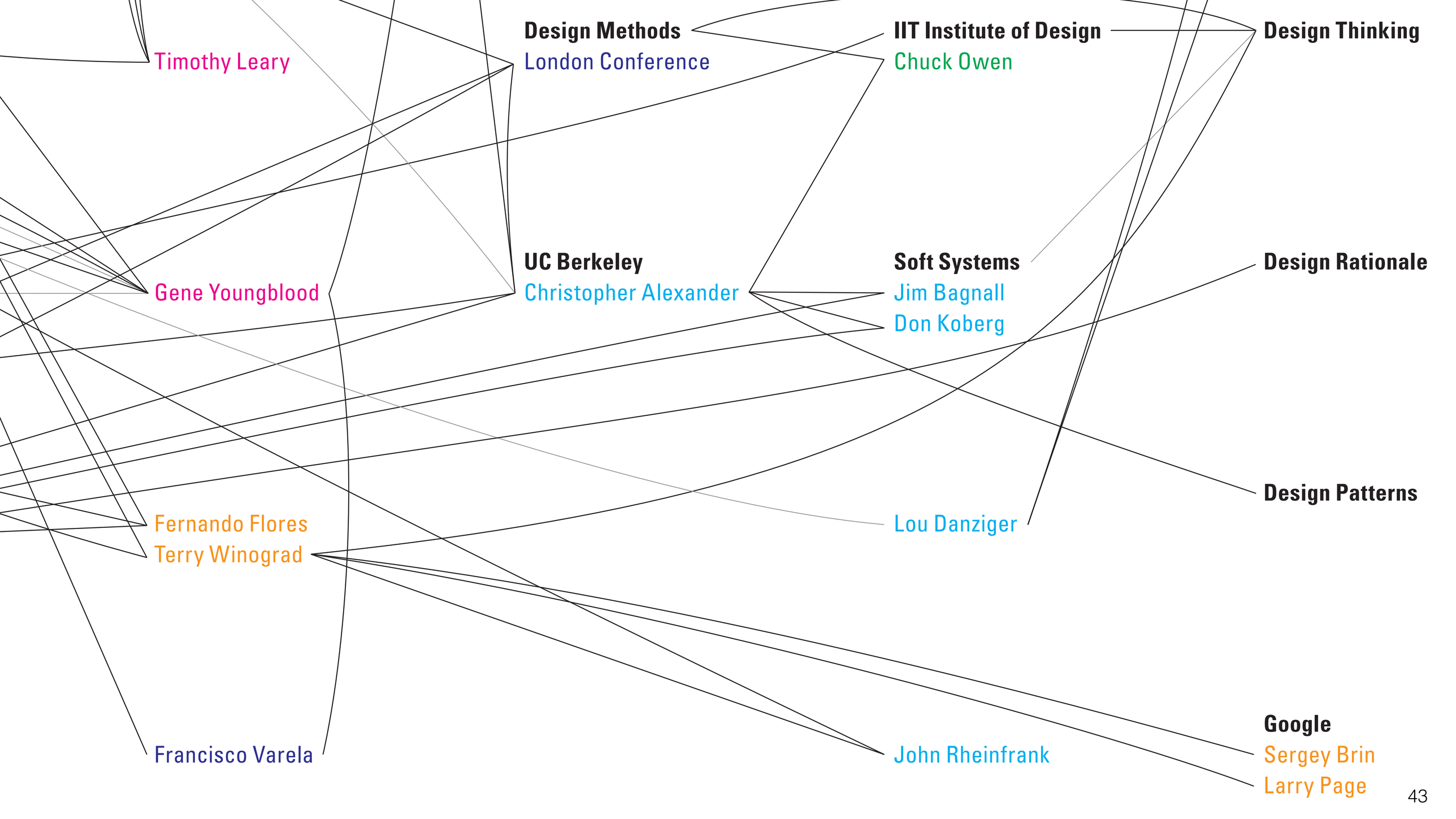
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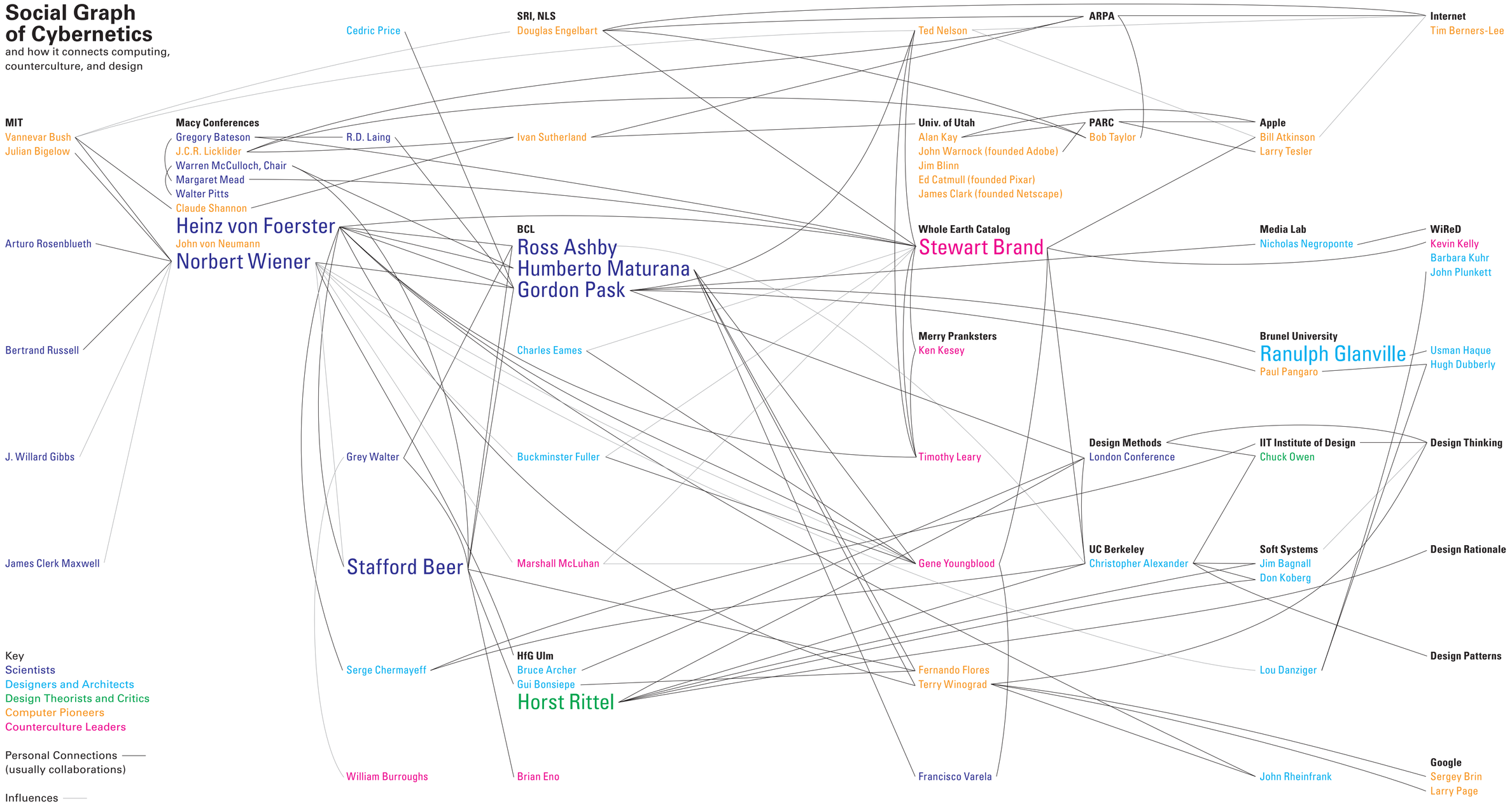

Dubberly & Pangaro, 2015: How cybernetics connects computing, counterculture, and design

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Gordon Pask

Early 1950s

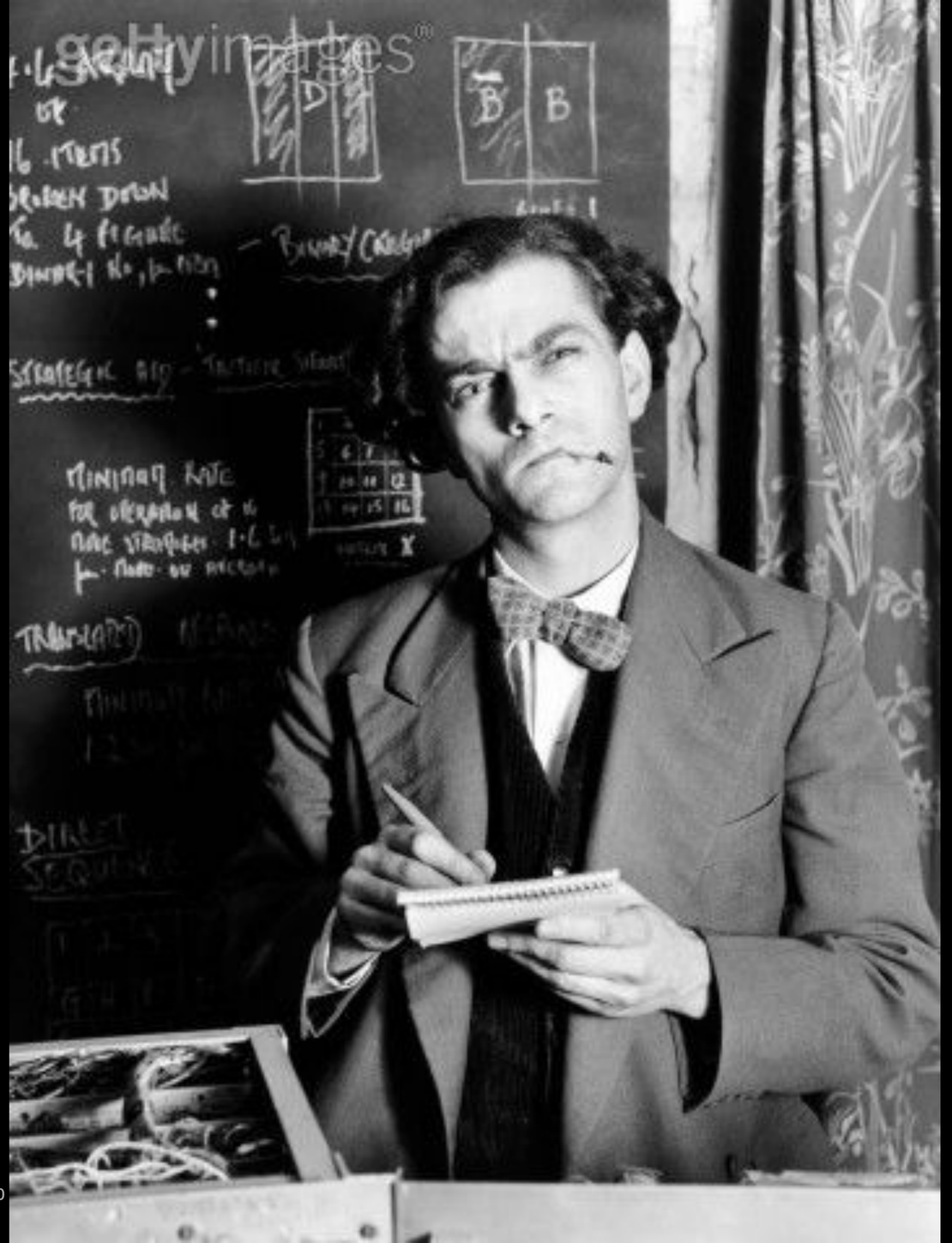


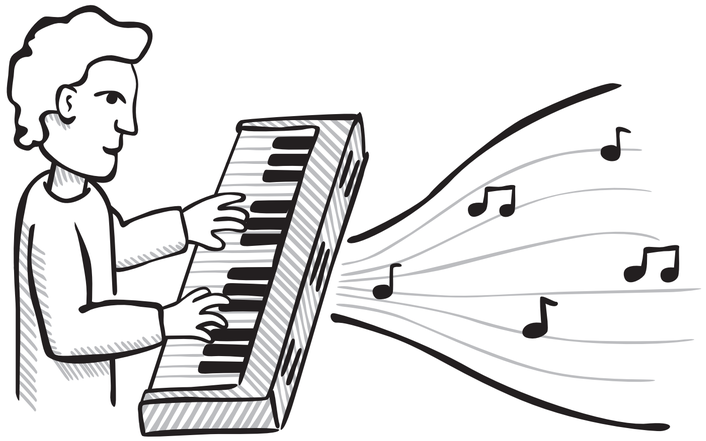
Photo: Uncredited

Gordon Pask was a wunderkind who was doing cybernetics before he knew it.

He realized it only after meeting Norbert Wiener.

Pask’s first interactive machine was called Musicolour, completed in 1953.

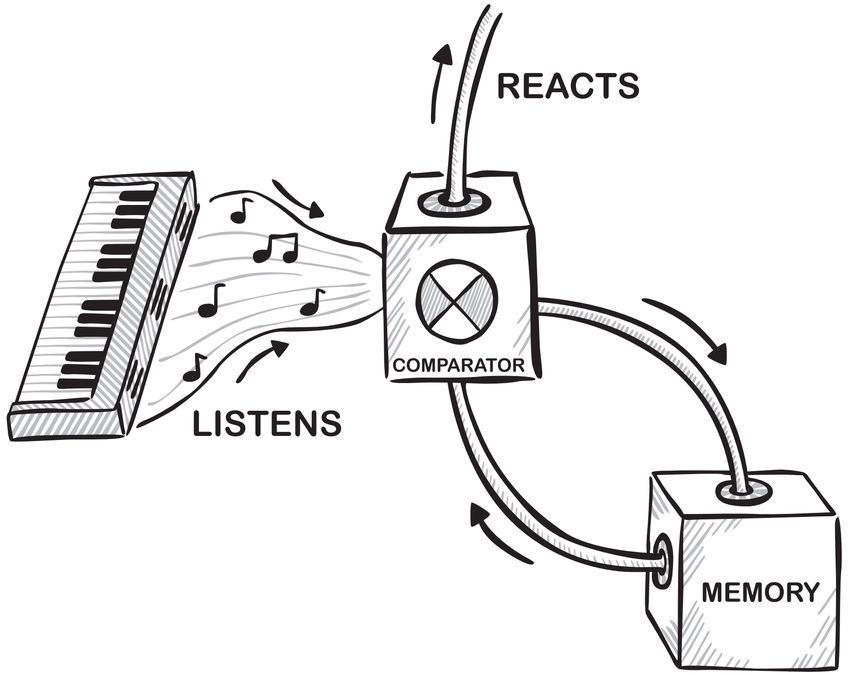
A musician improvises on any musical instrument.

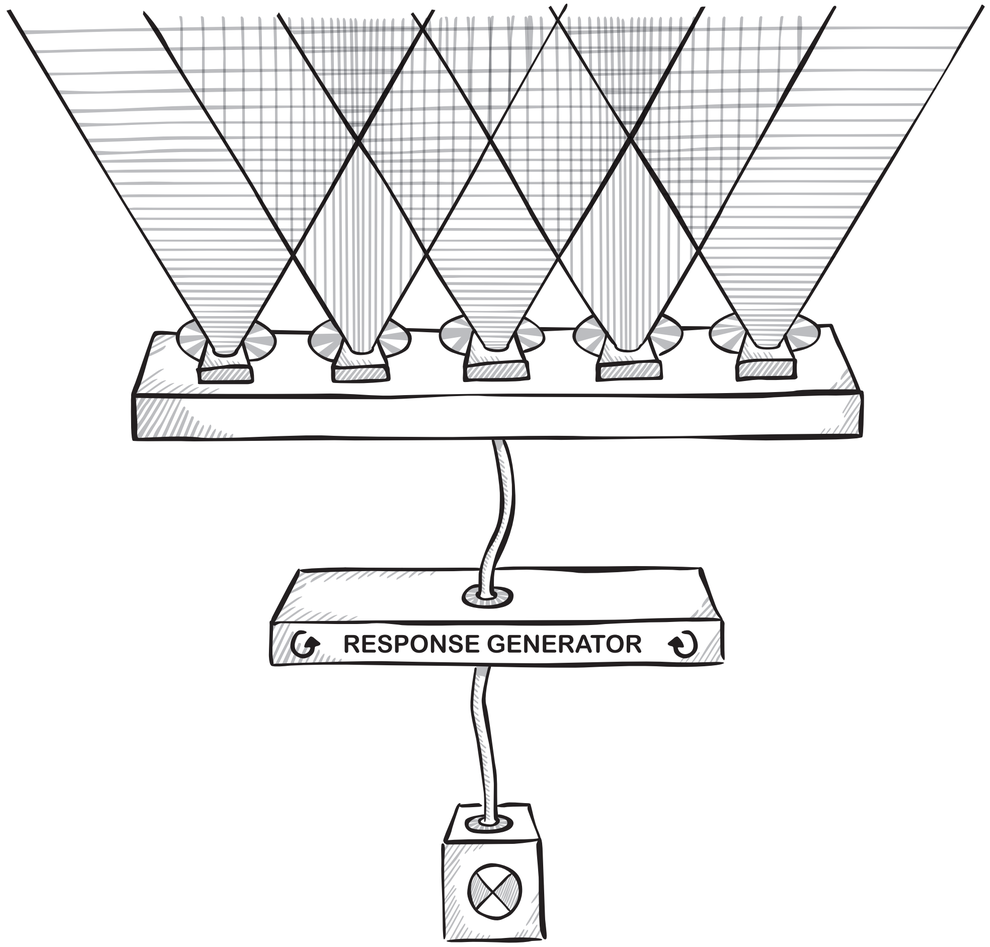


Musicolour listens in real-time and reacts, depending on what came before.

