

Questions for Conversation Theory

Conversation Theory
in an hour or so

ASC 2016 — Pangaro

GORDON PASK

CONVERSATION,
COGNITION AND
LEARNING



A CYBERNETIC THEORY
AND METHODOLOGY

ELSEVIER

GORDON PASK

CONVERSATION
THEORY



APPLICATIONS IN EDUCATION
AND EPISTEMOLOGY

ELSEVIER











What is Conversation? What is Theory?
What is Conversation Theory, anyhow?
How did it arise? Who participated? Where did it end up?
Is it interesting? How might it be useful?
Where has it been applied? Why should you care?
What does it offer the practice of education?
Of design? Of ethics?
Where is it headed? (Sorry, steering joke.)

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Conversation Theory
instead of dinner

ASC 2016 — Pangaro

What is Conversation? What is Theory?

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How did it arise? Who participated? Where did it end up?

Is it interesting? How might it be useful?

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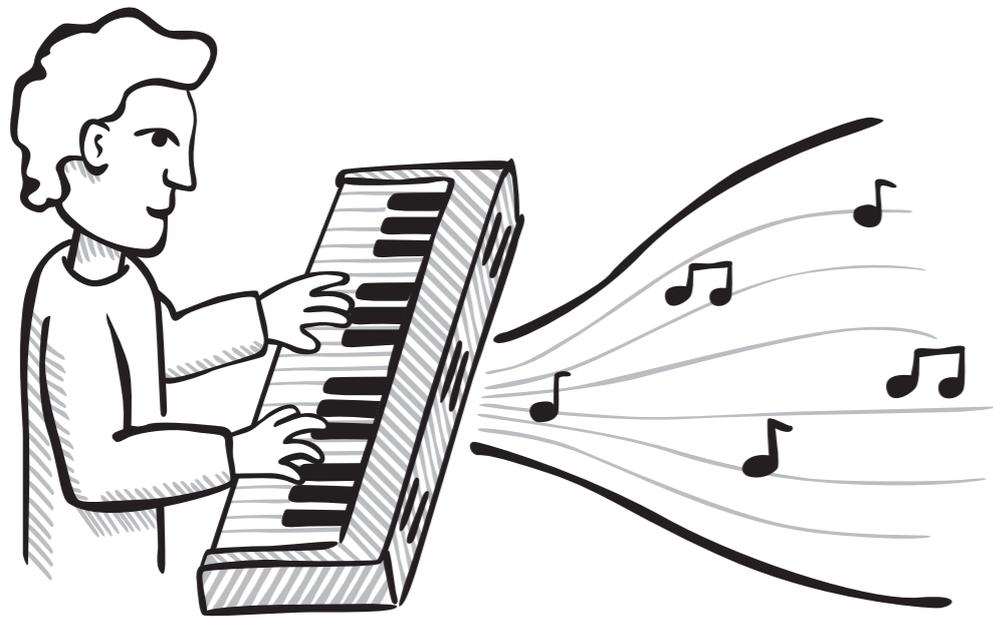
What does it offer the practice of education?

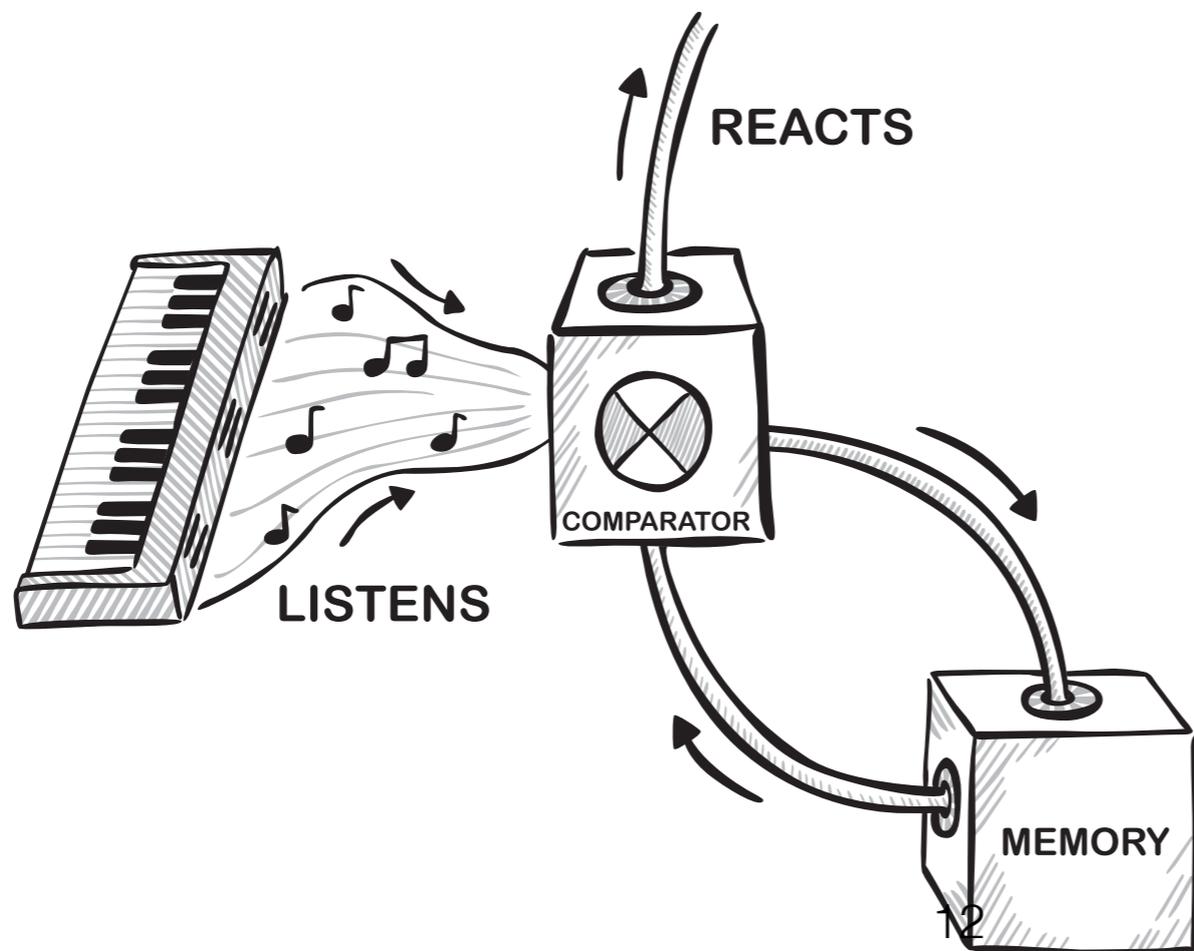
Of design? Of ethics?

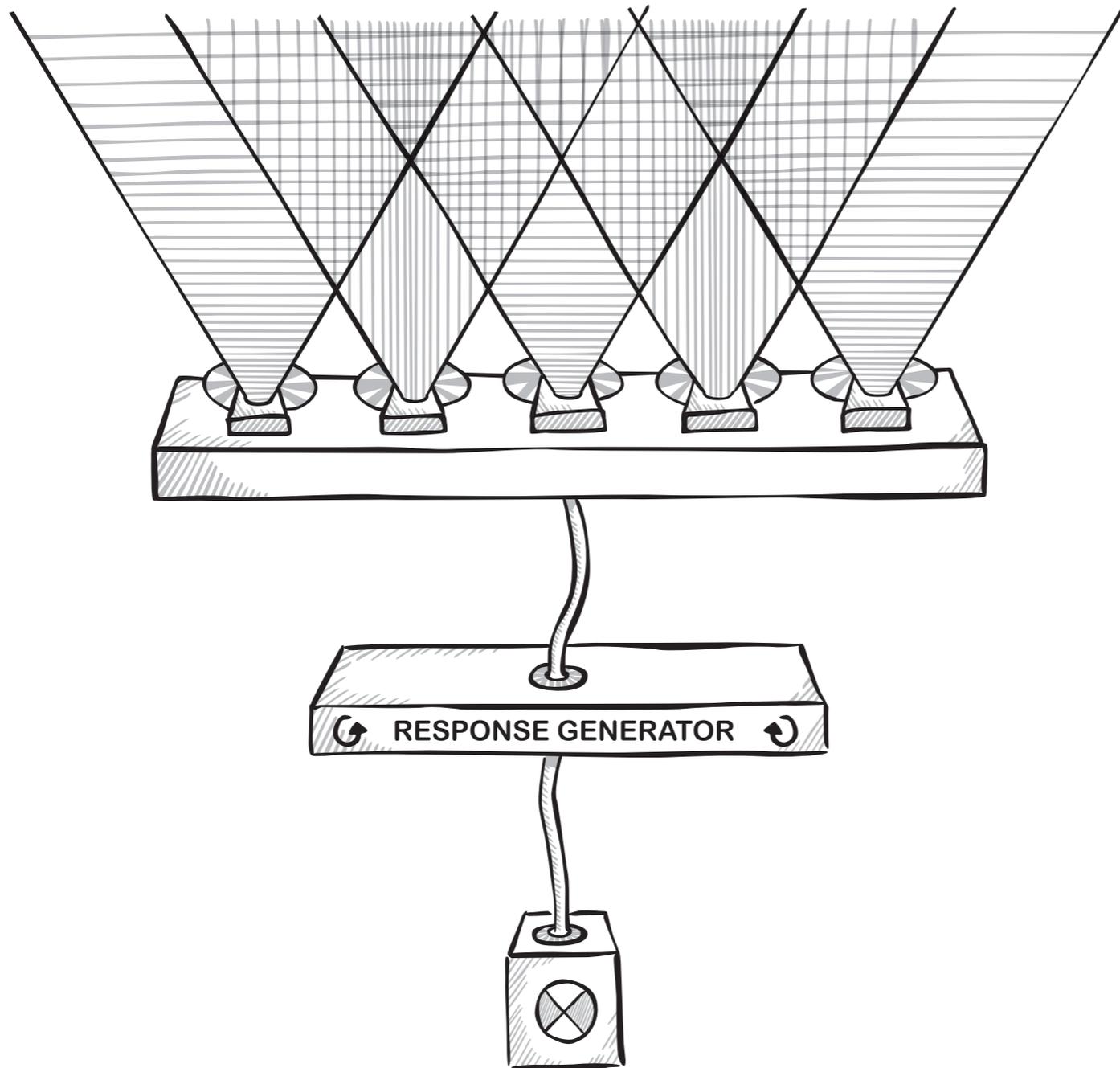
Where is it headed? (Sorry, steering joke.)