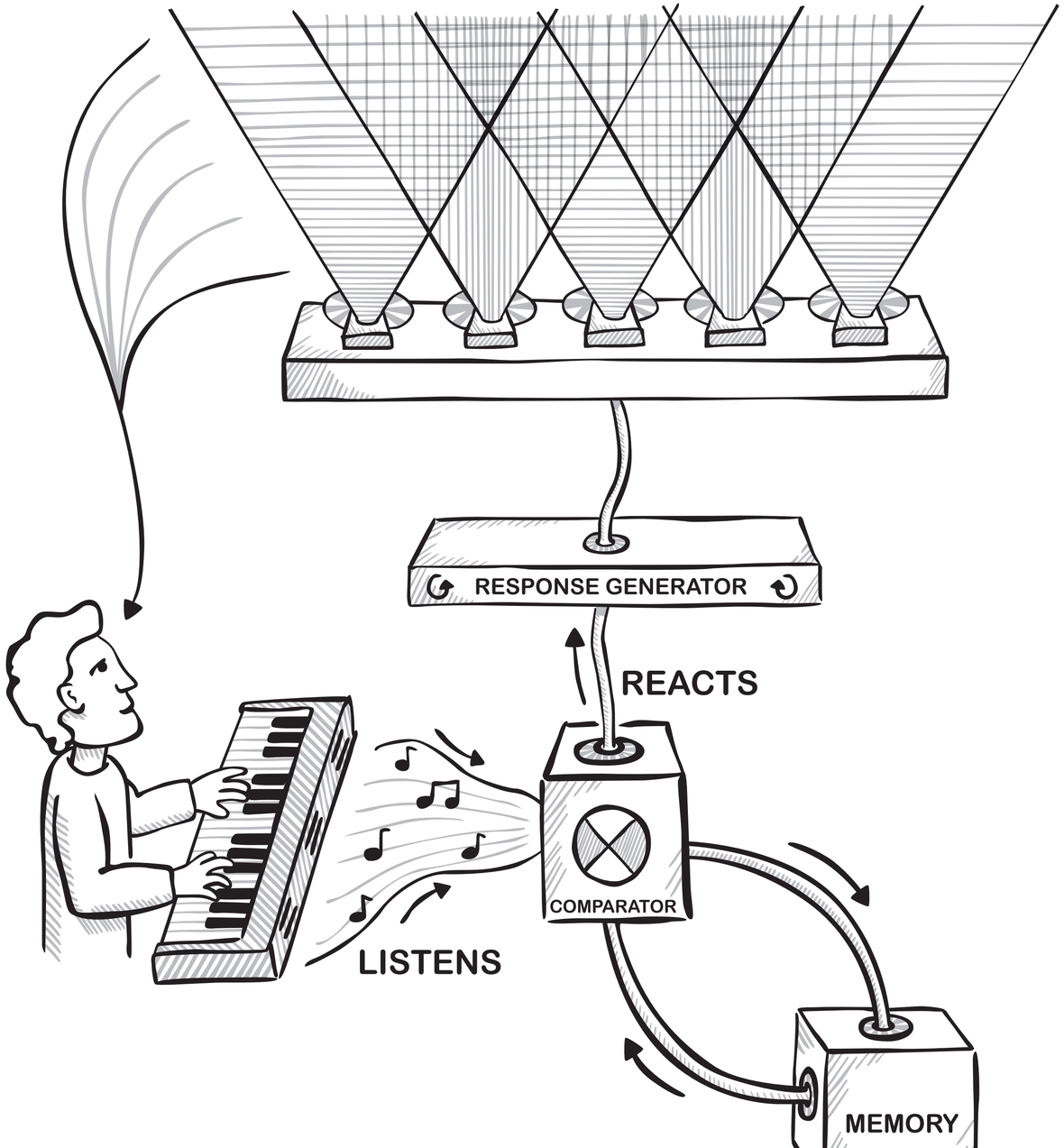
It’s purpose is to avoiding getting "bored."

It wants the music to change over time.





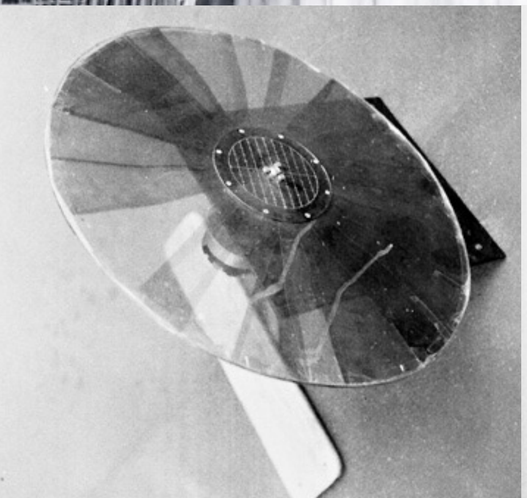
If the music is changing, Musicolour responds with colored lights that synch with the music—but its response also changes over time.

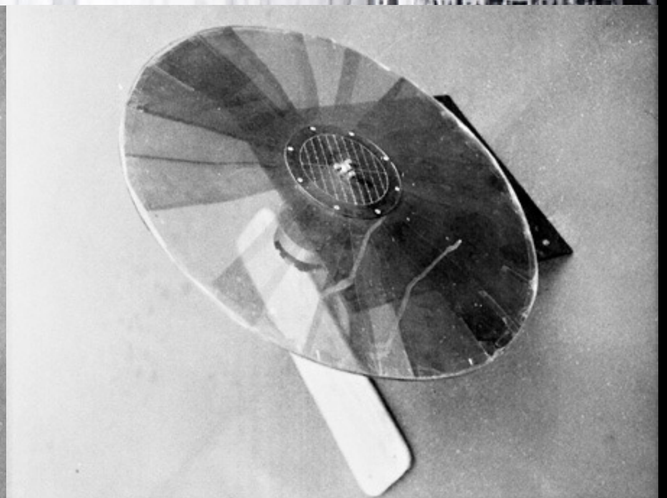


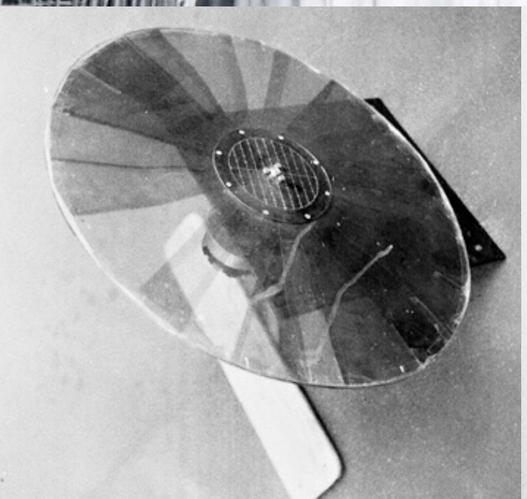
If the musician sees Musicolour is not responding, he changes his playing.

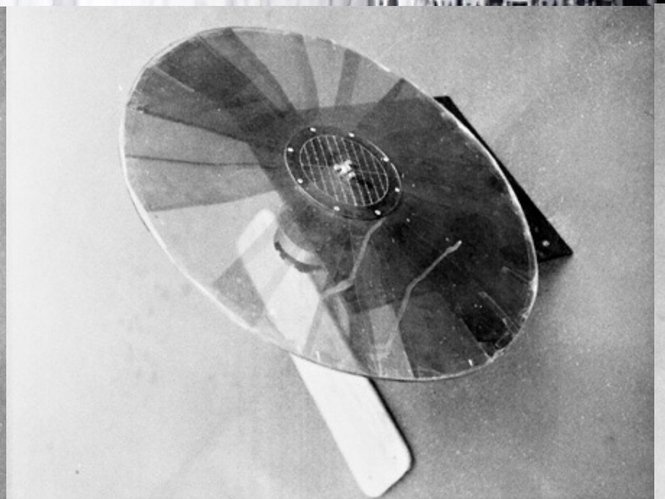
Musicolour provokes a conversation between human and machine.

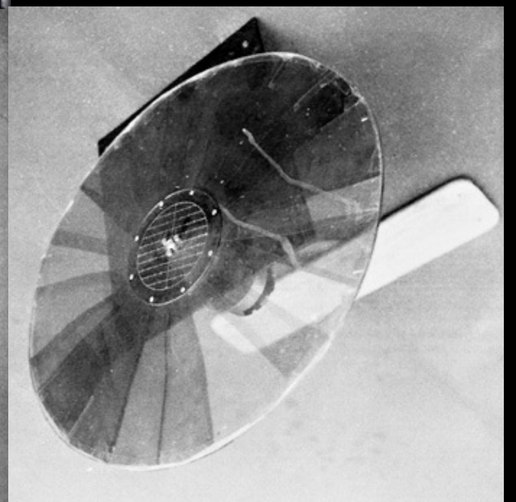
Pask installed Musicolour
in venues around England.





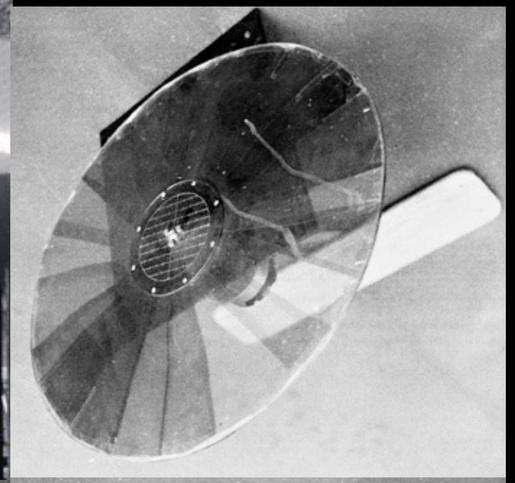


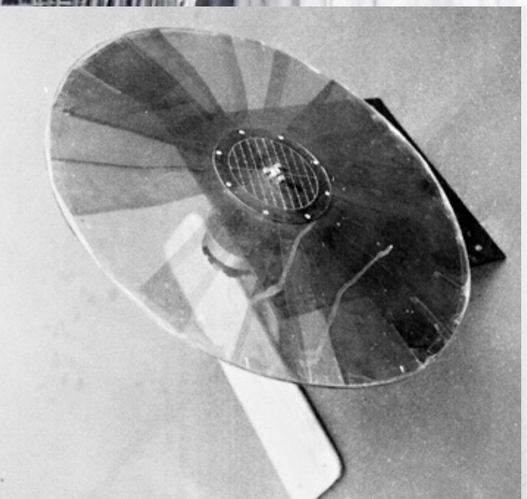


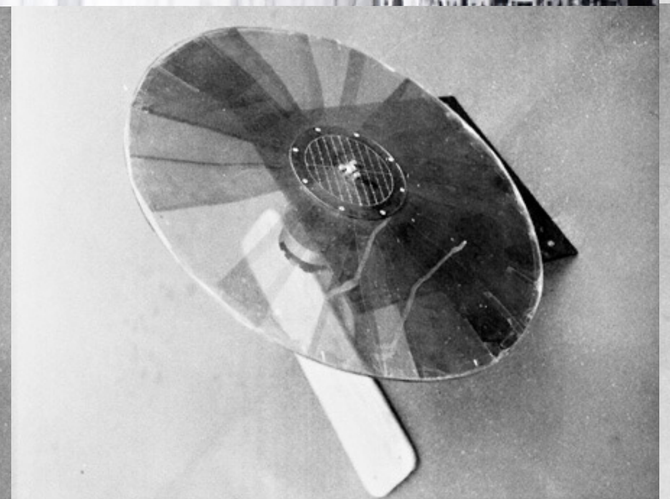


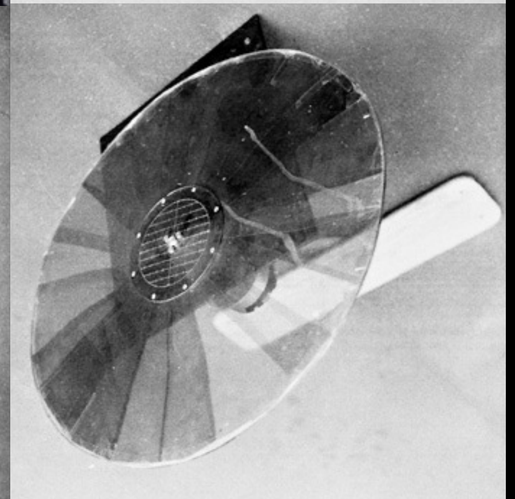
Lights were configured to shine on curtains.

The electronics were bulky and complex and could malfunction or catch fire.









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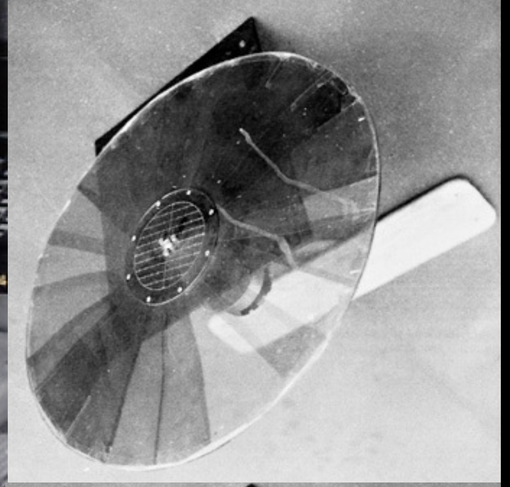