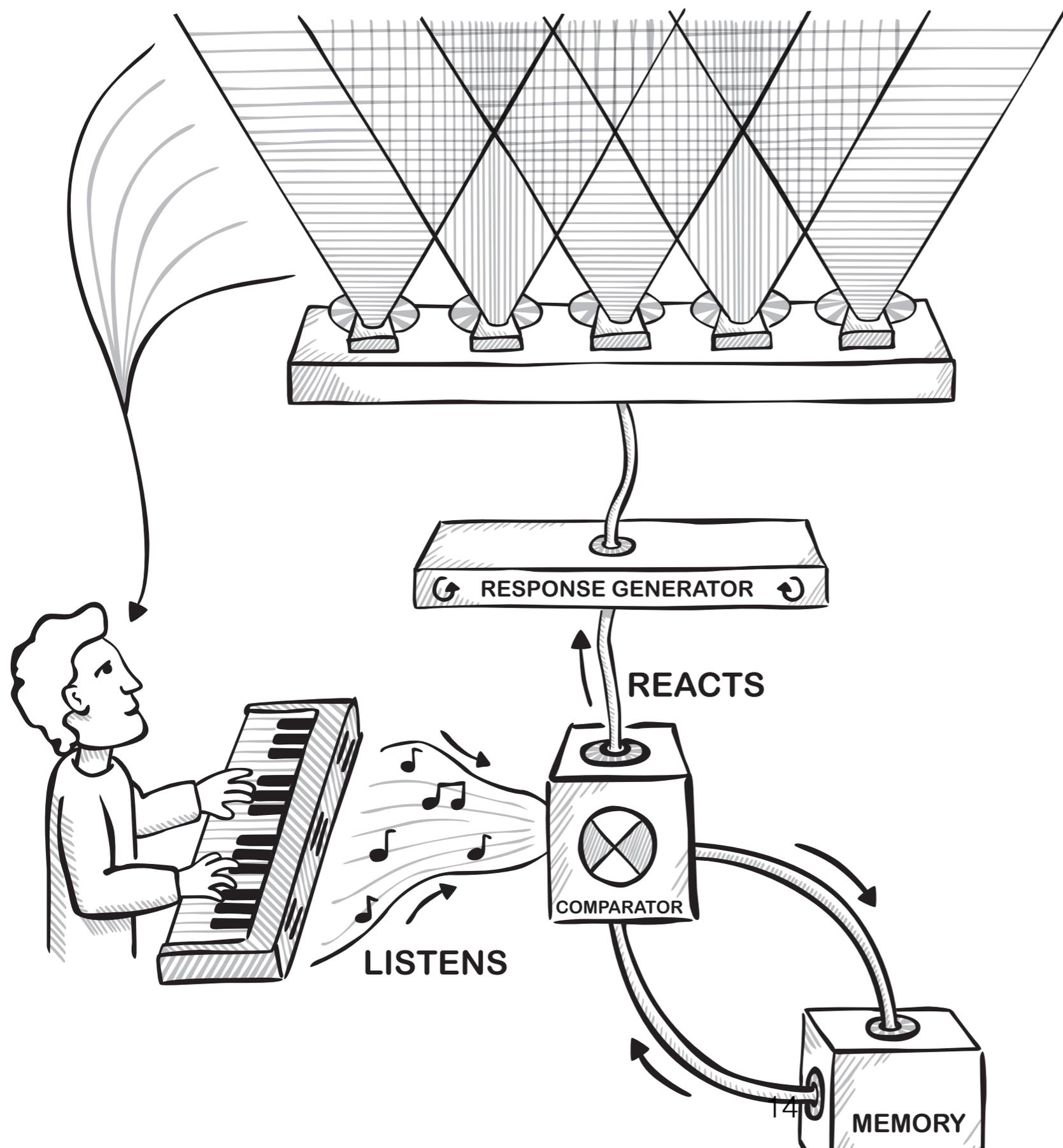
Conversation Theory
in an hour or so

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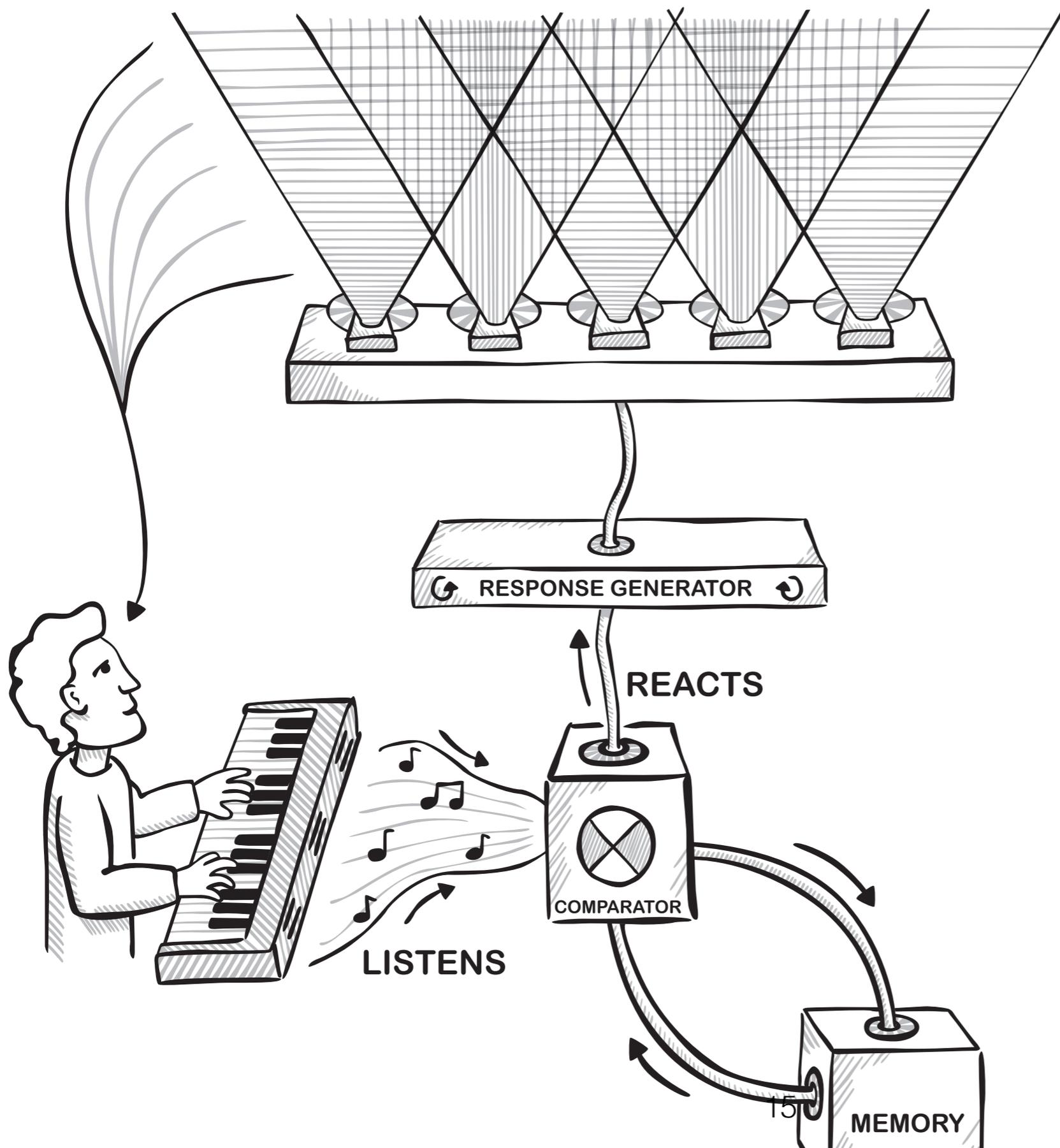








Musicolour
mid-1950s

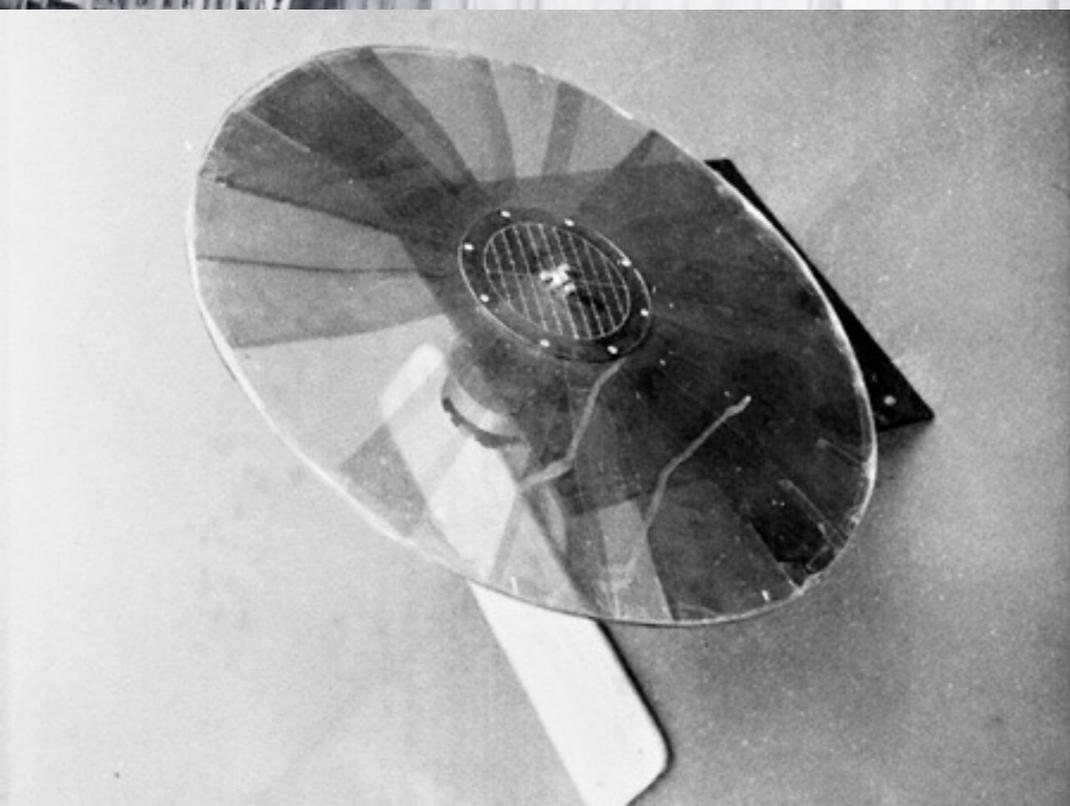


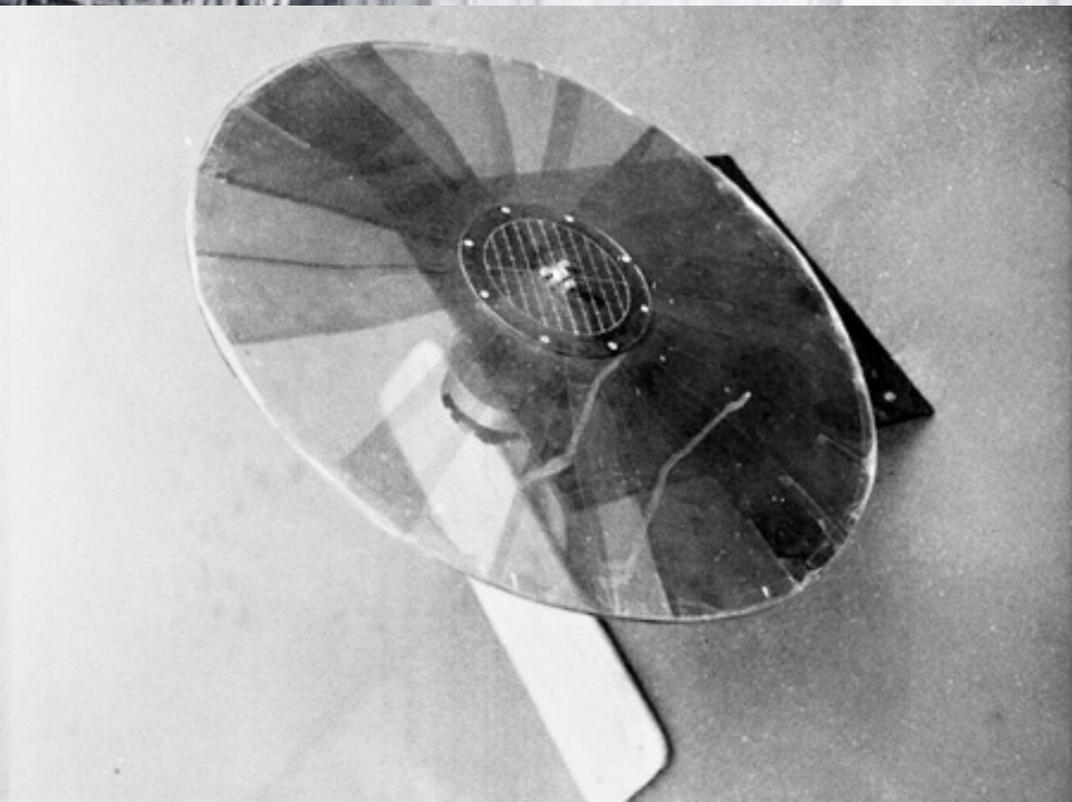
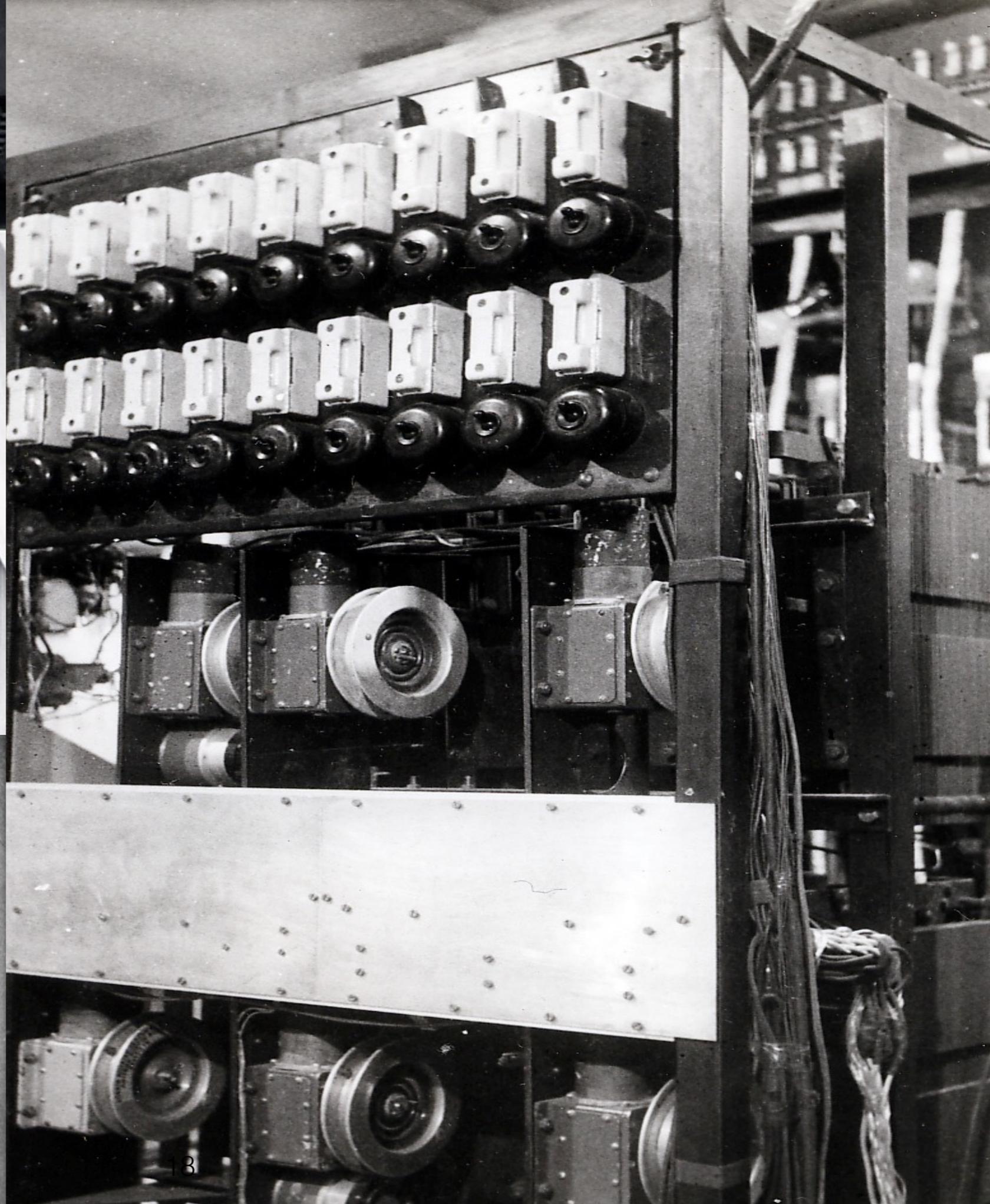


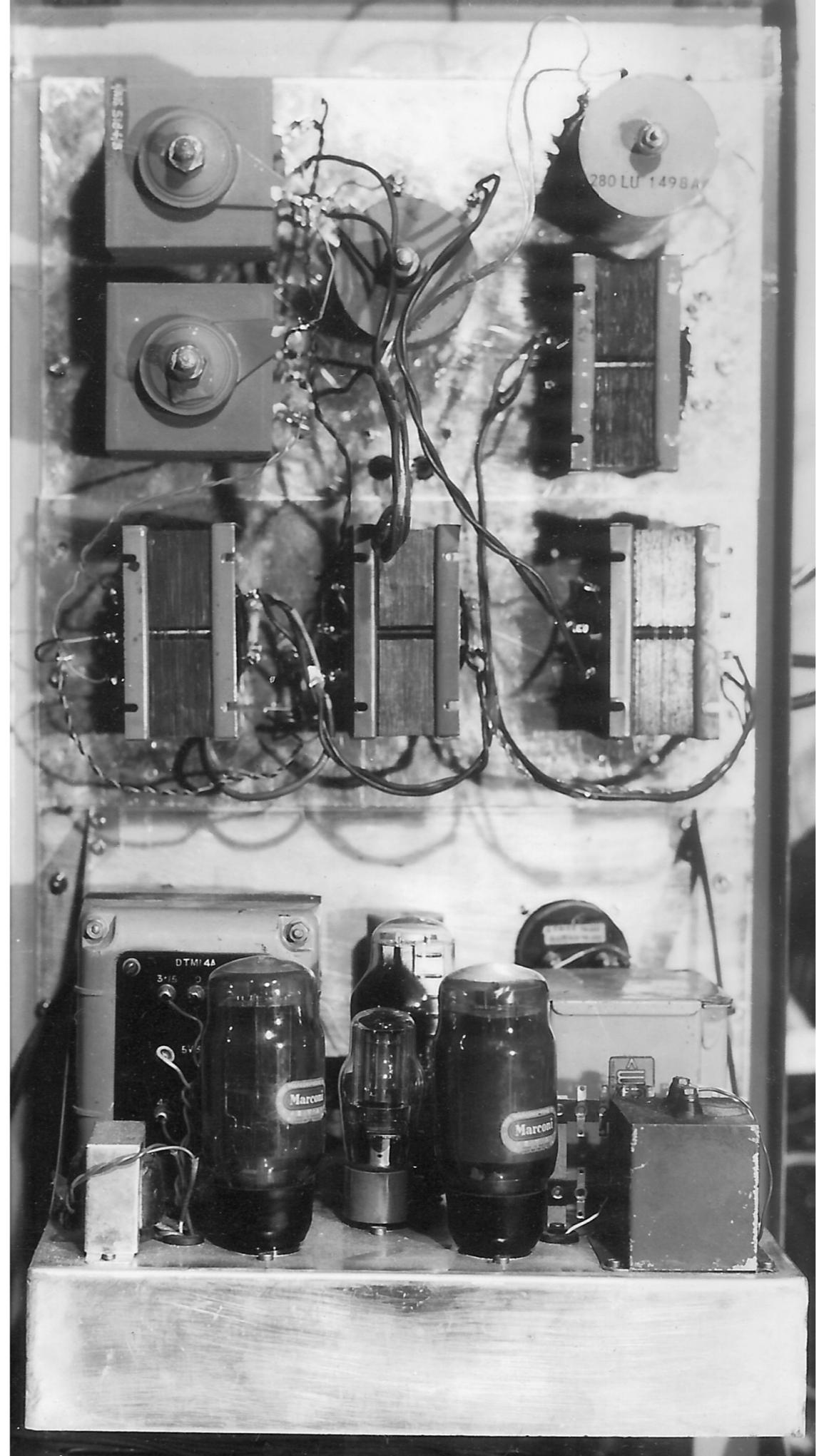
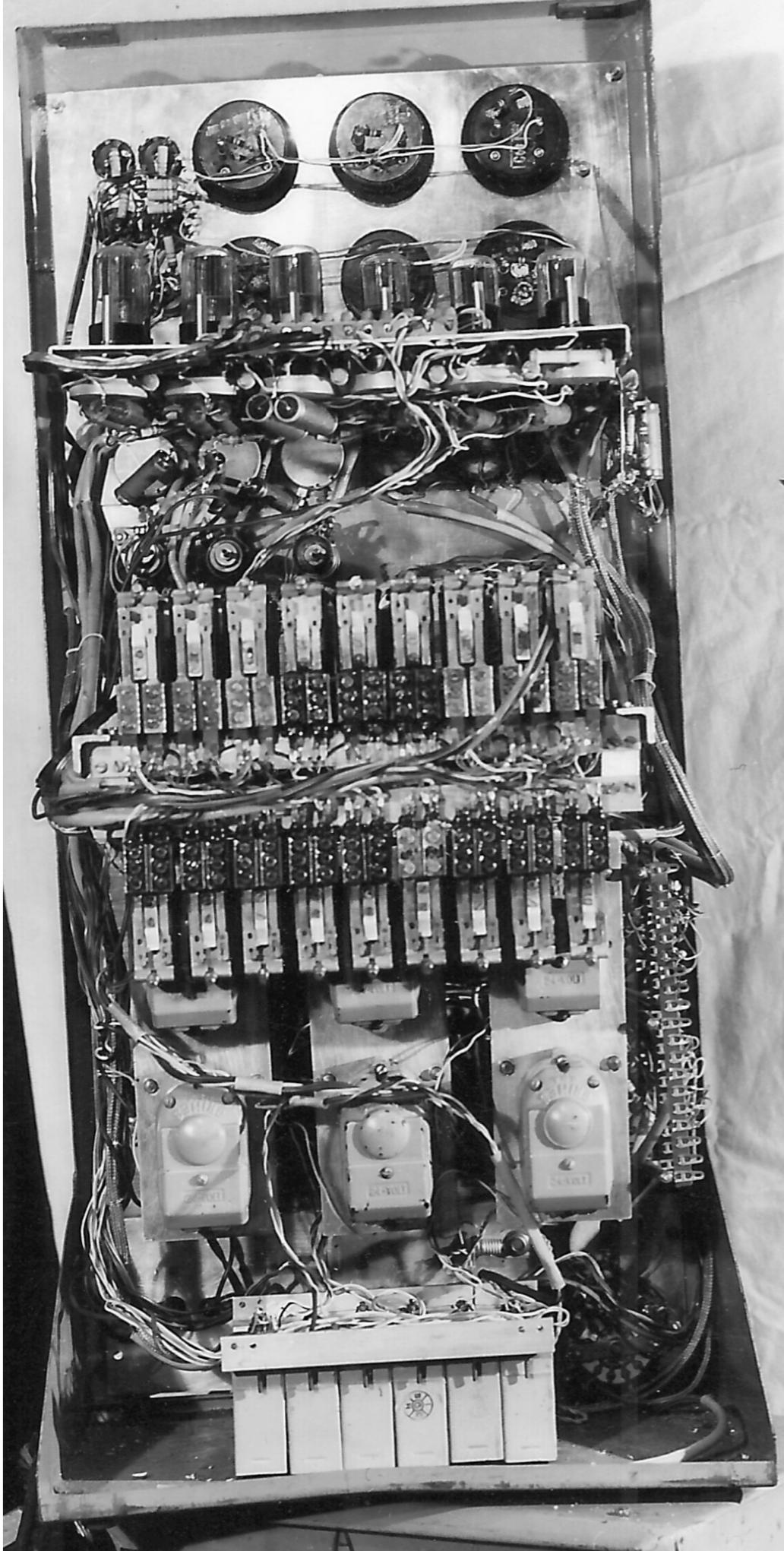
Musiccolour
mid-1950s