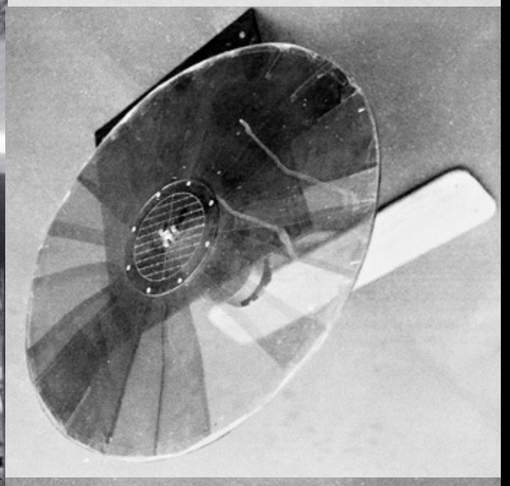

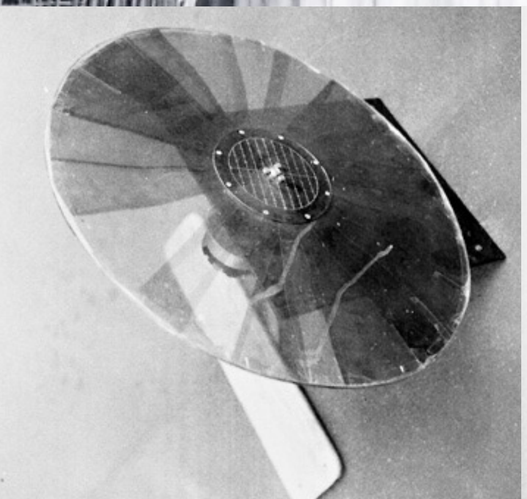

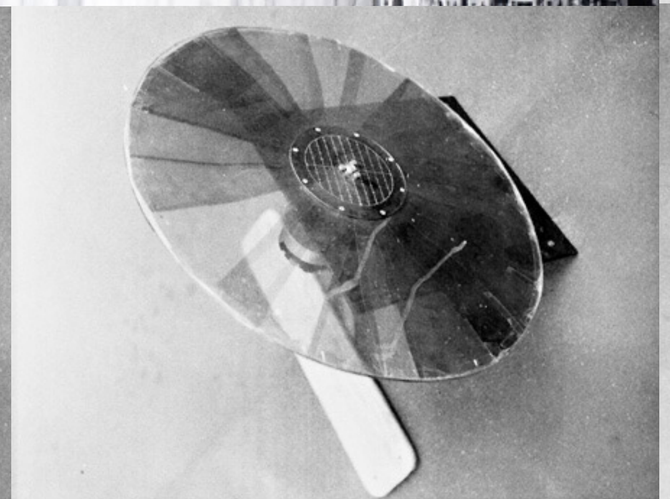

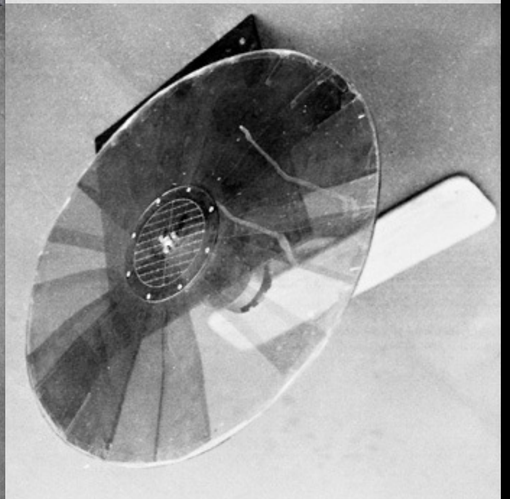

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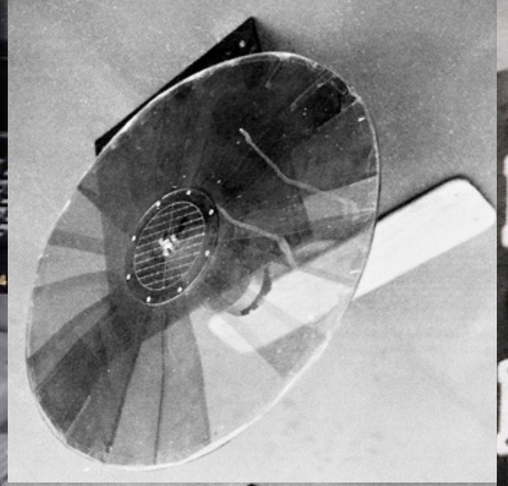
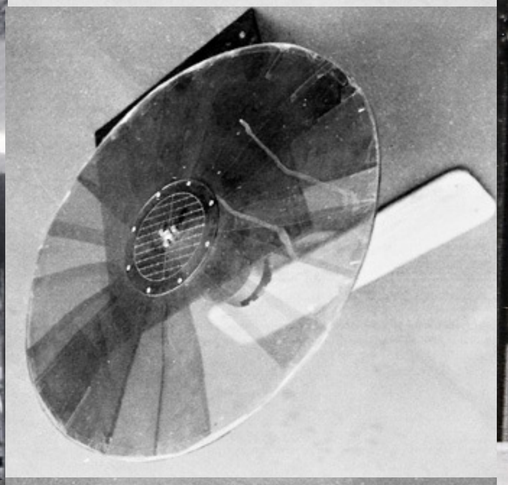
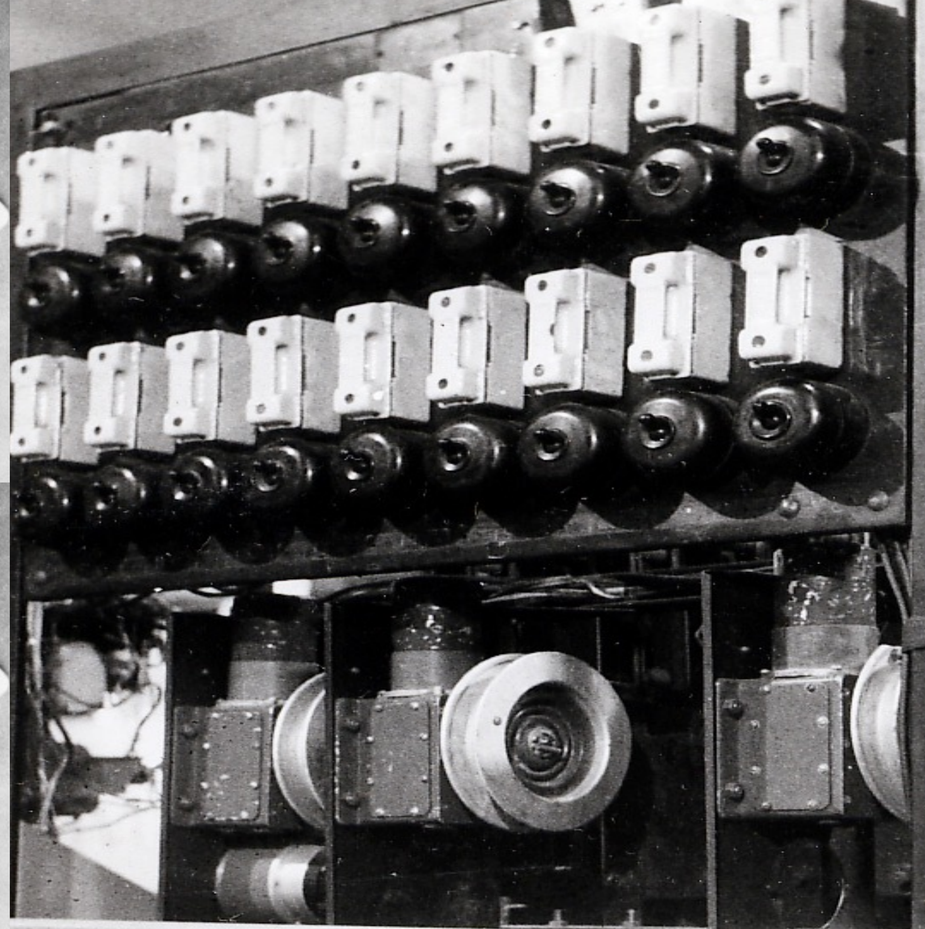
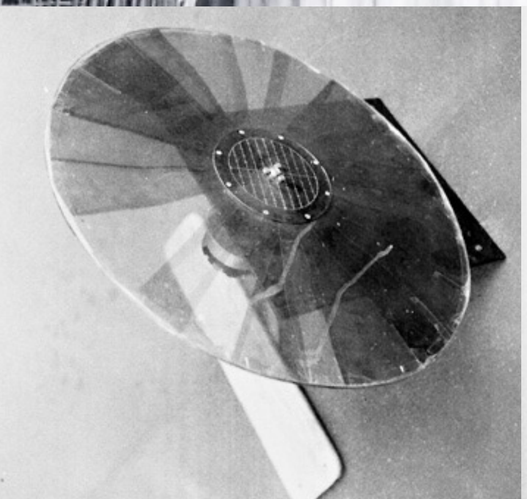
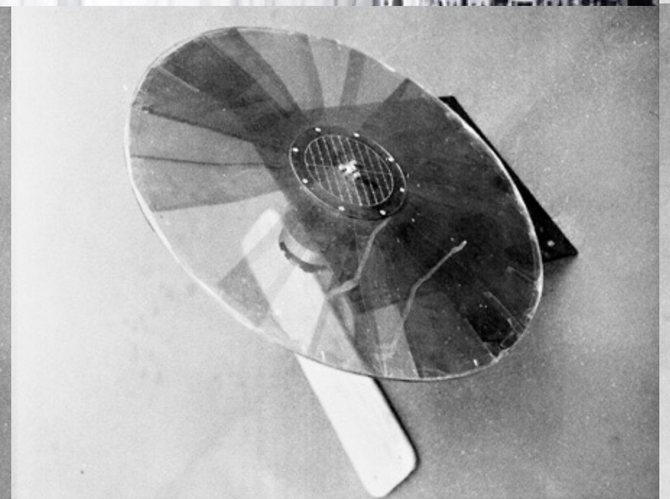
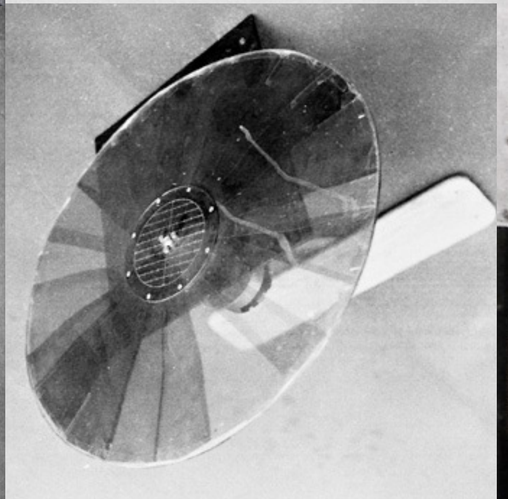


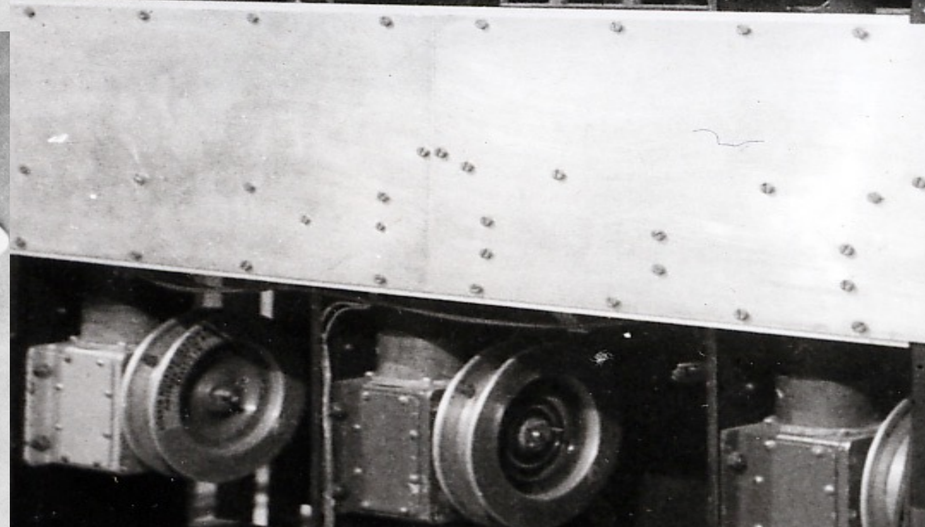


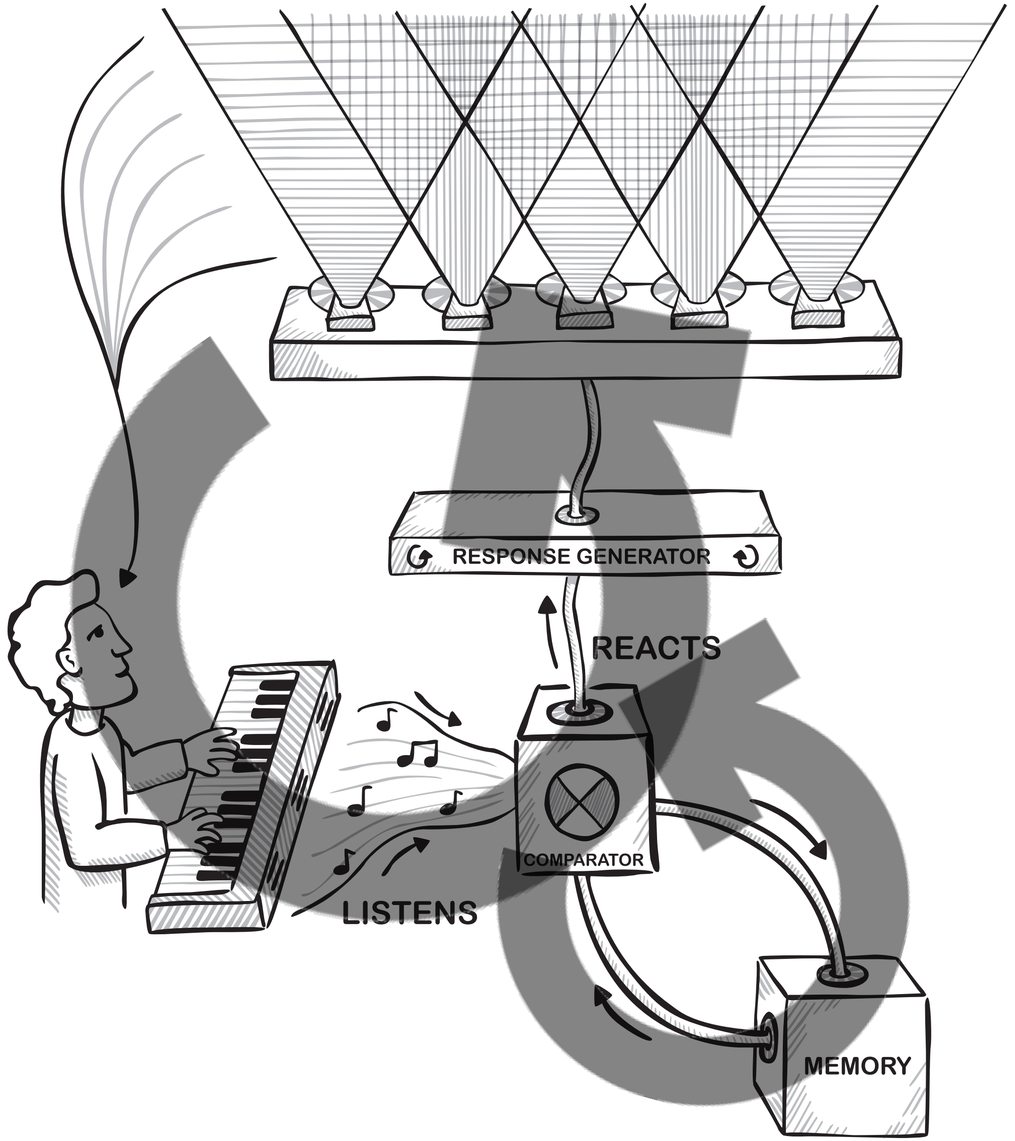








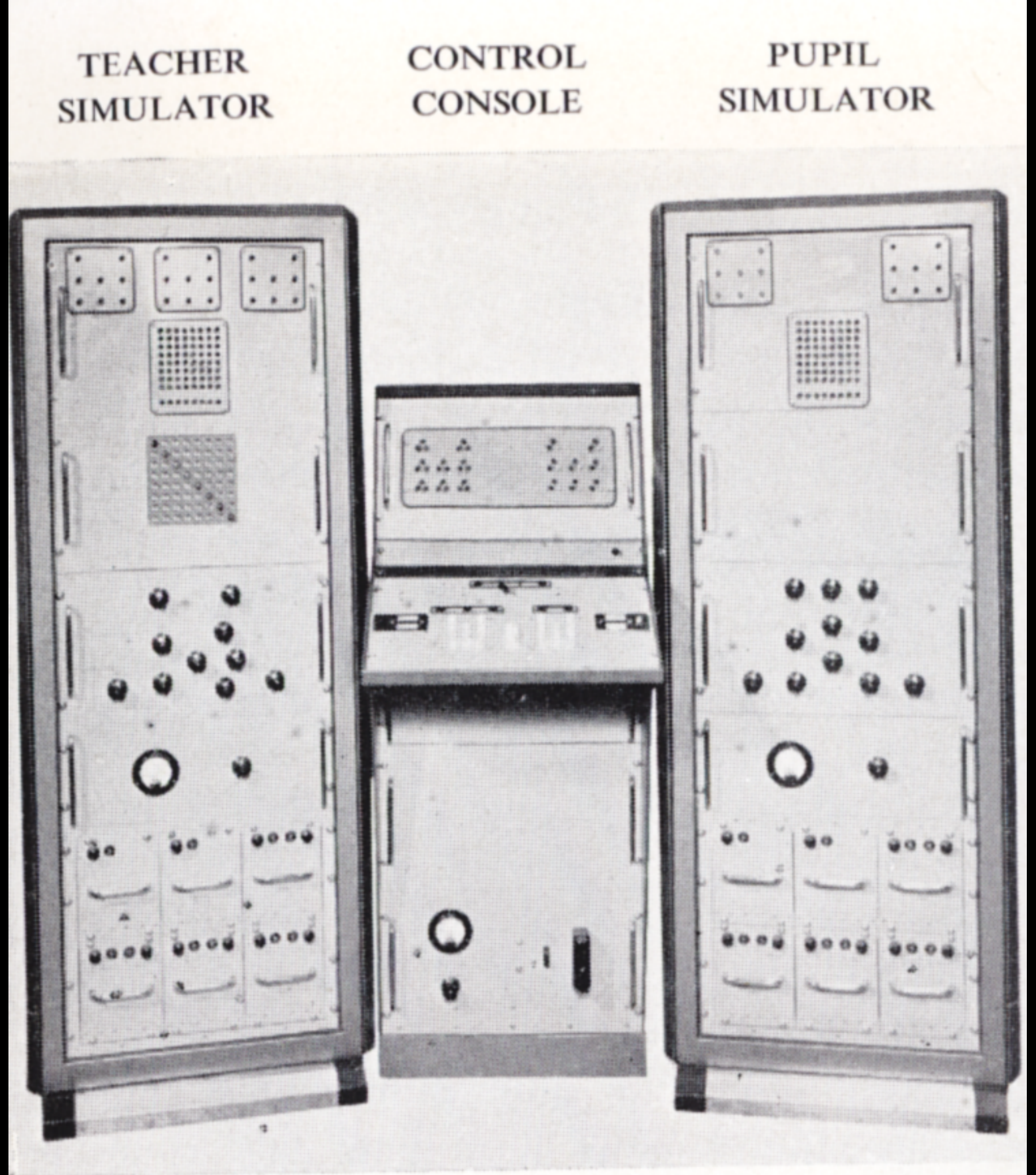




Musicolour had multiple levels of feedback that separated actions from goals.

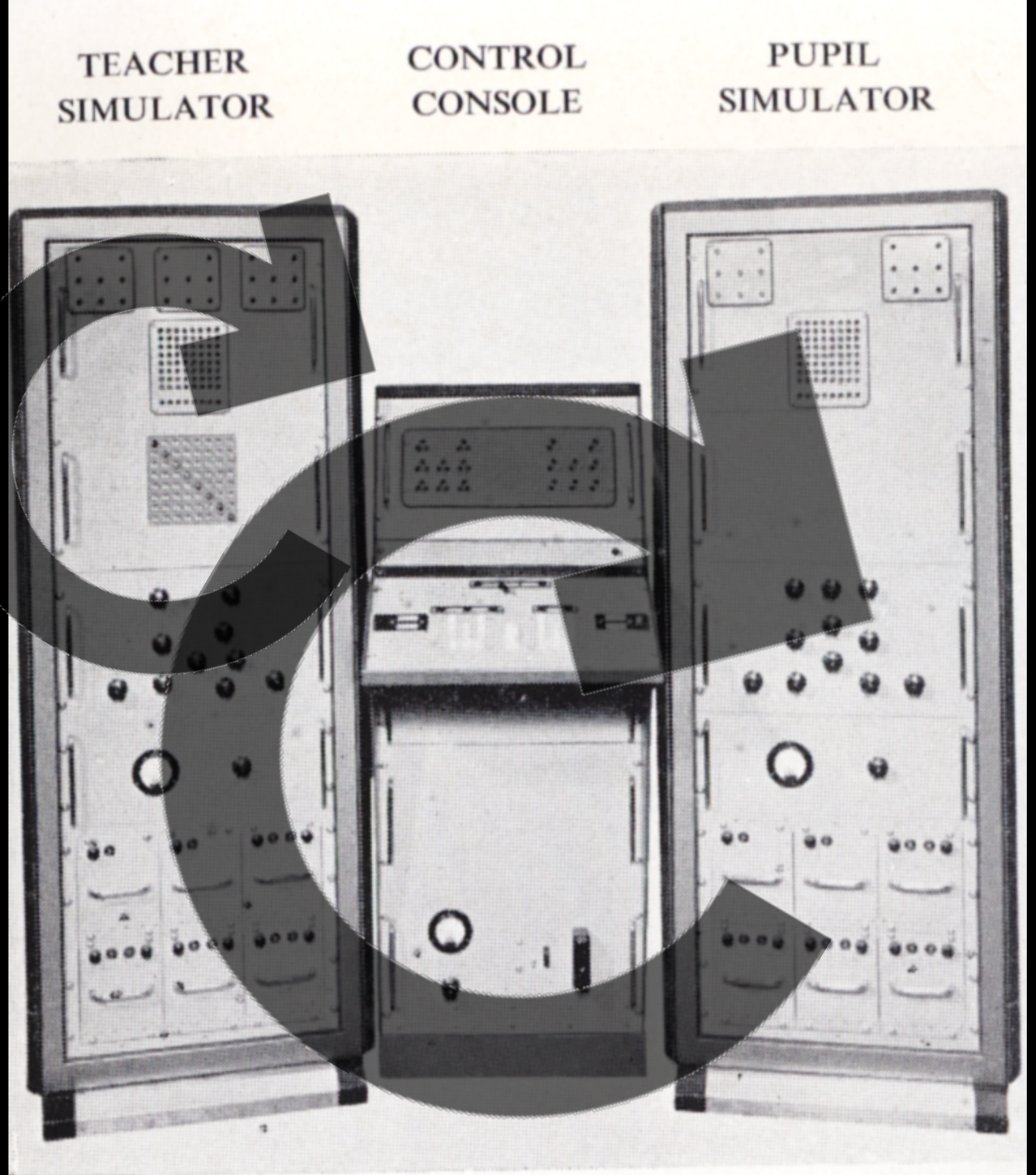
This architecture brings a human back to being human—it brings human attention to what is novel and interesting.

AIs—what to watch next on Youtube—don't create this depth of engagement.



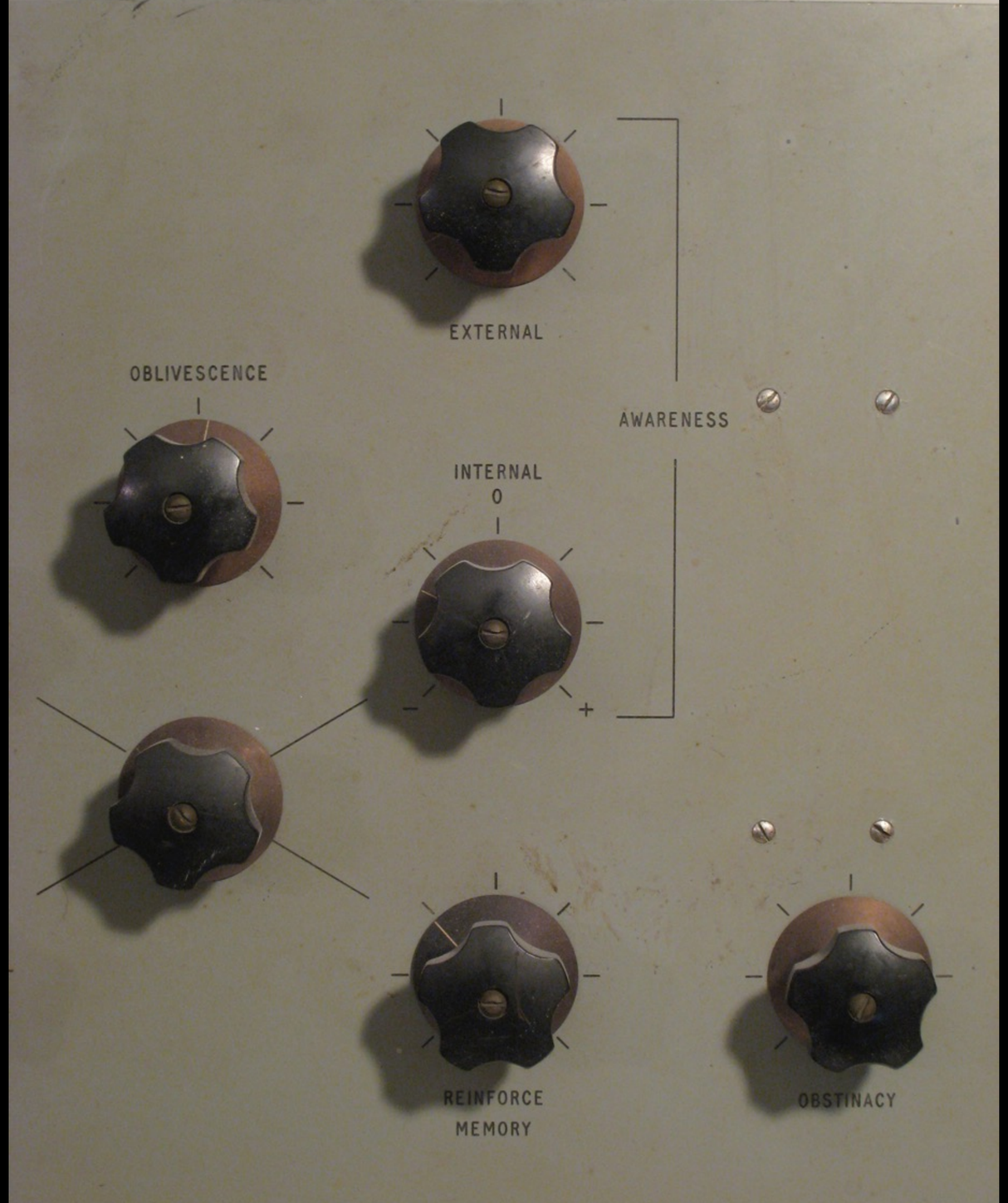
Pask created many conversational machines.

Here a teacher-machine converses with a pupil-machine.



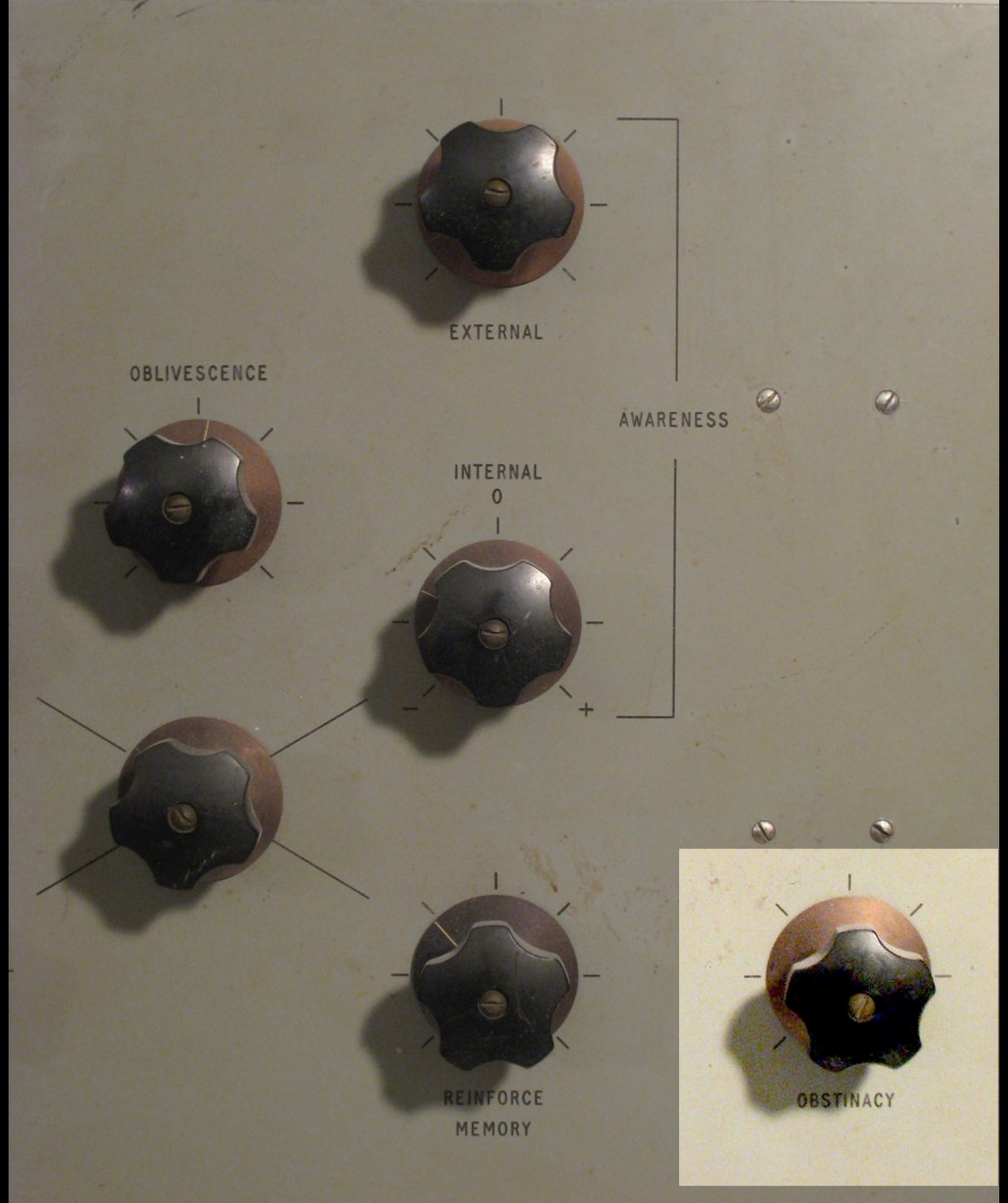
The conversation architecture was the same as Musicolour.

One loop applied feedback from actions and another applied feedback about goals.



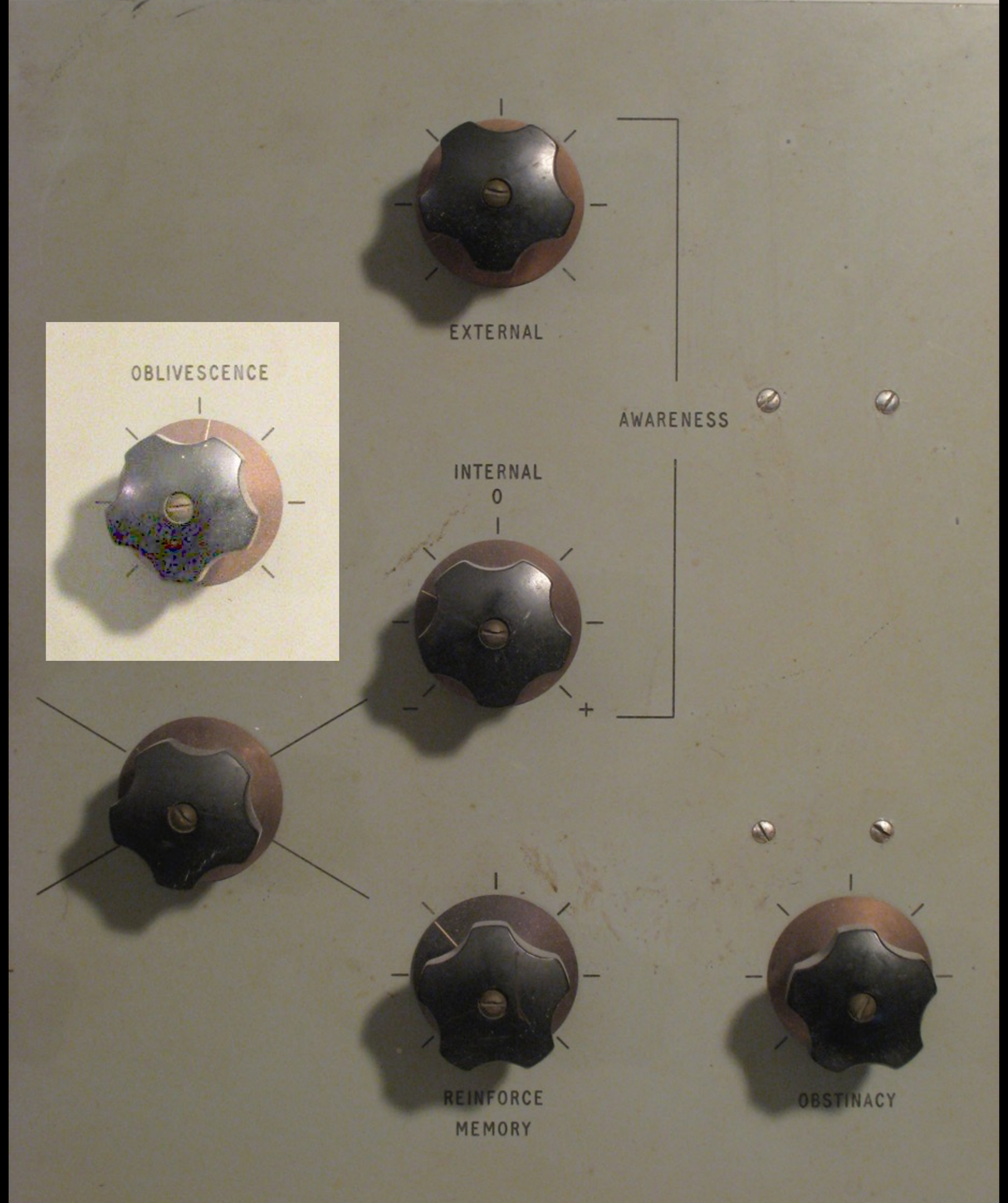
The control panel of the pupil-machine had a knob to control internal awareness

And another knob to control external awareness.