Musicolour
mid-1950s

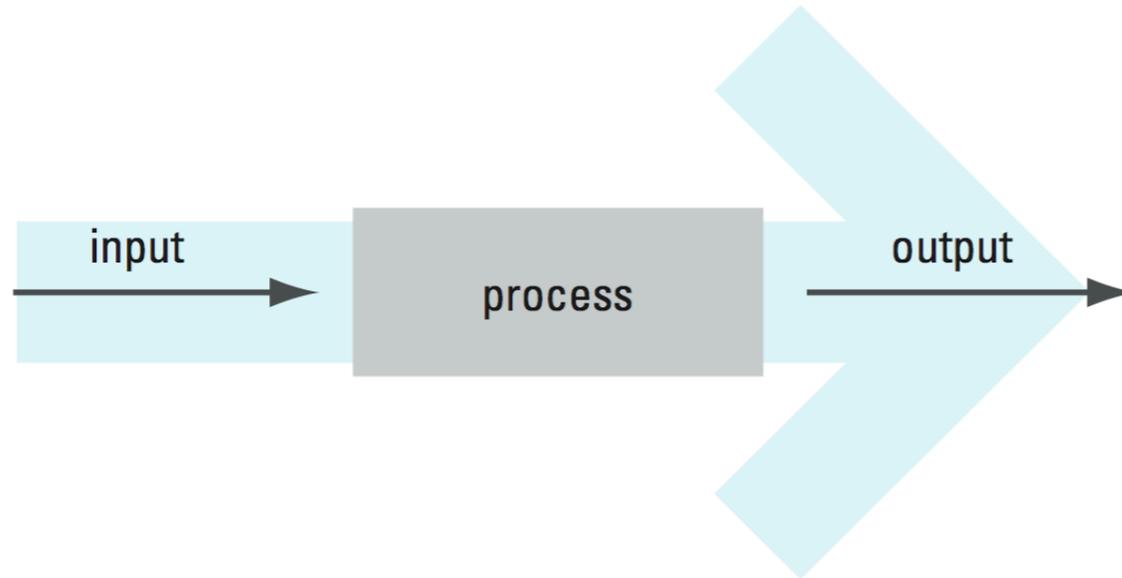






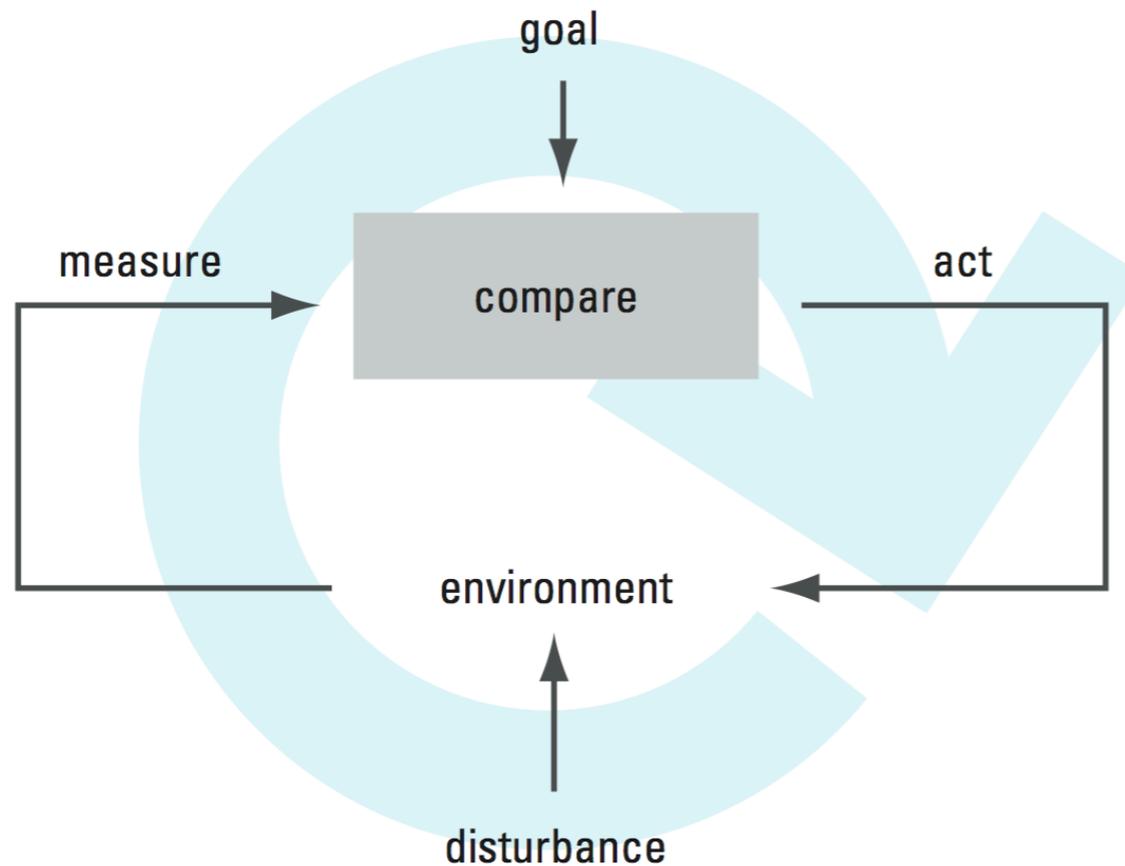
Why is this cybernetic?