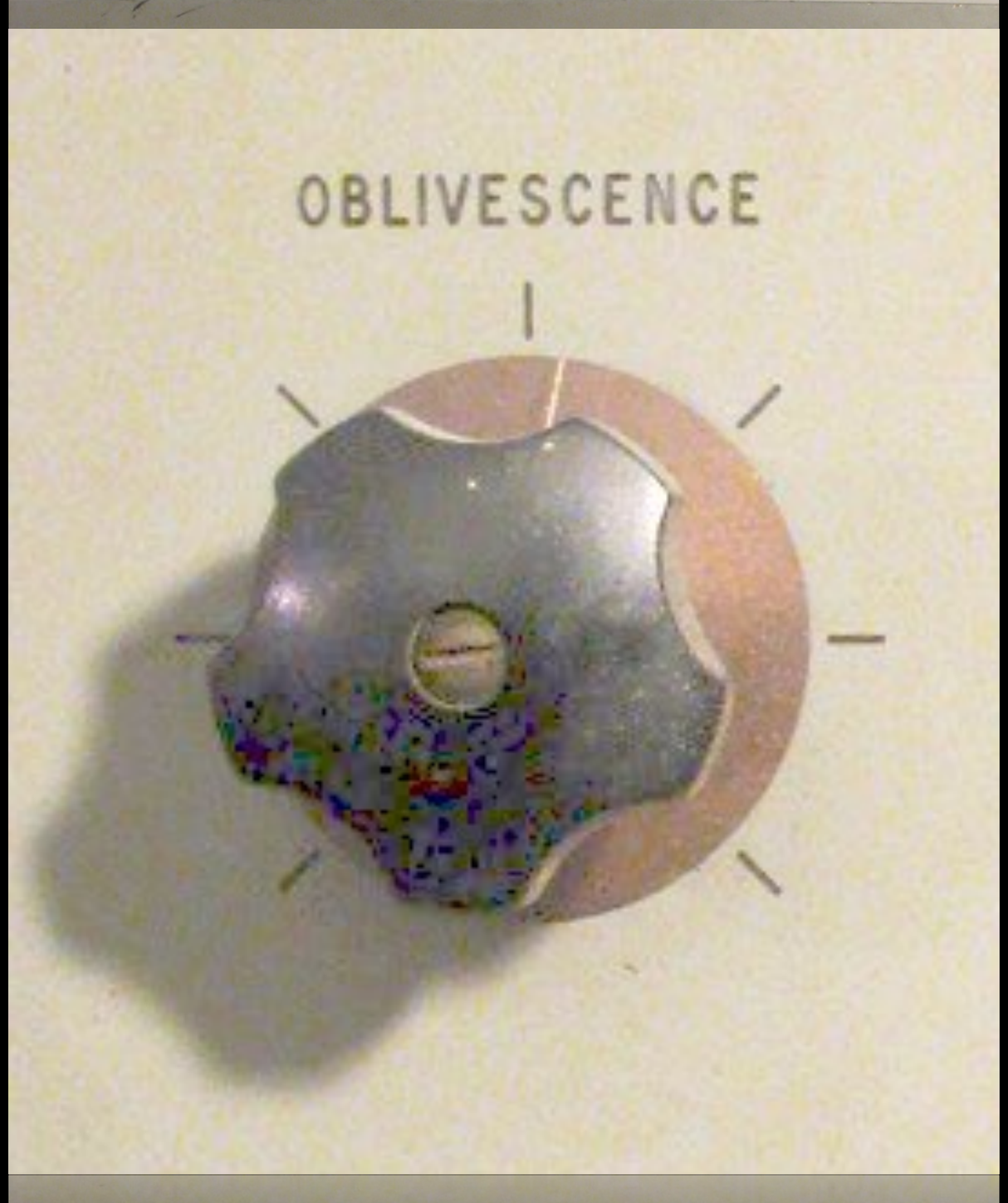


Yet another knob controlled the degree of obstinacy.

Turning up this knob made the pupil-machine less willing to learn.

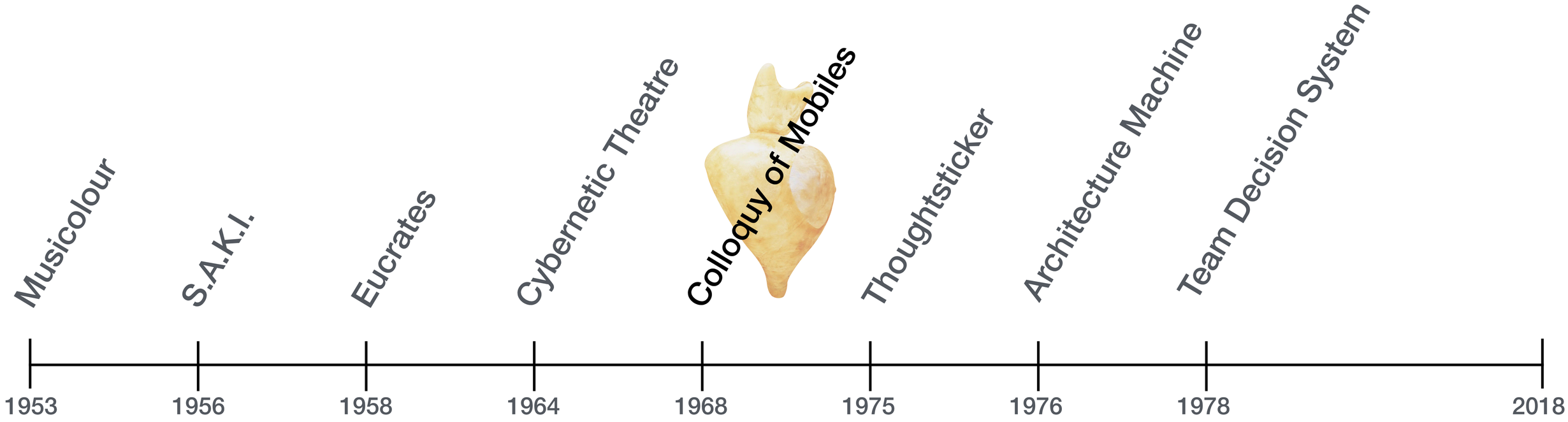


But there was something beyond obstinacy.



"Oblivescence" means "willful forgetfulness."

Gordon Pask – Computing Conversation as a creative act



Gordon Pask was considered
"A Cybernetician’s Cybernetician."

Photo: Paul Pangaro

1980s

Photo: Paul Pangaro

Pask was a second-generation cybernetician.

He had his own research approach before learning about the discipline of cybernetics.

Pask’s approach was to create machinery for studying feedback in conversations of all kinds.

That’s his wife, Elizabeth.

Mid-1980s

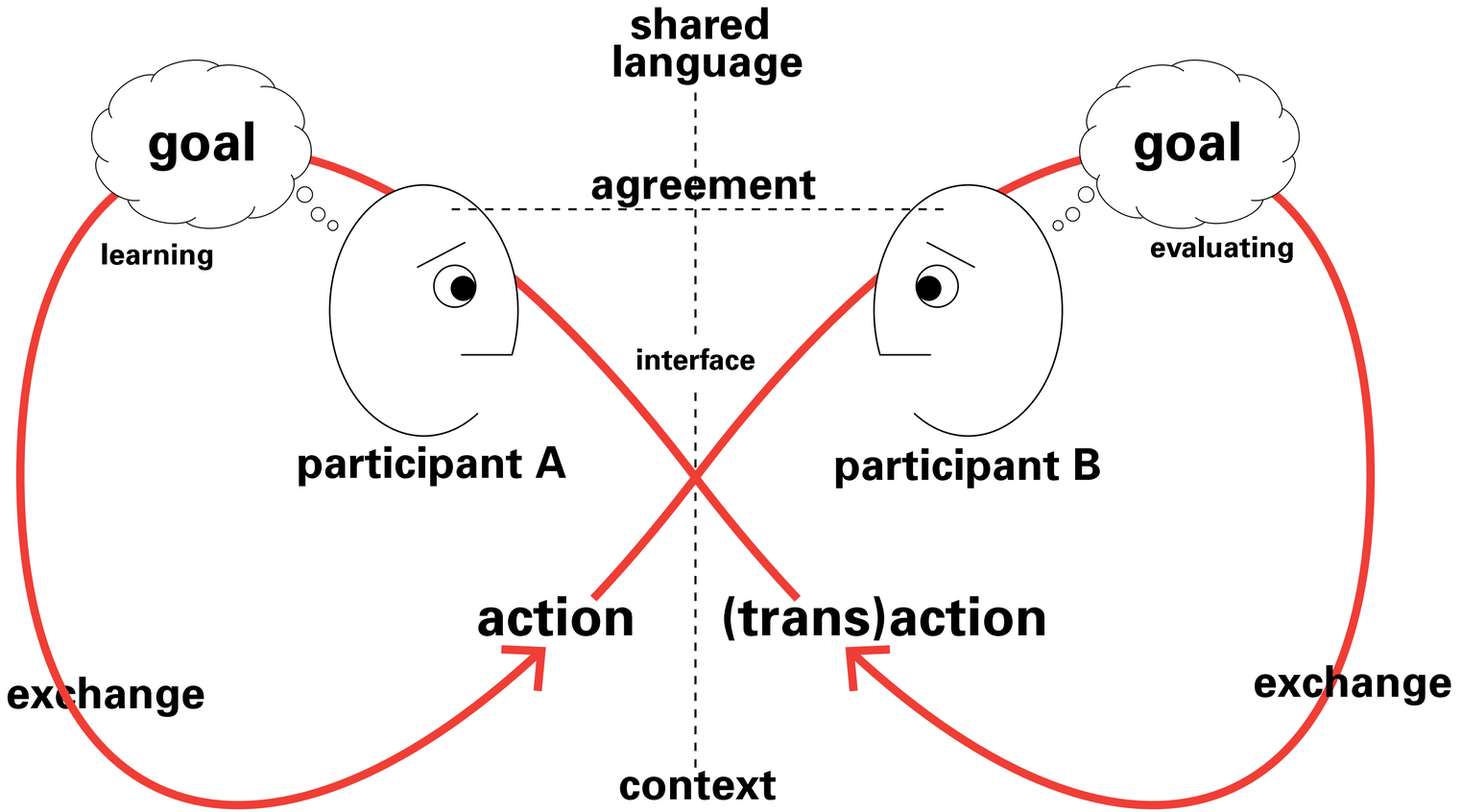
Photo: Paul Pangaro

Mid-1980s

Photo: Paul Pangaro

Conversation Model—C-L-E-A-T

C – Context
L – Language
E – Engagement
A – Agreement
T – (Trans)Action



After Gordon Pask

#NewMacyMeetings
Cybernetics, AI, and Ethical Conversations

Appendices
Pask's "Colloquy of Mobiles"
Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

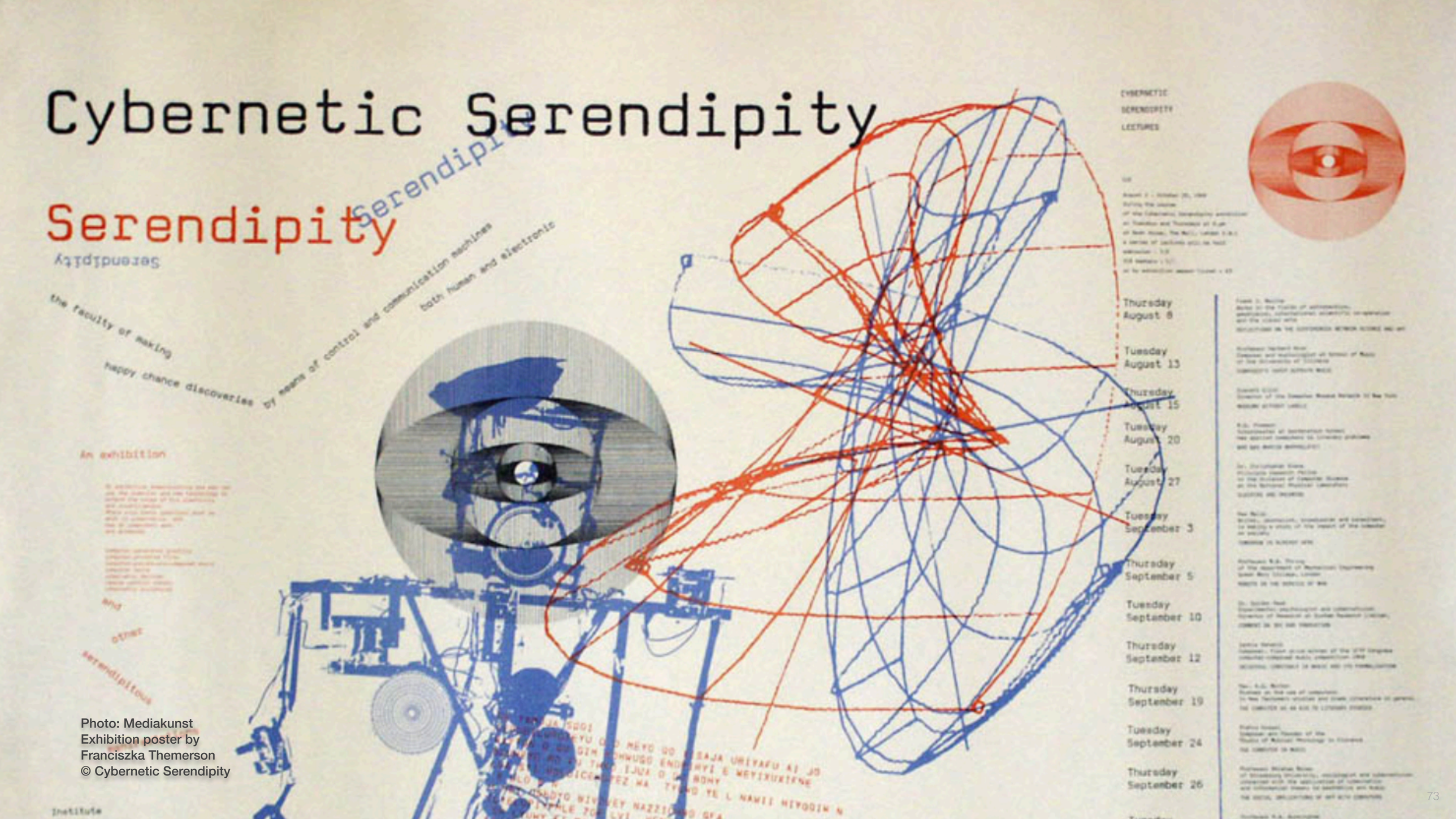


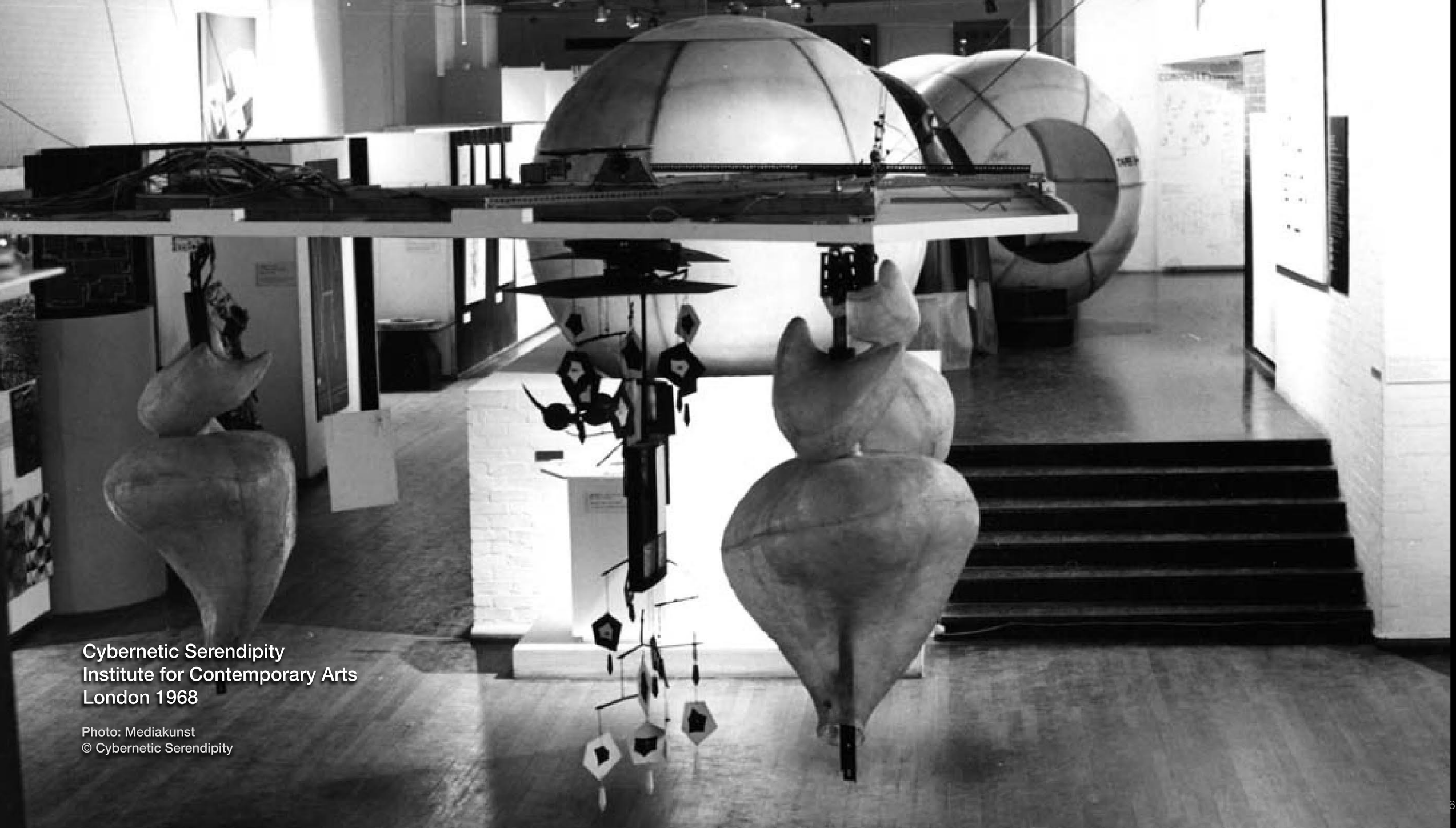
Photo: Mediakunst
Exhibition poster by
Franciszka Themerson
© Cybernetic Serendipity

Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst

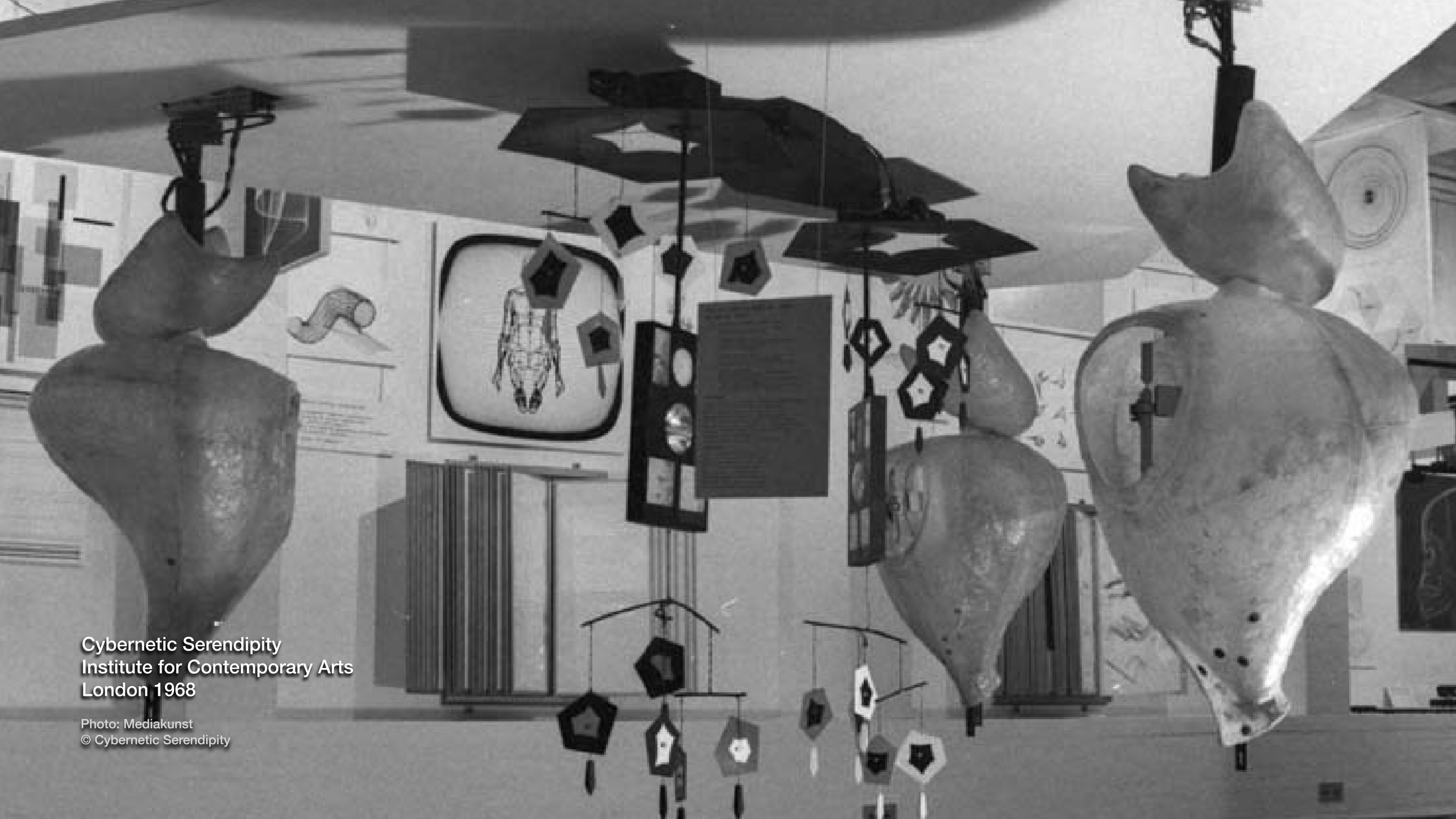
Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst



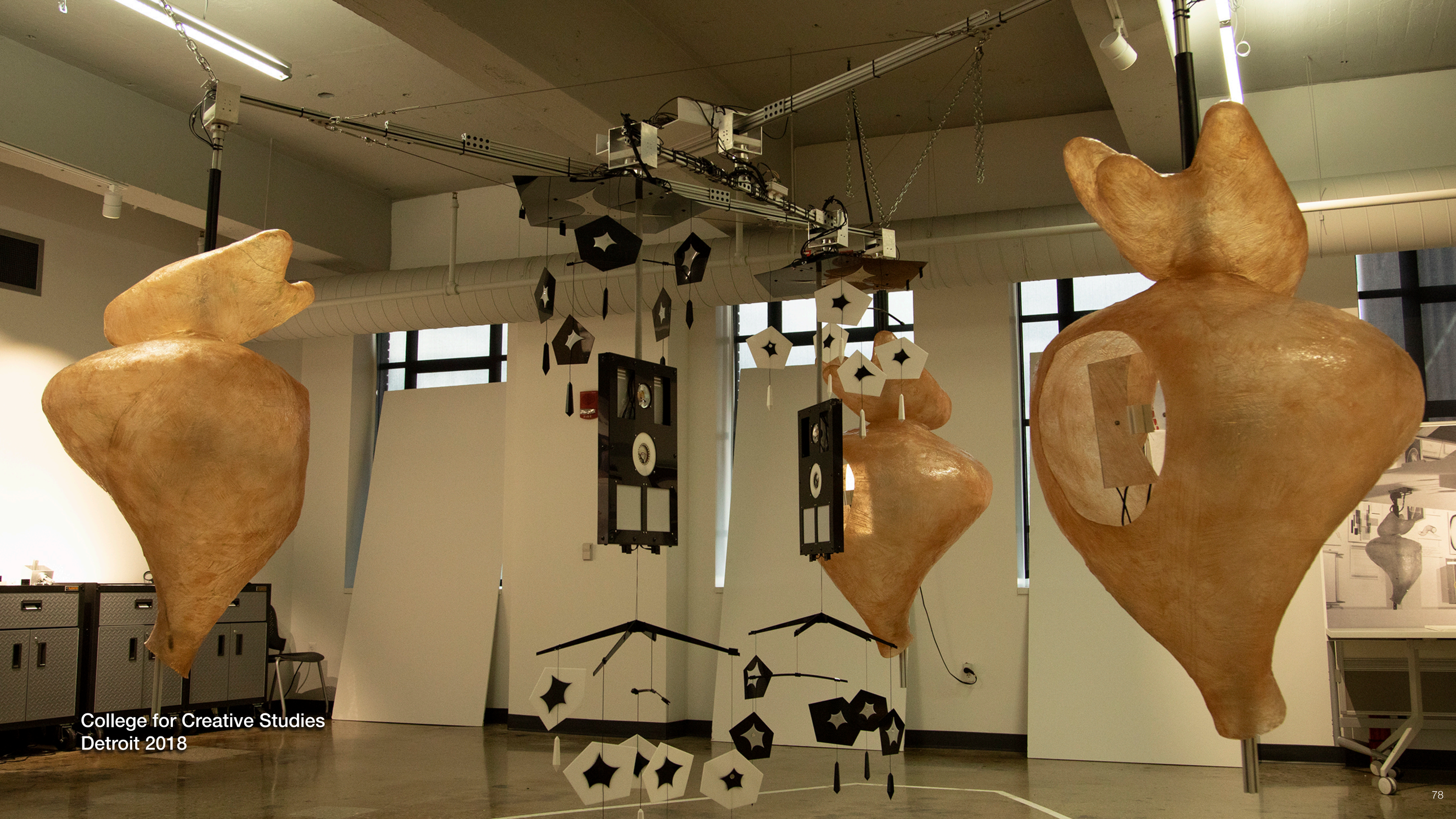
Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst
© Cybernetic Serendipity



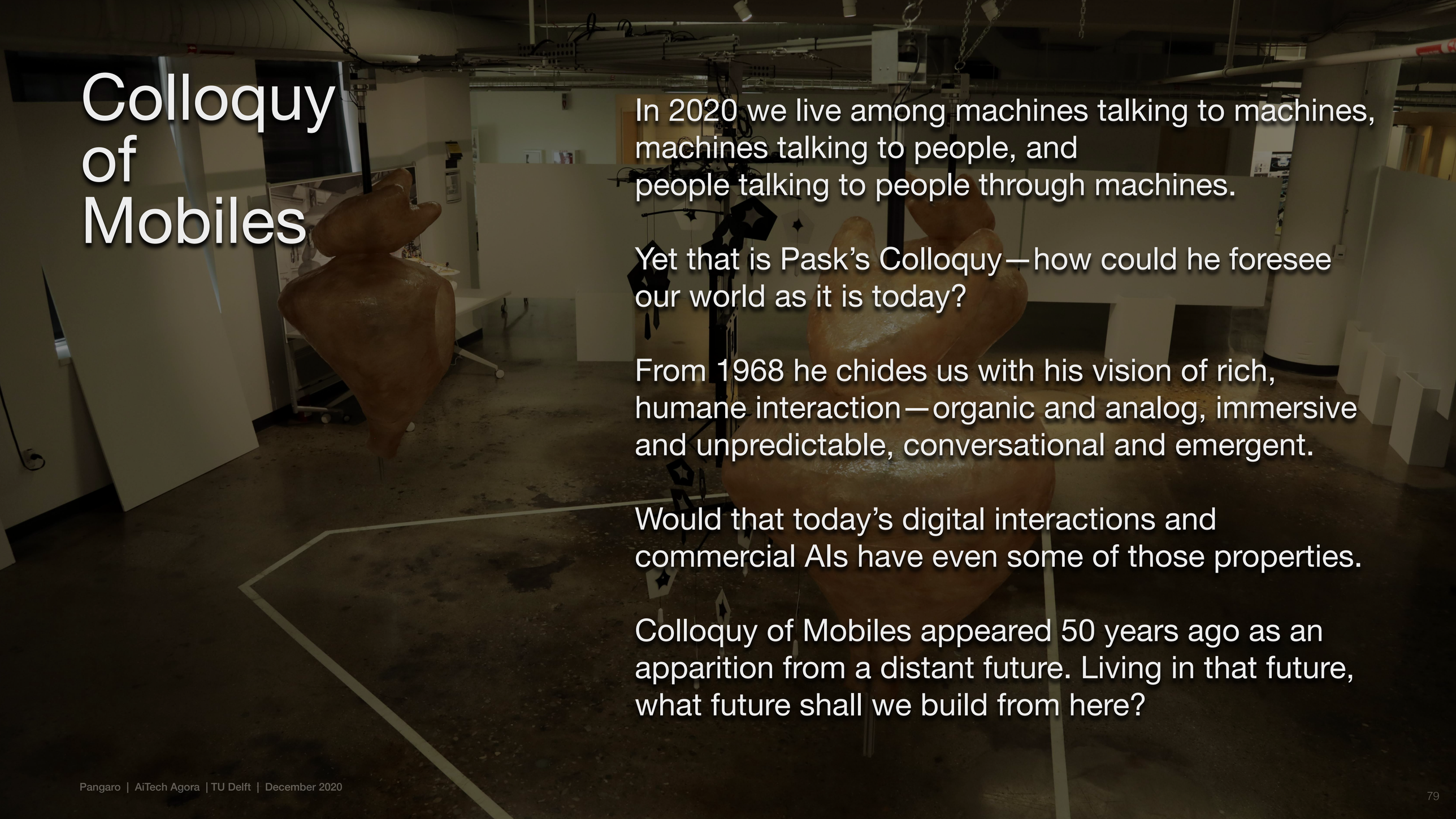
Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst



College for Creative Studies
Detroit 2018

Colloquy of Mobiles



In 2020 we live among machines talking to machines, machines talking to people, and people talking to people through machines.

Yet that is Pask's Colloquy—how could he foresee our world as it is today?

From 1968 he chides us with his vision of rich, humane interaction—organic and analog, immersive and unpredictable, conversational and emergent.

Would that today's digital interactions and commercial AIs have even some of those properties.

Colloquy of Mobiles appeared 50 years ago as an apparition from a distant future. Living in that future, what future shall we build from here?

COLLOQUY 2018 Advisory Board

Amanda Pask Heitler and Hermione Pask, Gordon Pask's daughters and executors of his scientific and artistic estate