other sciences can only explain
how short linear sequences operate



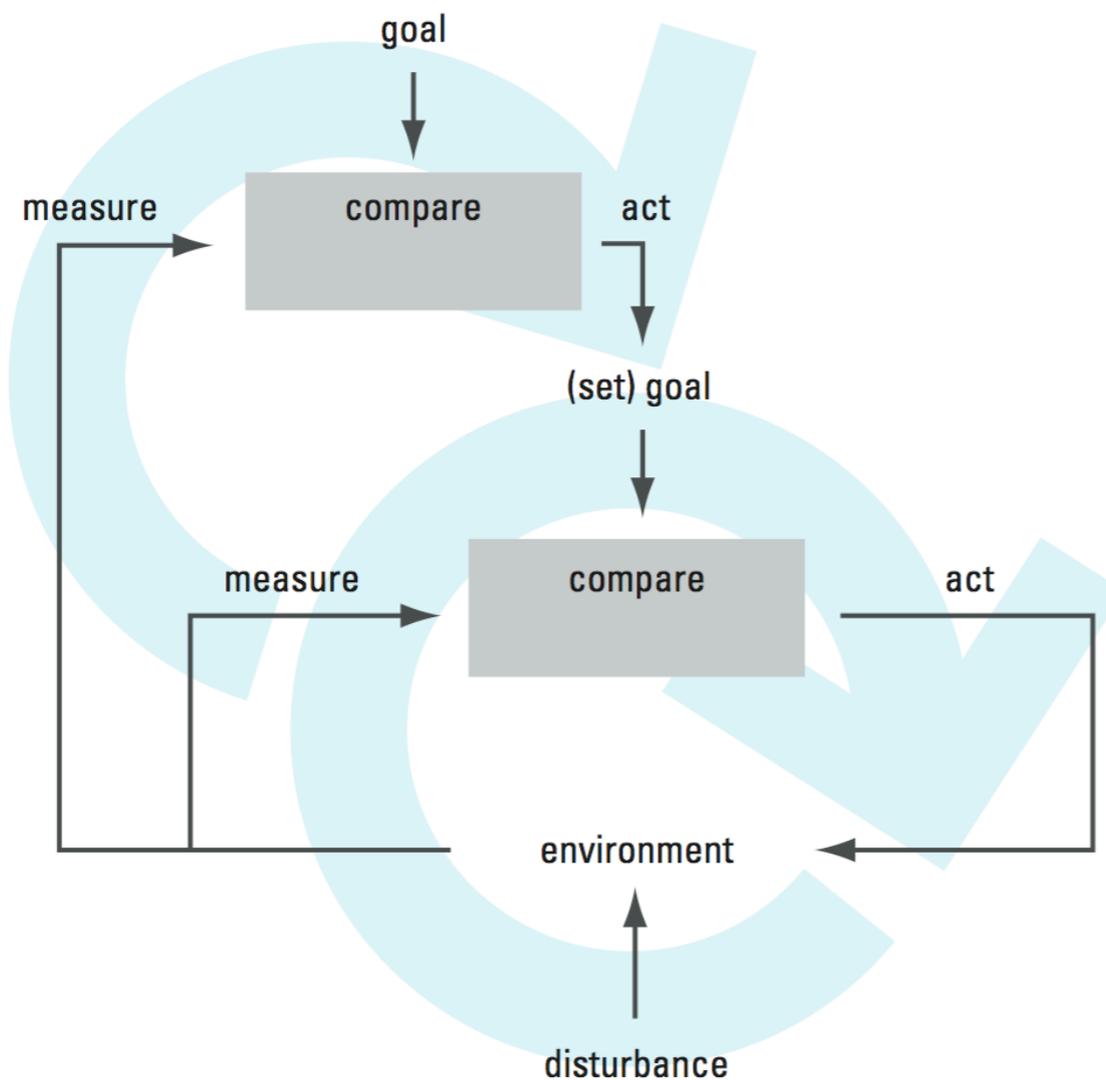
first-order cybernetics

cybernetics explains how
circular causal systems work



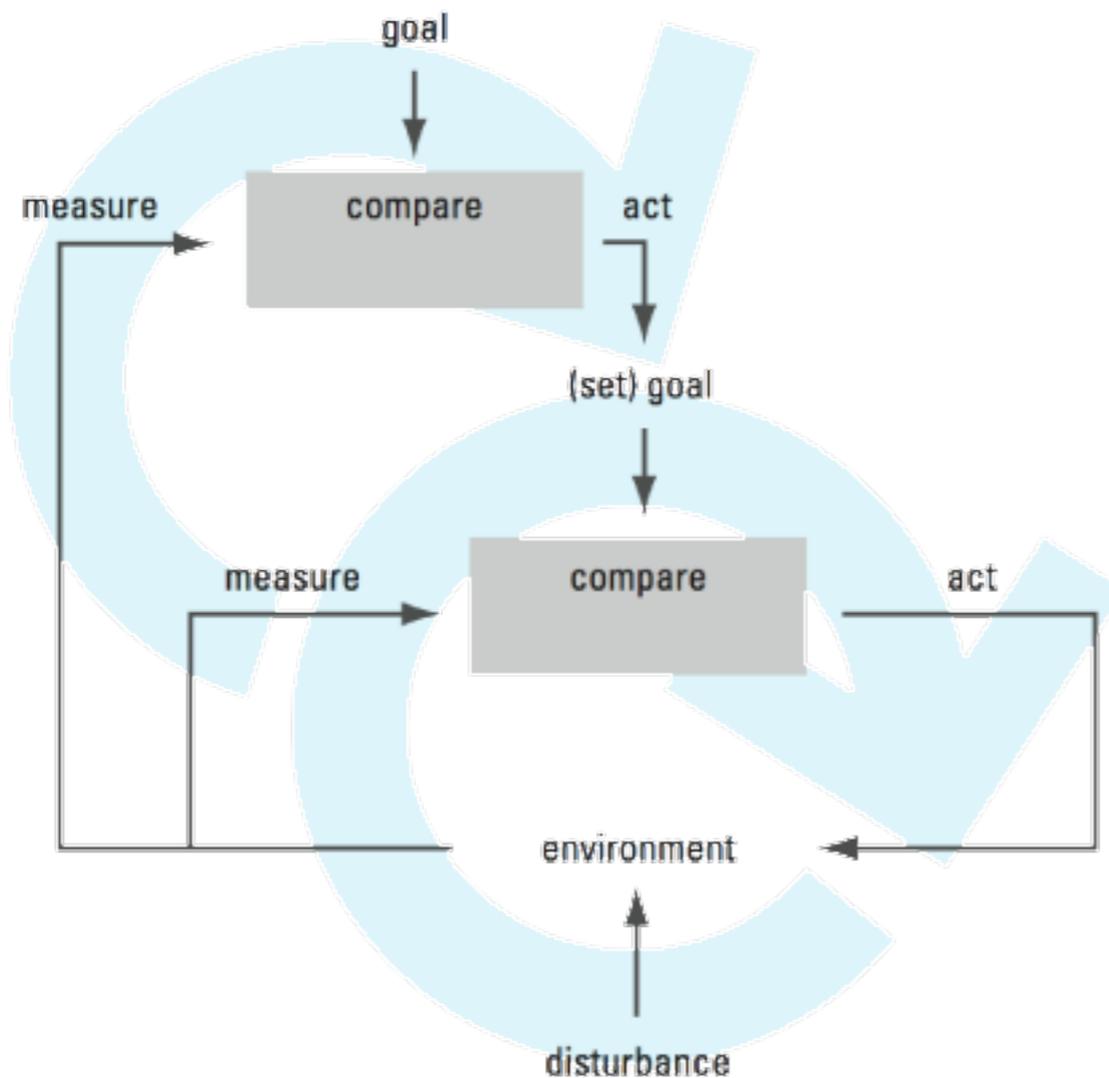
double-loop system

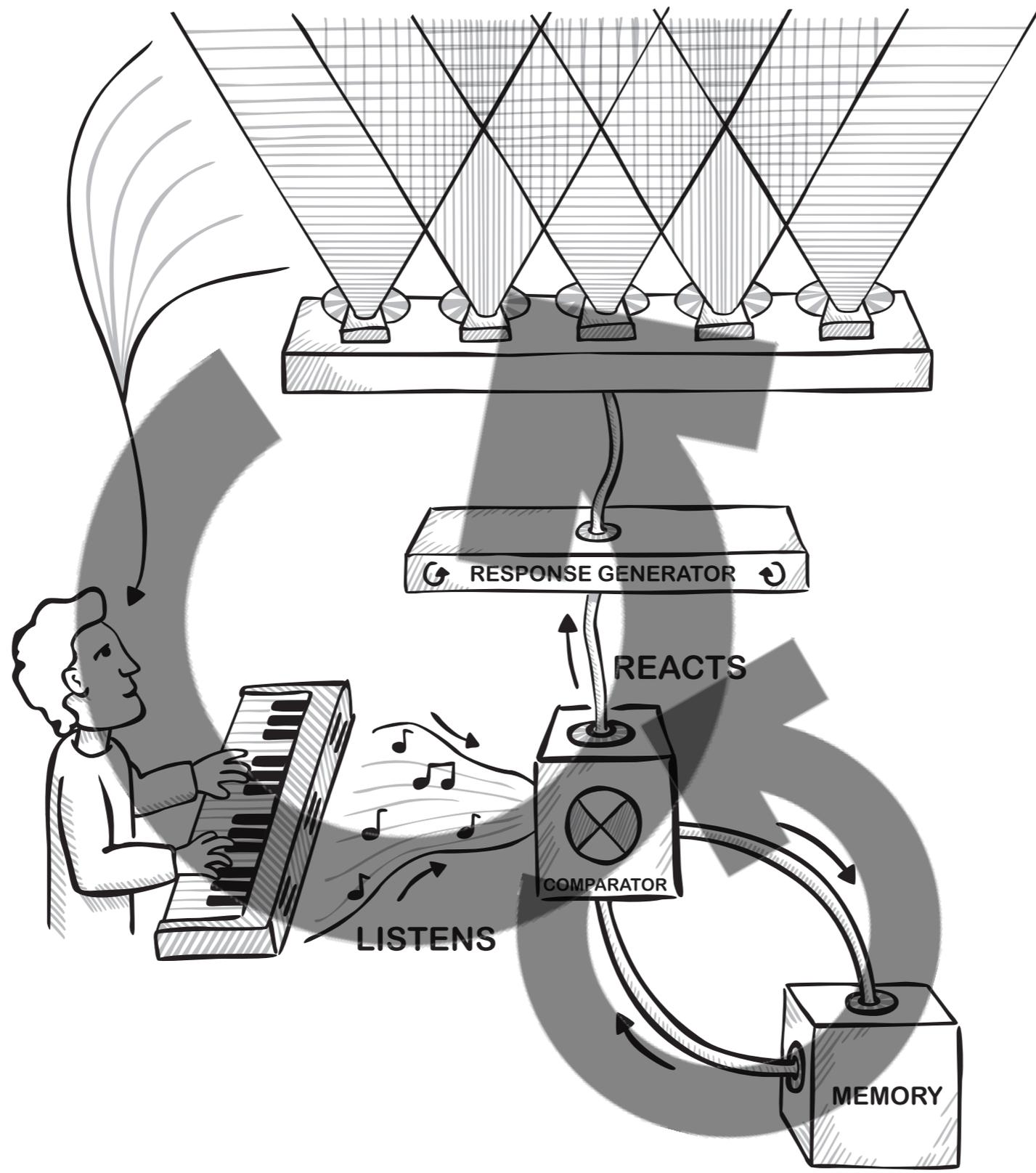
cybernetics explains how circular causal systems work— even when they self-regulate and modify their goals.

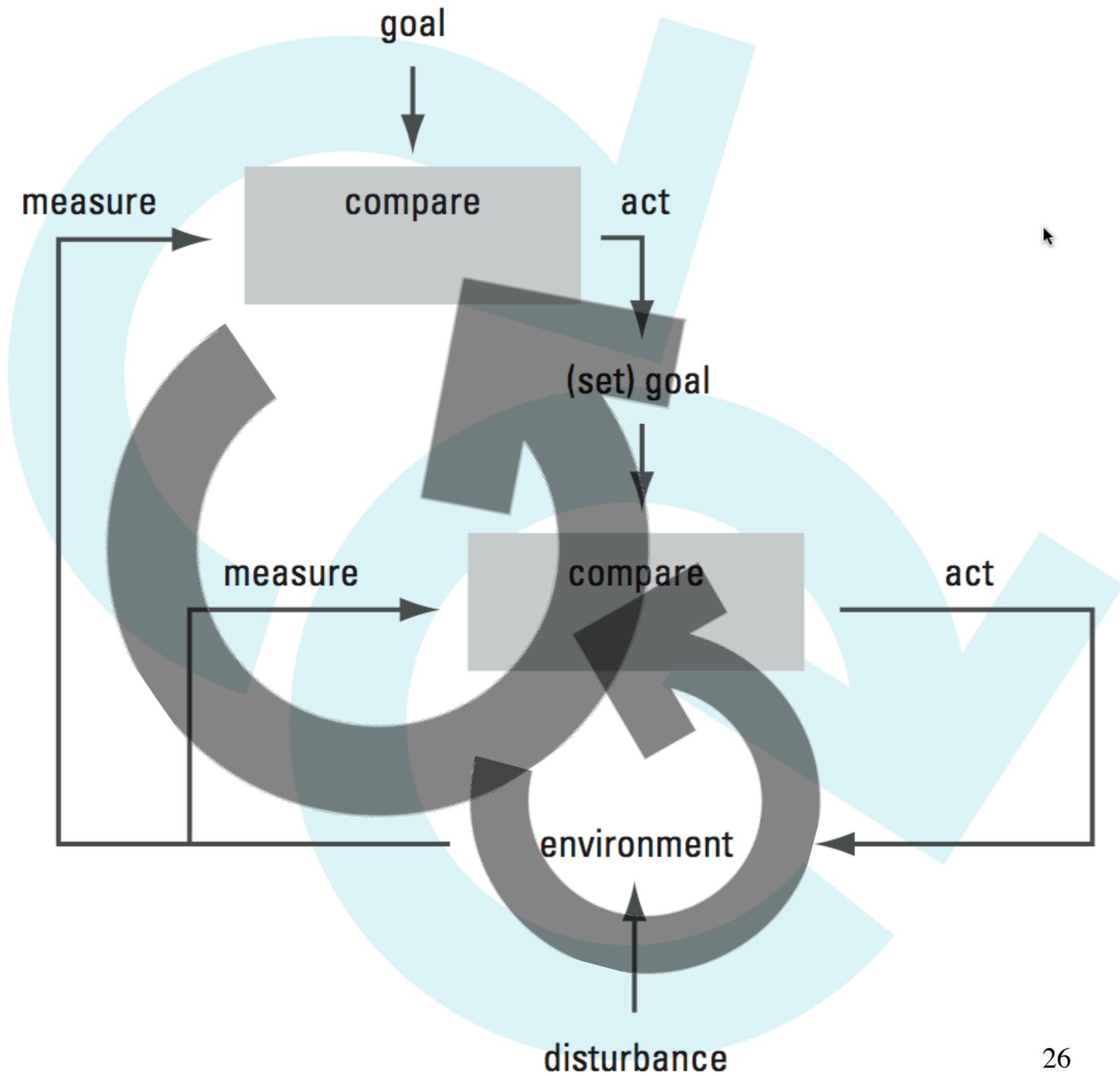


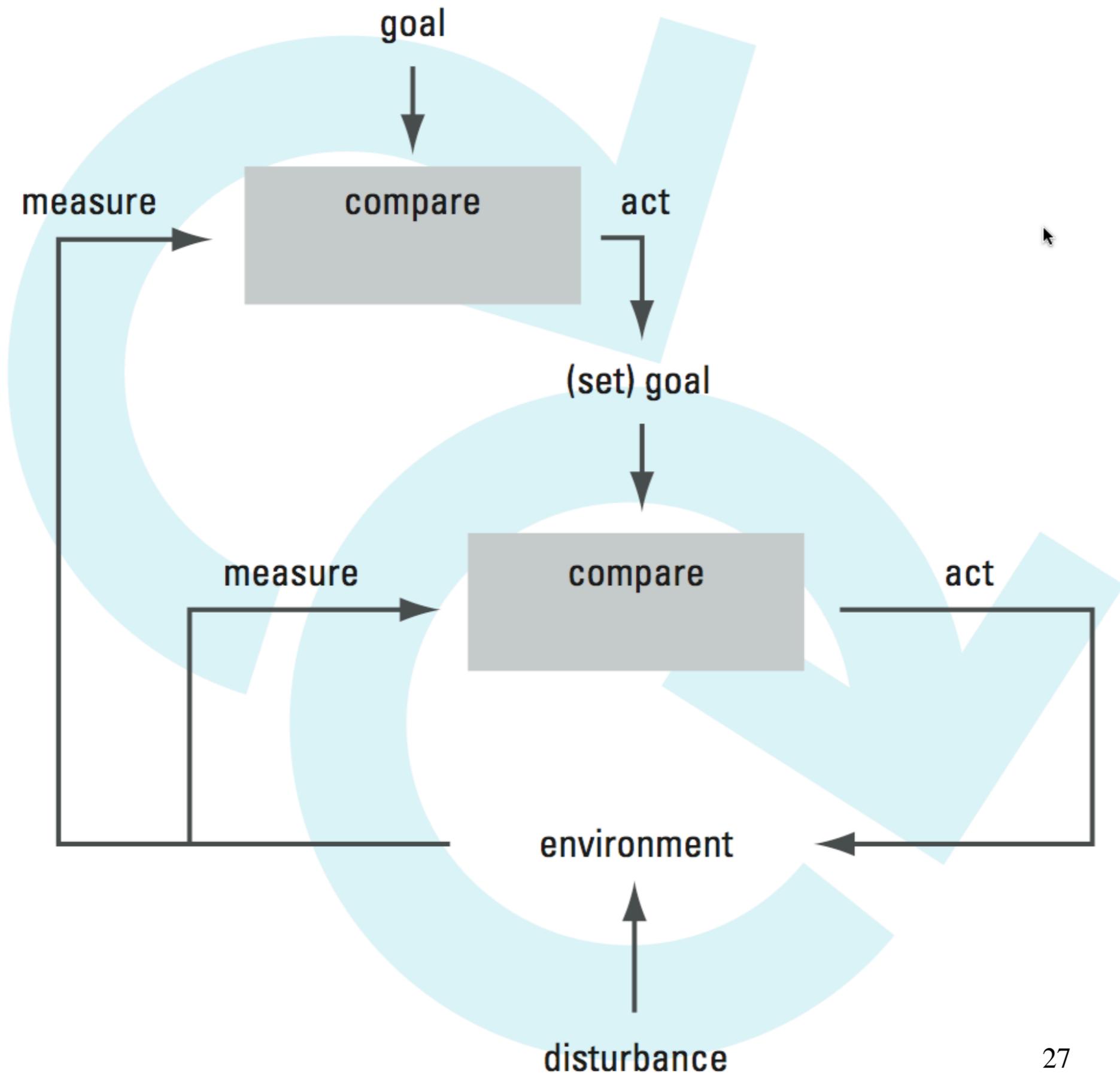
learning system

cybernetics explains how circular causal systems work— even when they self-regulate and modify their goals.

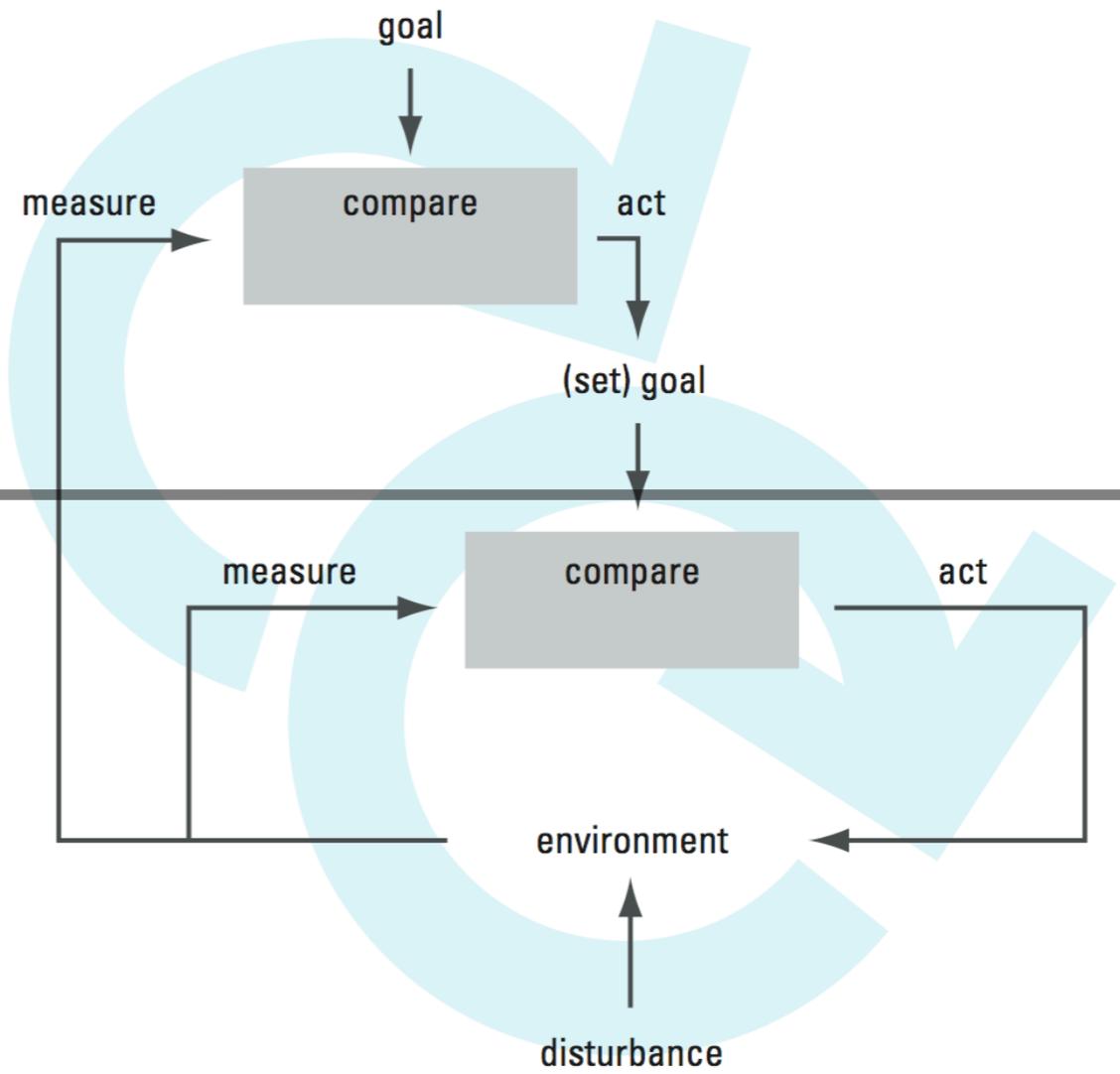
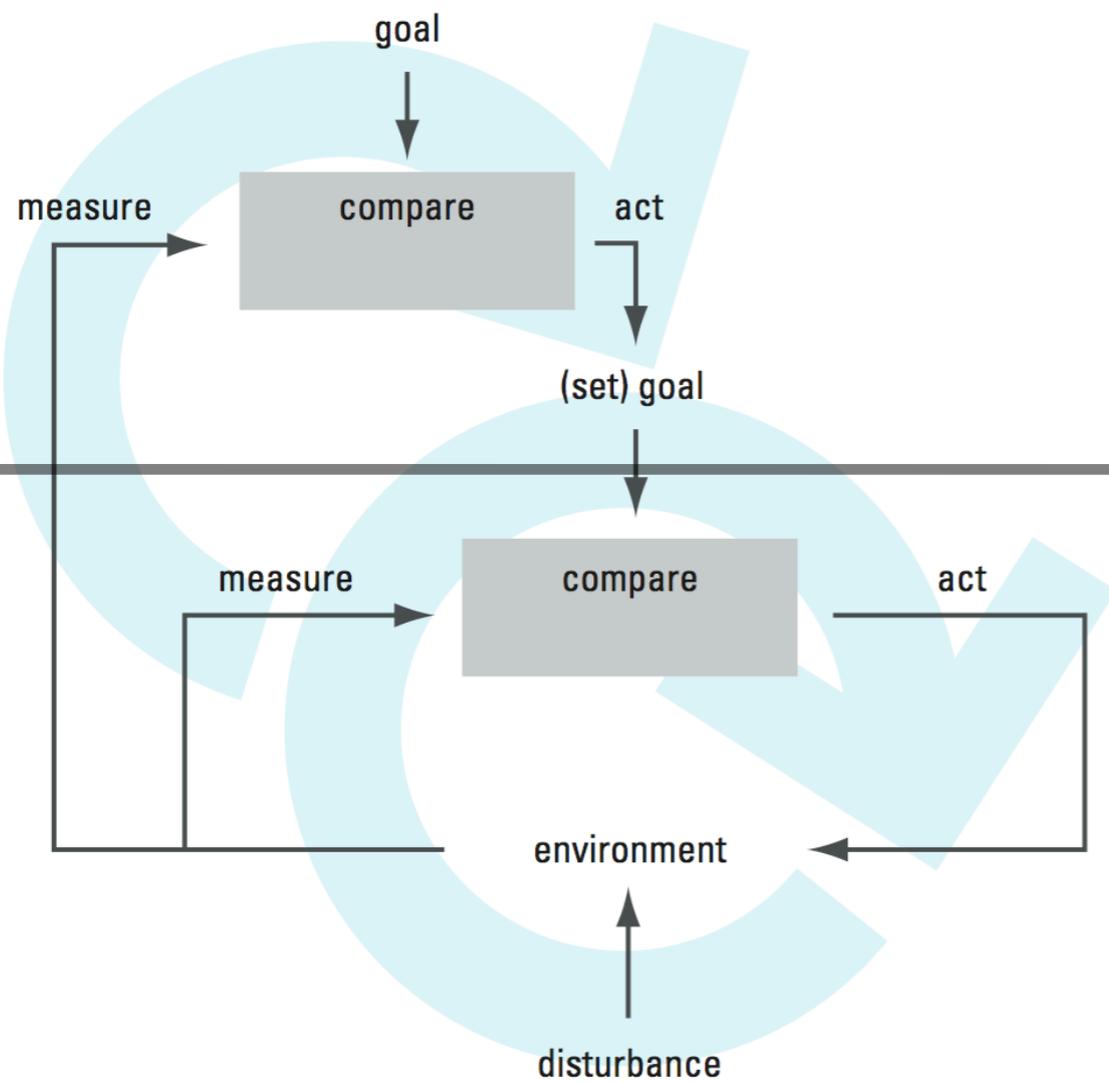