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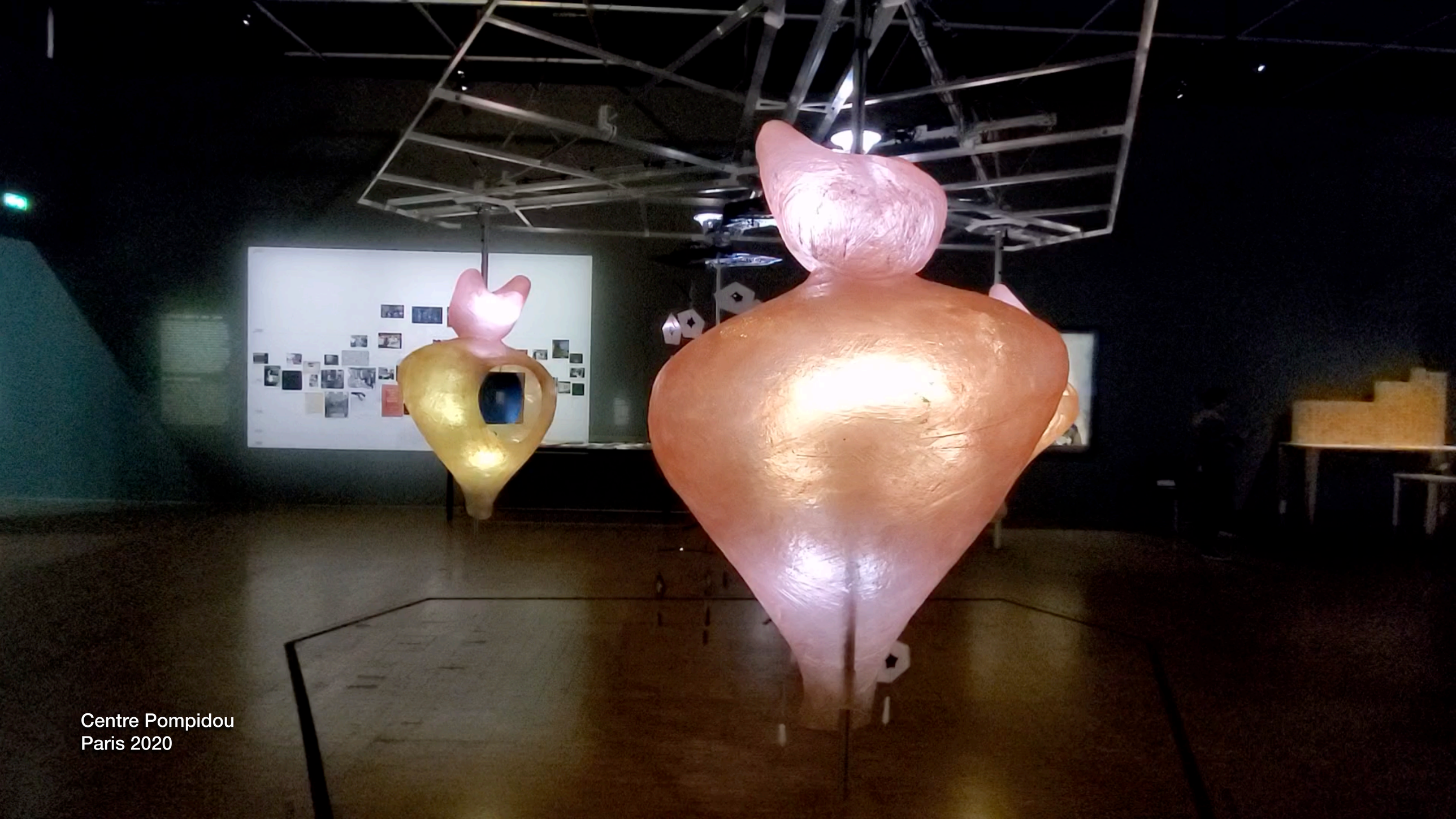
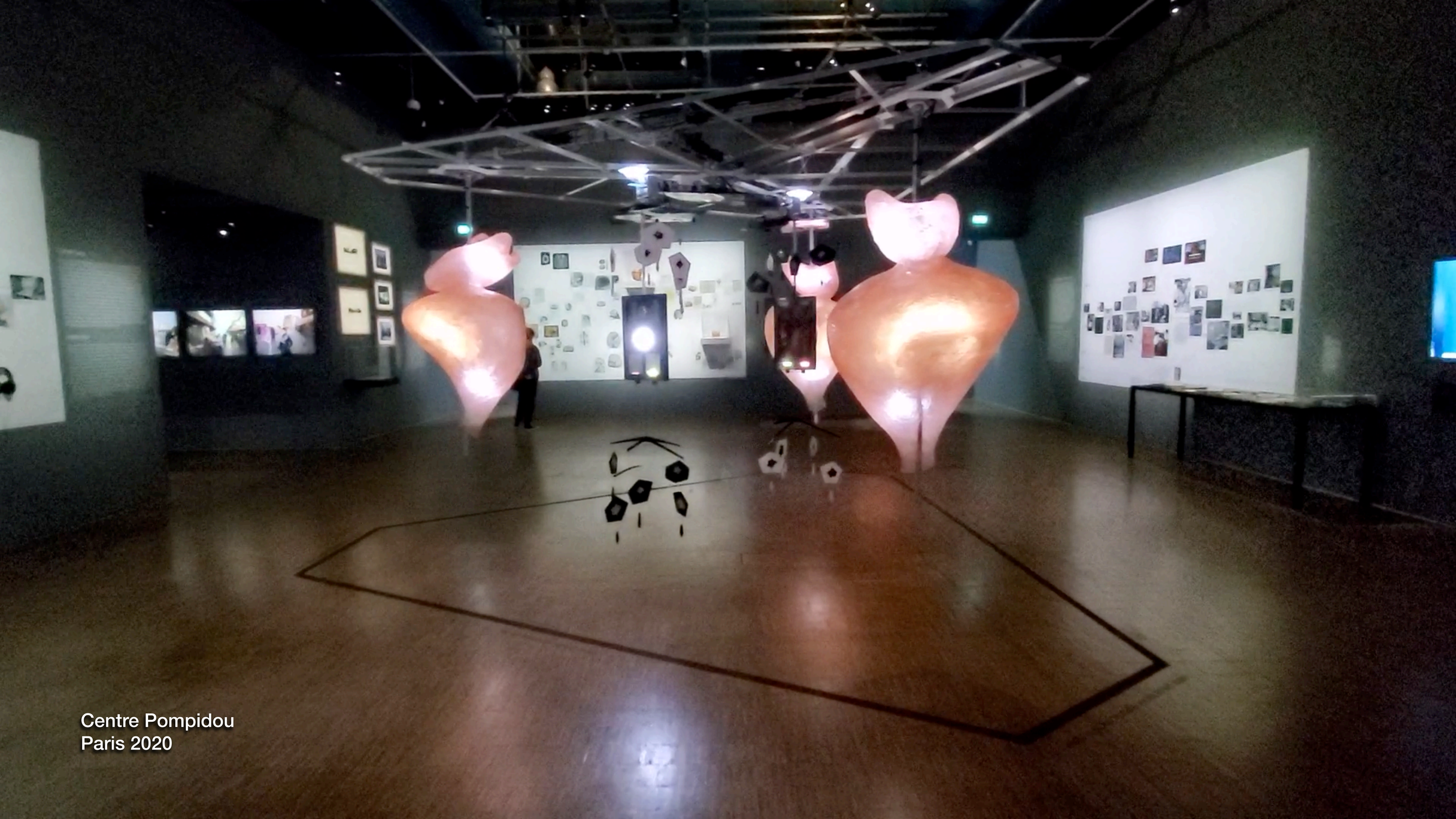
#NewMacyMeetings
Cybernetics, AI, and Ethical Conversations

Appendices
“Colloquy of Mobiles”
Centre Pompidou 2020

Centre Pompidou
Paris 2020



Centre Pompidou
Paris 2020


Centre Pompidou
Paris 2020

Centre Pompidou
Paris 2020

Gordon Pask

The Colloquy of Mobiles, 1968/2018

2018 Installation / 2018 Installation
Fibre de verre, aluminum, Delrin®, et matériel électromécanique / Fiberglass, aluminum, Delrin®, and mechatronics
Reconstitution de Paul Pangaro et TJ McLeish / Reconstruction by Paul Pangaro and TJ McLeish
Collection ZKM | Center for Art and Media Karlsruhe
Don de Paul Pangaro / Gift of Paul Pangaro

Gordon Pask s'attache aux contextes dans lesquels la cybernétique – science du contrôle et des systèmes d'information, entre humains et machines – s'applique à la création du sens au travers la conversation comme système d'échanges d'information. Il développe en particulier une théorie de l'interaction homme-machine à partir de systèmes de contrôle à la fois mécaniques, électroniques et biologiques, qui anticipe des modèles d'apprentissage aujourd'hui constitutifs du deep learning. Présentée lors de la célèbre exposition *Cybernetic Serendipity* (London, 1968), *Colloquy of Mobiles* est un ballet cybernétique dynamique, dans laquelle des automates mâles et femelles conversent et se rencontrent alors qu'un spectateur humain armé d'une torche est en mesure d'interagir et de s'impliquer dans les échanges.

Gordon Pask's primary interest lay in contexts where cybernetics – the science of control and communication in humans or machines – applies to the creation of meaning through conversation. Notably, he developed a cybernetic theory of conversation that applies equally to mechanical, electronic, biological, or social systems. His models of learning subsume the AI symbolic schoo as well as neural nets, which constitute deep learning today. Originally presented at the famous *Cybernetic Serendipity* exhibition in London in 1968, *The Colloquy of Mobiles* is a dynamic cybernetic courtship, in which male and female machines have drives that – through conversation – become satisfied. human spectators, with the aid of a torch, can participate.

Centre Pompidou
Paris 2020

Gordon Pask

The Colloquy of Mobiles, 1968/2018

2018 Installation / 2018 Installation
Fibre de verre, aluminum, Delrin®, et matériel électromécanique / Fiberglass, aluminum, Delrin®, and mechatronics
Reconstitution de Paul Pangaro et TJ McLeish / Reconstruction by Paul Pangaro and TJ McLeish
Collection ZKM | Center for Art and Media Karlsruhe
Don de Paul Pangaro / Gift of Paul Pangaro

et femelles convergent et se reflètent alors qu'un spectateur humain armé d'une torche est en mesure d'interagir et de s'impliquer dans les échanges.

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#NewMacyMeetings
Cybernetics, AI, and Ethical Conversations

Appendices
Neurones: Les intelligences simulées

Centre Pompidou
Paris 2020

Neurones

les intelligences simulées

26 février - 20 avril 2020

#ExpoNeurones
#MutationsCreations

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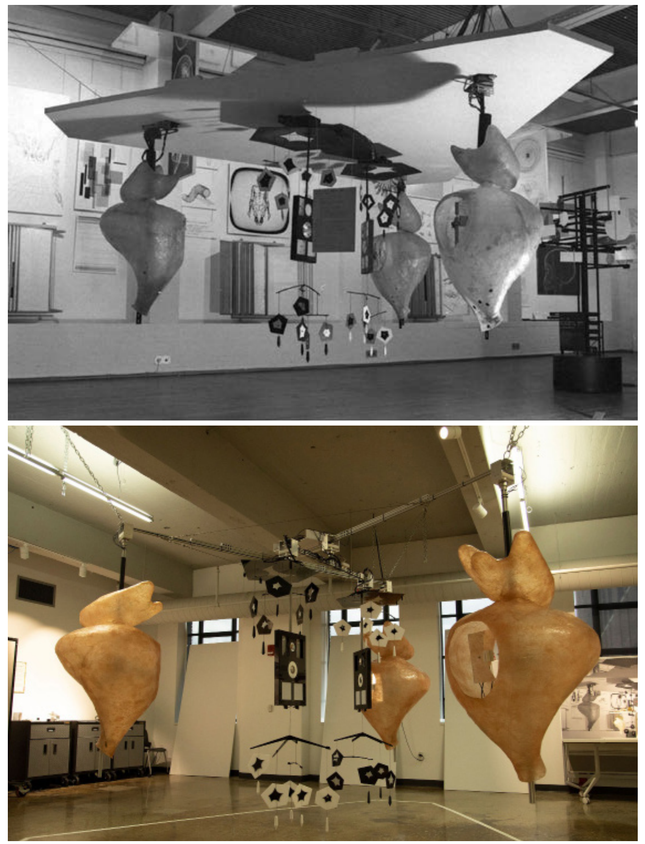
Neurones, les intelligences simulées

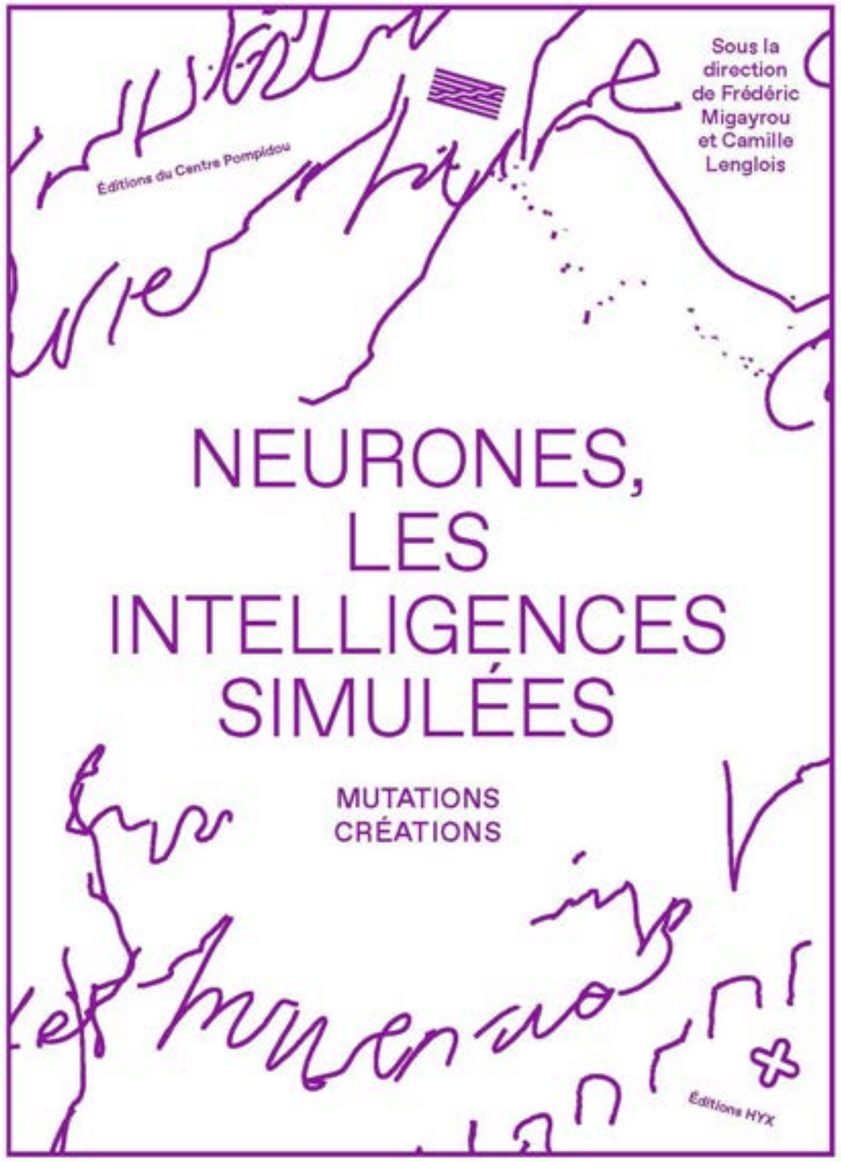
26 février – 20 avril 2020
Dans le cadre de Mutations / Créations #4

Focus sur *Colloquy of Mobiles* de Gordon Pask



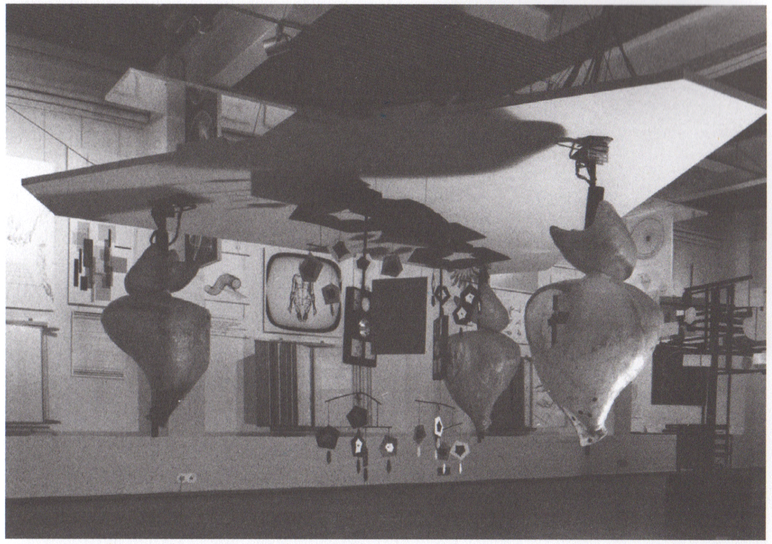
7 **Gordon Pask**
Colloquy of Mobiles, 1968 et 2019

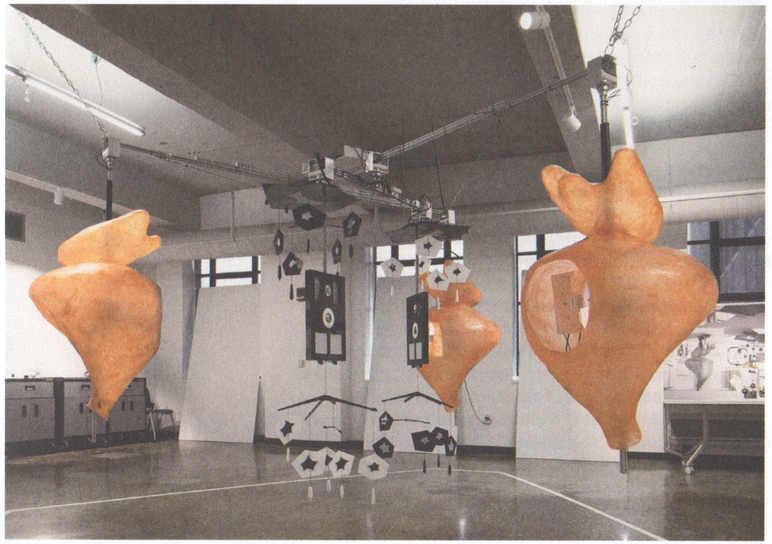
Personnage complexe d'abord influencé par Norbert Wiener, Gordon Pask a été un des pionniers de la cybernétique de second ordre, s'attachant aux effets et aux contextes dans lesquels la cybernétique soit la science du contrôle des système d'information, vivant ou non-vivants s'applique à elle-même. Au centre de ses recherches l'interaction entre l'homme et la machine est conçue comme un processus dynamique qu'il formalise en une « théorie de la conversation » et une théorie de l'interaction entre acteurs organisés autour de systèmes de contrôle aussi bien électronique que mécanique ou biologique. Au travers de multiples publications dont *Conversation, cognition and learning* (1975), Gordon Pask développe sa théorie de l'interaction ancrée au sein d'une théorie des systèmes définissant la fonction des acteurs au sein d'un réseau et anticipant des modèles d'apprentissage (learning) qui trouvent aujourd'hui toute leur actualité. Au travers de multiples installations comme *Musicolor* (1953) où le musicien était l'acteur d'un mécanisme d'apprentissage, comme *SAKI* (1956) un système informatique adaptatif d'enseignement ou plus tard des environnements informatiques permettant d'interagir avec de vastes bases de données (*Thoughstickers*, 1974). Enseignant dans de nombreuses universités en Angleterre, aux États-Unis ou au Canada, il sera aussi l'interlocuteur de Cedric Price pour la conception du *Fun Palace* (1961) une architecture prônant l'interaction et la participation ainsi que consultant auprès du Architecture Machine Group avec Nicholas Negroponte au M.I.T. *Colloquy of Mobiles* est une installation présentée lors de la célèbre exposition *Cybernetic Serendipity* organisée par Jasia Reichardt en 1968 à l'Institute of Contemporary Art (I.C.A) à Londres et consistait en une sculpture cybernétique dans laquelle des automates mâles et femelles conversent alors qu'un spectateur humain armé d'une torche pouvait interagir et s'impliquer dans les échanges, le dispositif évoluant ainsi au cours des différentes actions.