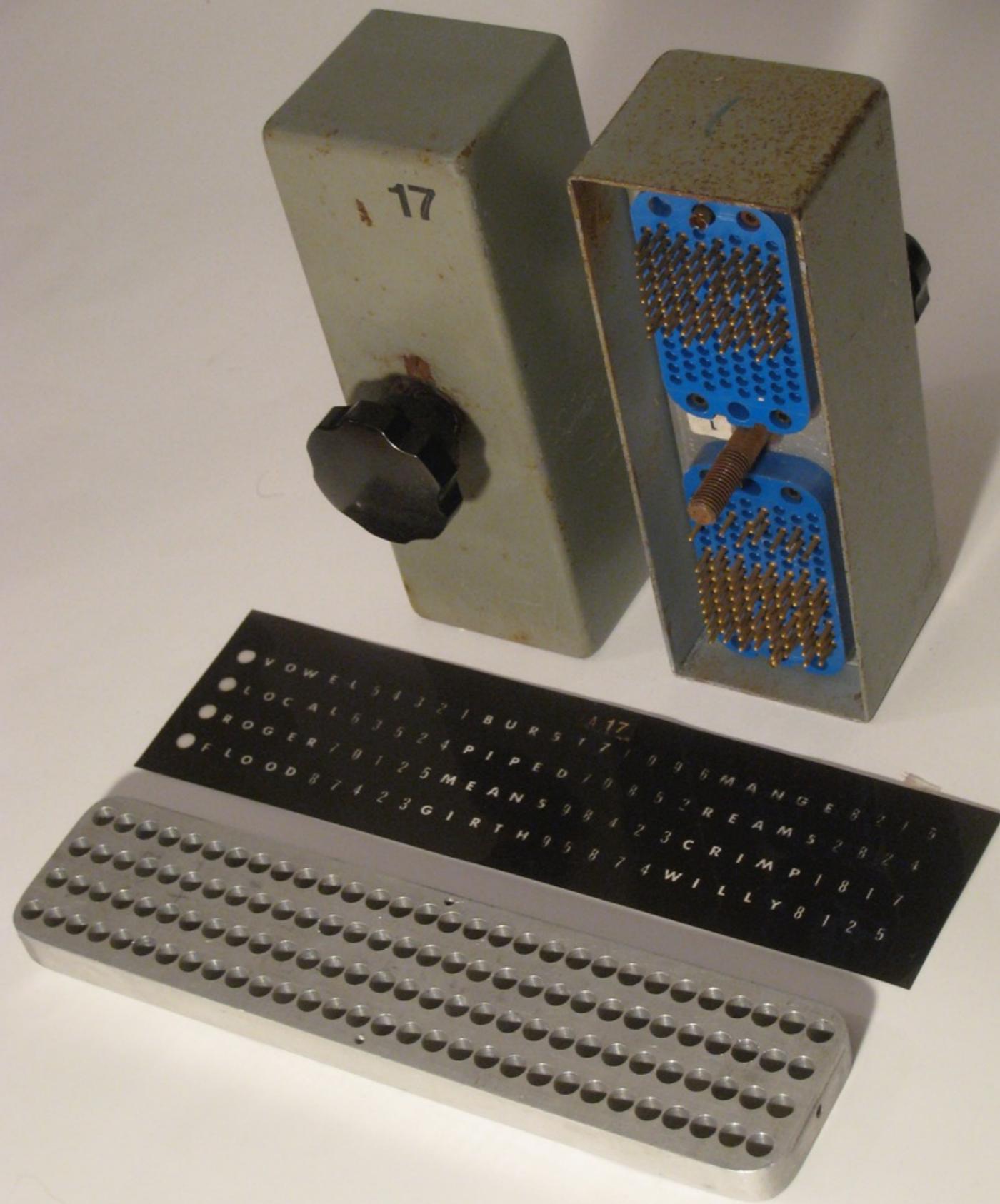




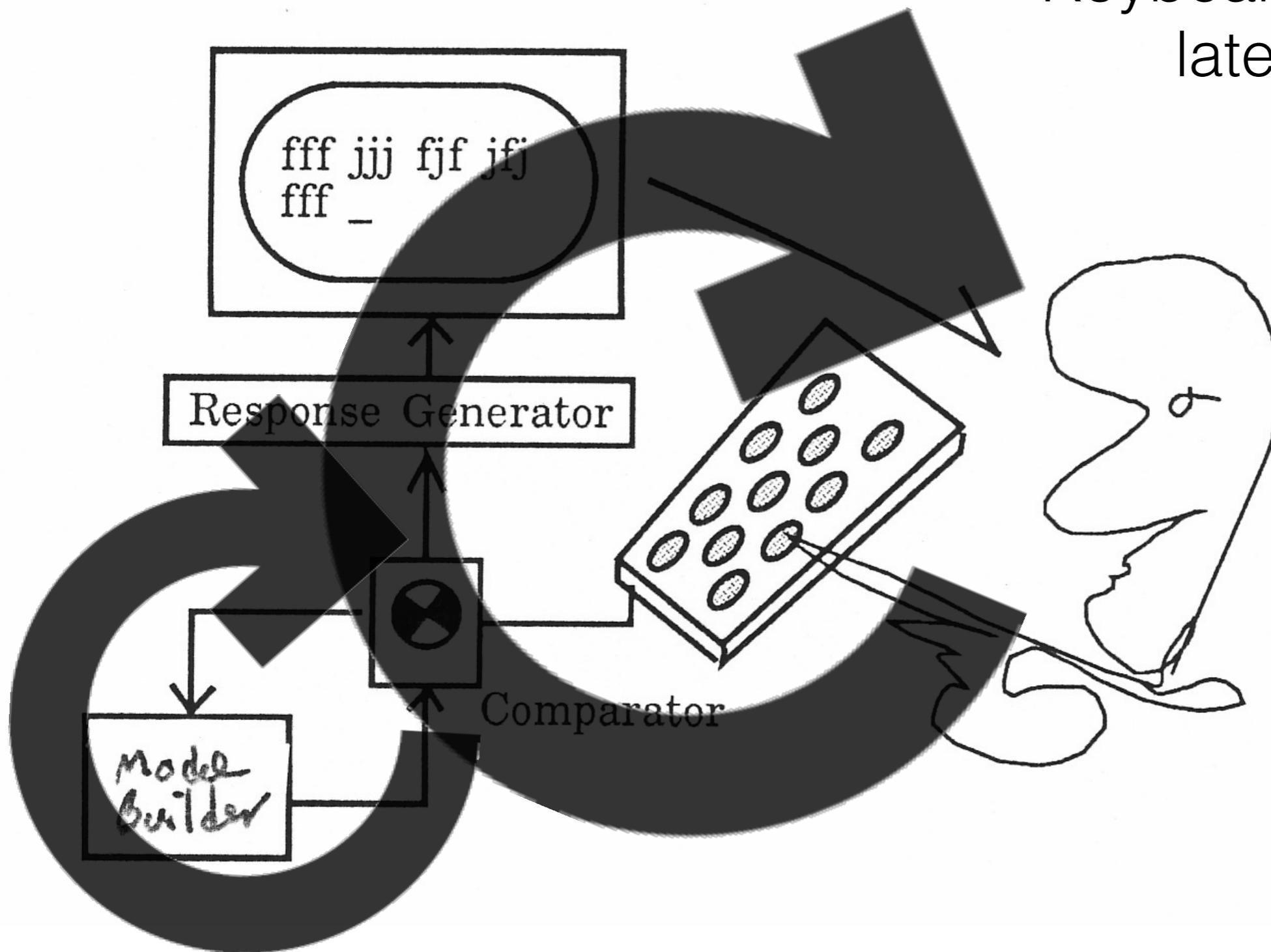
conversation







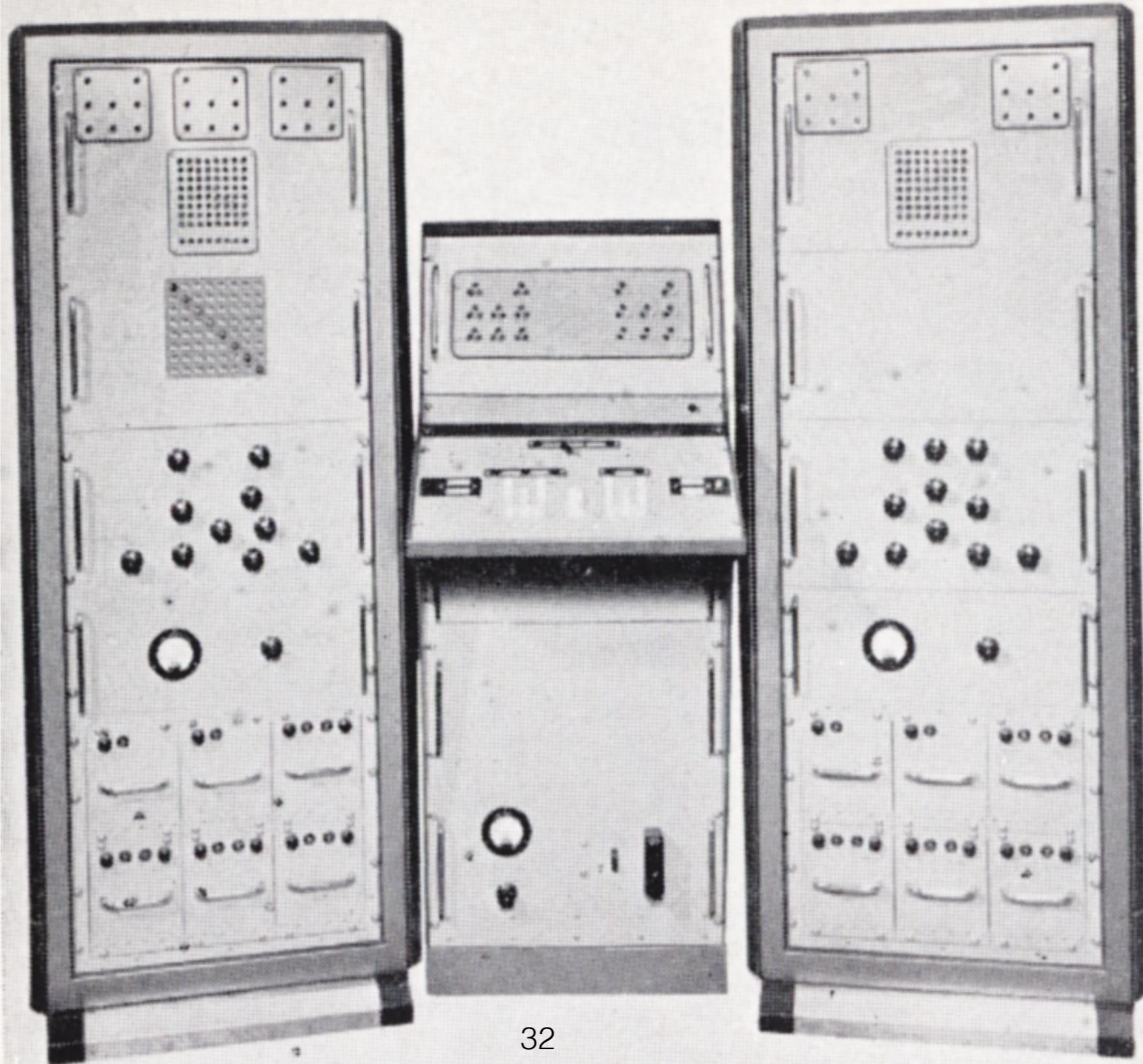
Self-Adaptive Keyboard Instructor late 1950s