Gordon Pask

Personnage complexe d'abord influencé par Norbert Wiener, Gordon Pask a été un des pionniers de la cybernétique dite de second ordre, s'attachant aux effets et aux contextes dans lesquels la cybernétique, soit la science du contrôle des systèmes d'information, vivant ou non-vivants s'applique à elle-même. Pour Pask, l'interaction entre l'homme et la machine est conçue comme un processus dynamique qu'il formalise en une « théorie de la conversation » et une théorie de l'interaction entre acteurs organisées autour de systèmes de contrôle aussi bien électronique que mécanique ou biologique. Au travers de multiples publications dont *Conversation, Cognition and Learning* (1975), Gordon Pask développe sa théorie de l'interaction ancrée au sein d'une théorie des systèmes définissant la fonction des acteurs au sein d'un réseau et anticipant des modèles d'apprentissage (*learning*) qui trouvent aujourd'hui toute leur actualité. Il développe à cet égard *Musicolor* (1953), une installation où le musicien était l'acteur d'un mécanisme d'apprentissage ou plus tard des environnements informatiques permettant d'interagir avec de vastes bases de données (*Thoughstickers*, 1974). Enseignant dans de nombreuses universités en Angleterre, aux États-Unis ou au Canada, il sera consultant auprès du *Architecture Machine Group* avec Nicholas Negroponte au MIT *The Colloquy of Mobiles* est une installation présentée lors de la célèbre exposition *Cybernetic Serendipity* organisée par Jasia Reichardt en 1968 à l'Institute of Contemporary Art (ICA) à Londres et consistait en une sculpture cybernétique dans laquelle des automates mâles et femelles conversent alors qu'un spectateur humain armé d'une torche pouvait interagir et s'impliquer dans les échanges, le dispositif évoluant ainsi au cours des différentes actions.

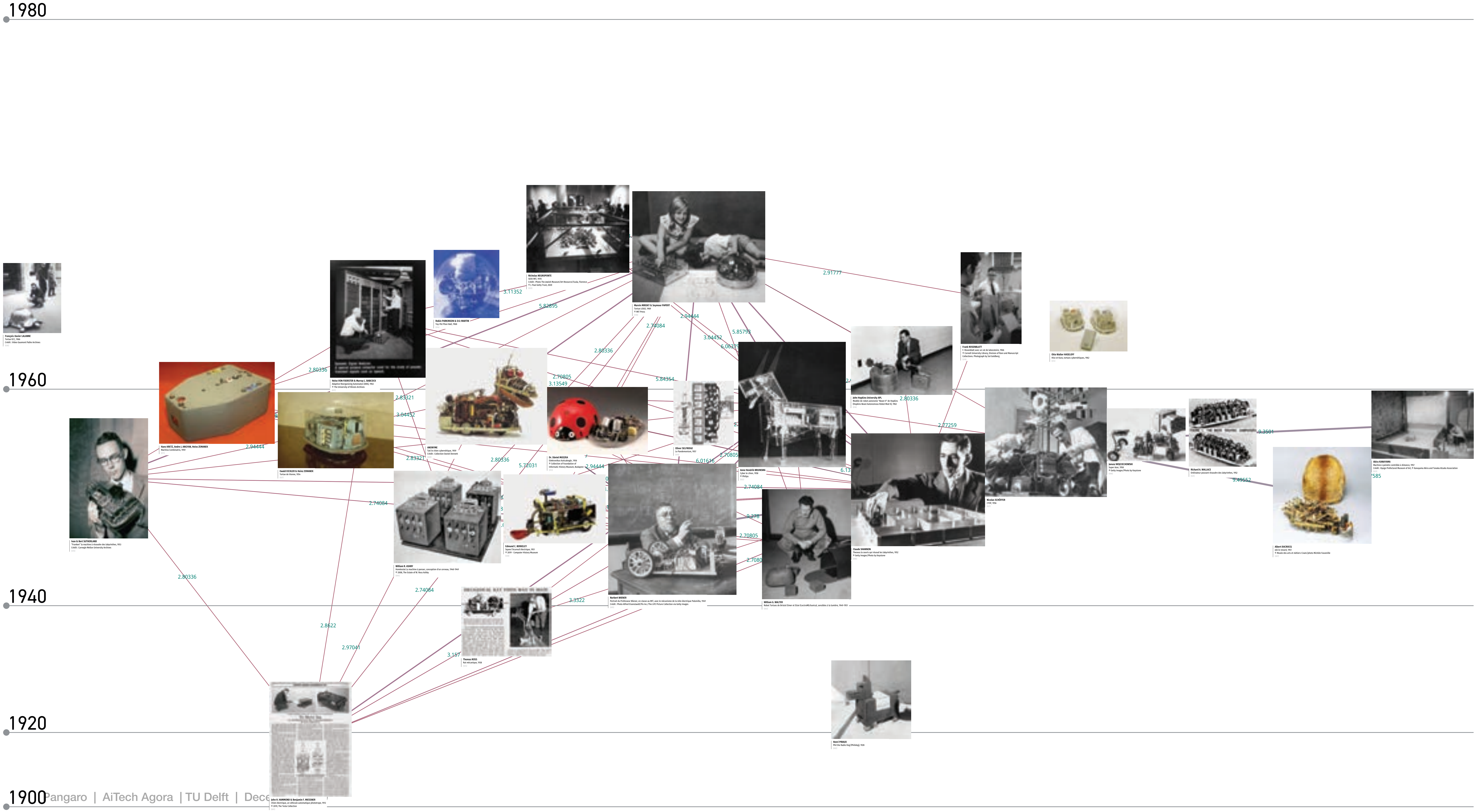


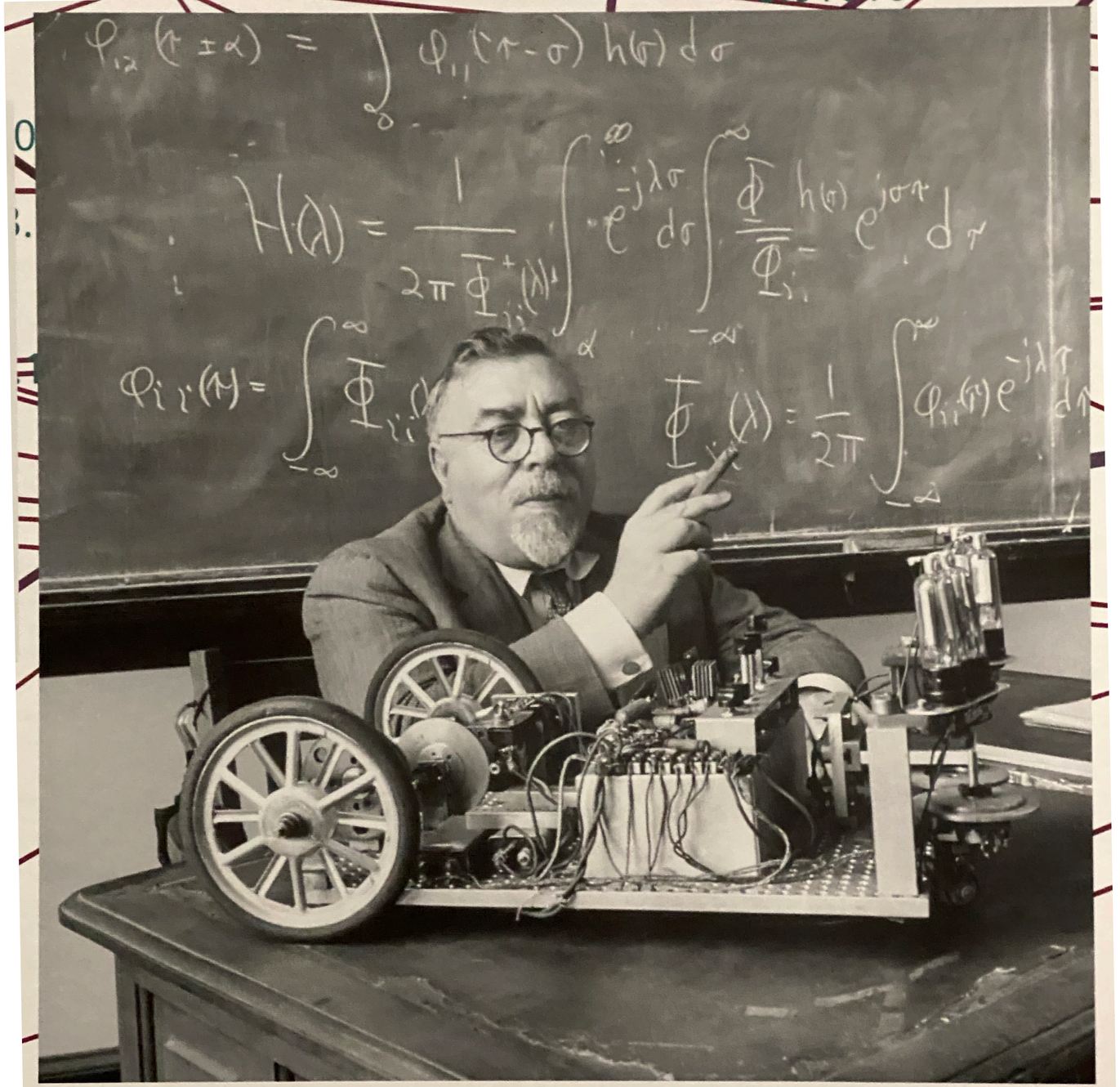


The Colloquy of Mobiles, 1968/2018
Installation
Fibre de verre, aluminum, Delrin®
et matériel électromécanique
Reconstitution par Paul Pangaro
et TJ McLeish
Collection ZKM | Center for Art
and Media Karlsruhe
Don de Paul Pangaro

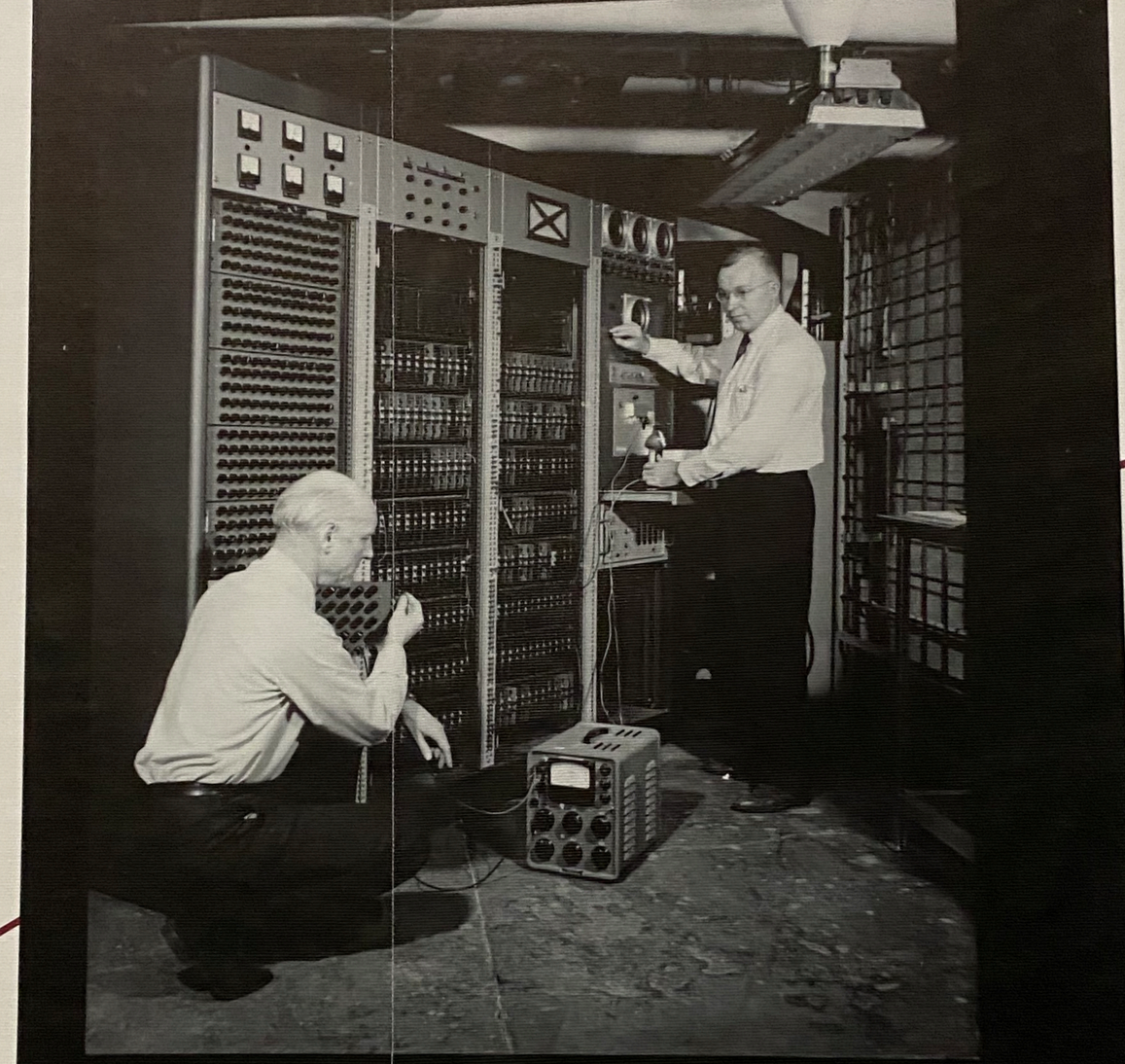

Centre Pompidou
Paris 2020

Graphe 3





Norbert WIENER
Portrait du Professeur Wiener, en classe au MIT, avec le mécanisme de la mite électrique Palomilla, 1949
Crédit : Photo Alfred Eisenstaedt/Pix Inc./The LIFE Picture Collection via Getty Images



Dynamic Signal Analyzer.
A special purpose computer used for the study of pseudo-transient signals such as speech.

Heinz VON FOERSTER & Murray L. BABCOCK
Adaptive Reorganizing Automaton (ARA), 1963
© The University of Illinois Archives

William R. ASHBY
Homéostat La machine à penser,
© 2008, The Estate of W. Ross Ash
(004)

Nicholas NEGROPONTE
SEEK MIT, 1970
Crédit : Photo The Jewish Museum/Art Resource/Scala, Florence
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#NewMacyMeetings
Cybernetics, AI, and Ethical Conversations

Appendices
Heinz von Foerster

“I shall act always so as to increase the total number of choices.”

— Ethical Imperative, Heinz von Foerster

Heinz von Foerster, 1991: “Ethics and Second-Order Cybernetics”

“If you desire to see, learn how to act.”

— *Aesthetic Imperative*, Heinz von Foerster

Heinz von Foerster, 1991: “Ethics and Second-Order Cybernetics”

“A is better off when B is better off.”

— Heinz von Foerster

Heinz von Foerster, 1991: “Ethics and Second-Order Cybernetics”

Next Macy Conferences

"Grace versus coercion. That is my idea. It might not be a great career move for any of us, but I would like to reconvene the Macy conferences with unknowability as the over-arching bridge."

— *Andrew Pickering, 2015*

"The Next Macy Conference: A New Synthesis"

Cybernetics, AI, and Ethical Conversations

"As a designer, I shall act always so as to increase the total number of choices for a user."

Links

pangaro.com/aitechagora2020/

Draft – #NewMacyMeetings – Planning Doc

First #NewMacy Meeting — Background and Description

Video of Lecture – FIrst Rationale for #NewMacy – March 2020

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