TEACHER
SIMULATOR

CONTROL
CONSOLE

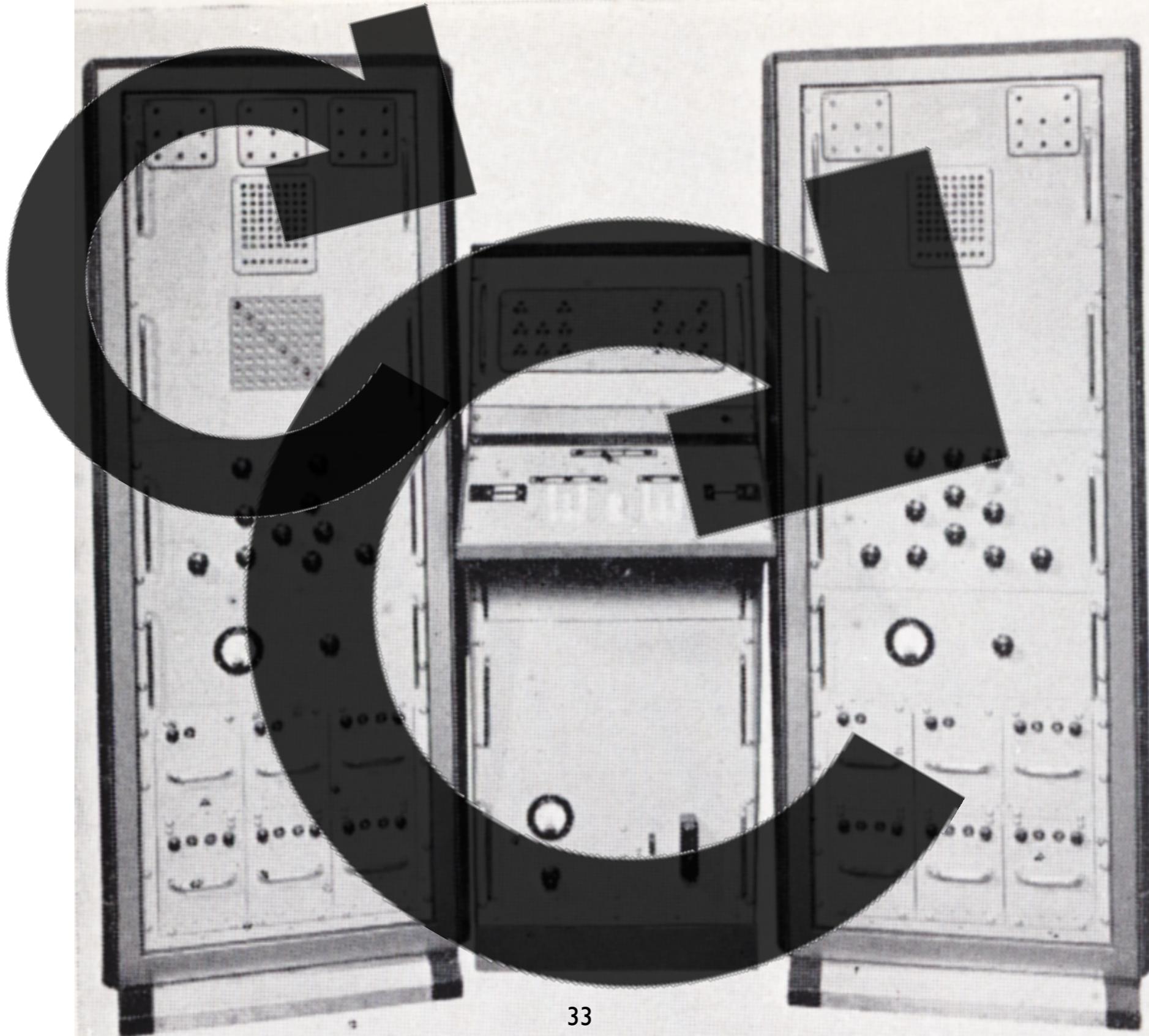
PUPIL
SIMULATOR

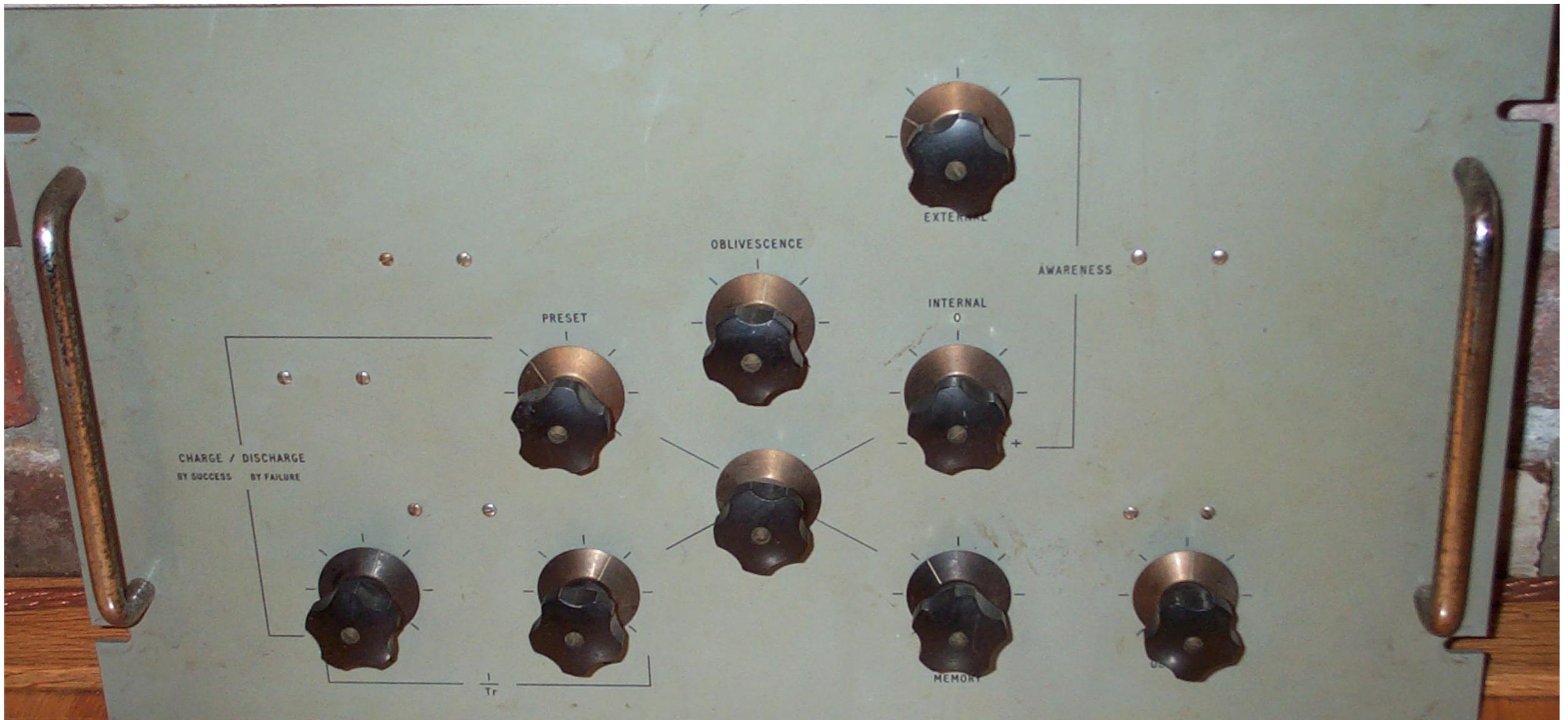


TEACHER
SIMULATOR

CONTROL
CONSOLE

PUPIL
SIMULATOR





EXTERNAL

OBLIVESCENCE

AWARENESS

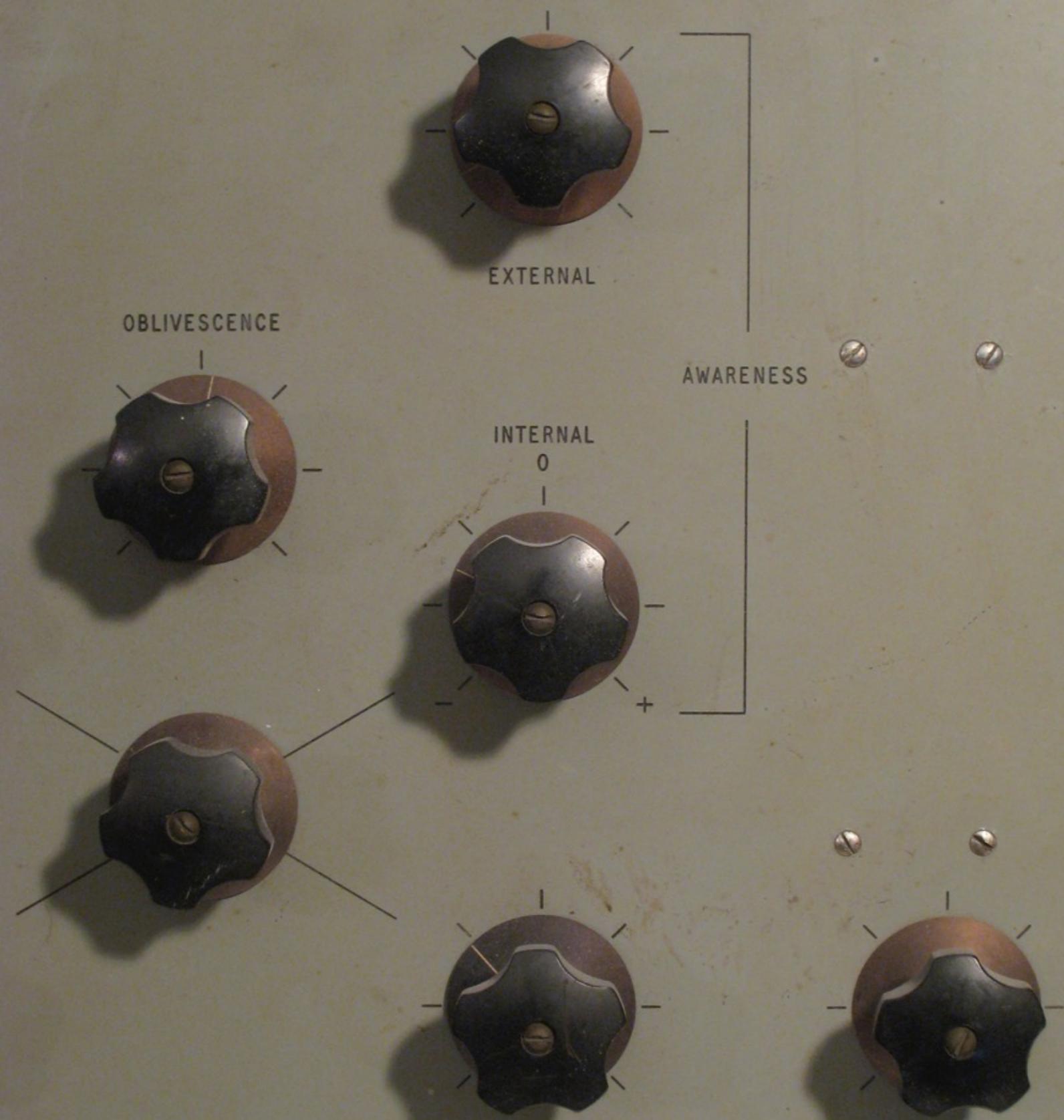
INTERNAL

0

+

REINFORCE
MEMORY

OBSTINACY



EXTERNAL

OBLIVESCENCE

AWARENESS

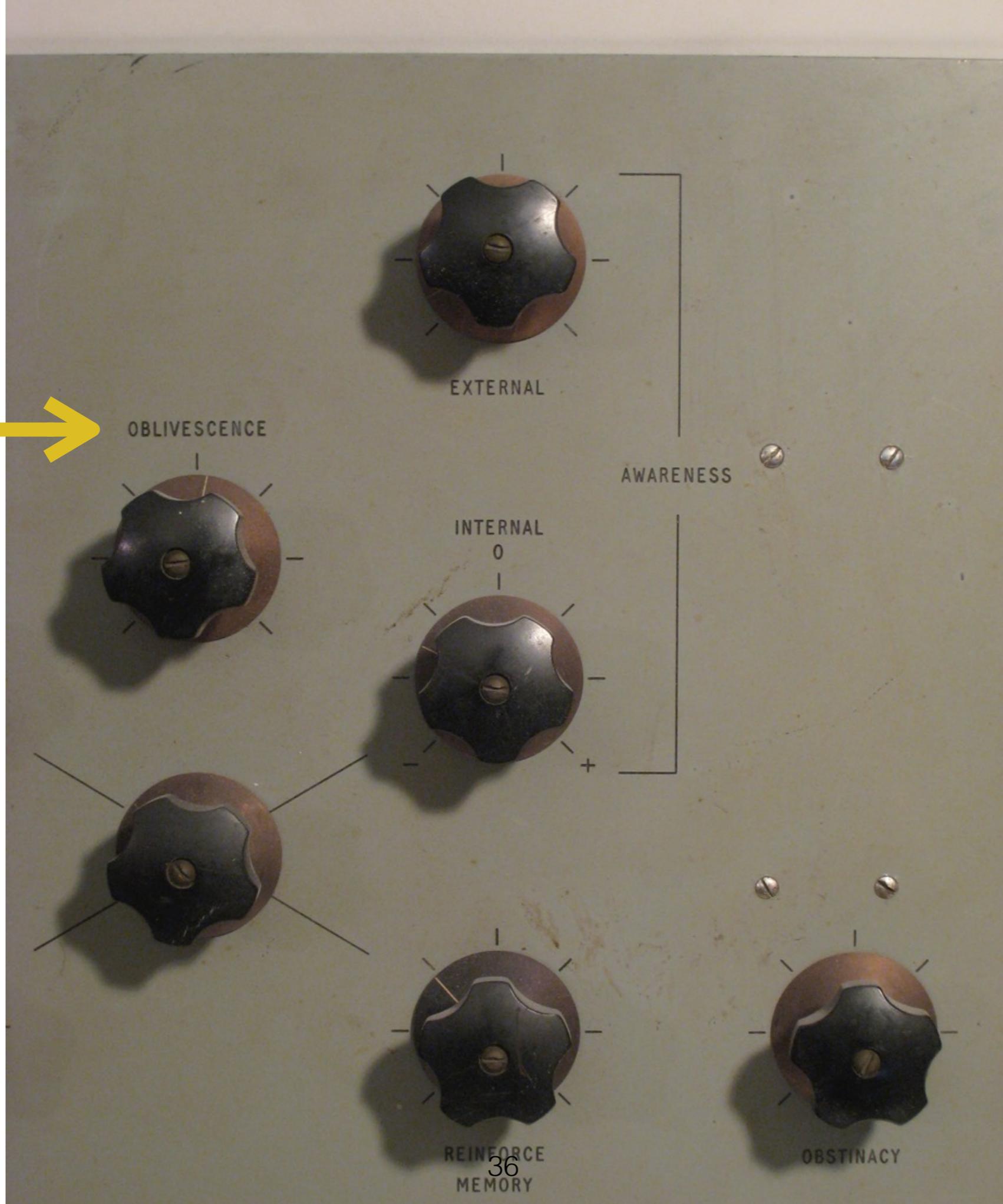
INTERNAL

0

+

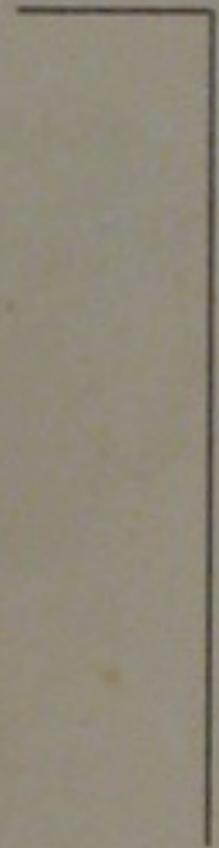
REINFORCE
MEMORY

OBSTINACY





EXTERNAL



AWARENESS



OBLIVESCENCE



INTERNAL

0



+





C

G

F

A

B

E

J

D

H

I

OVERLAY CARDS

K

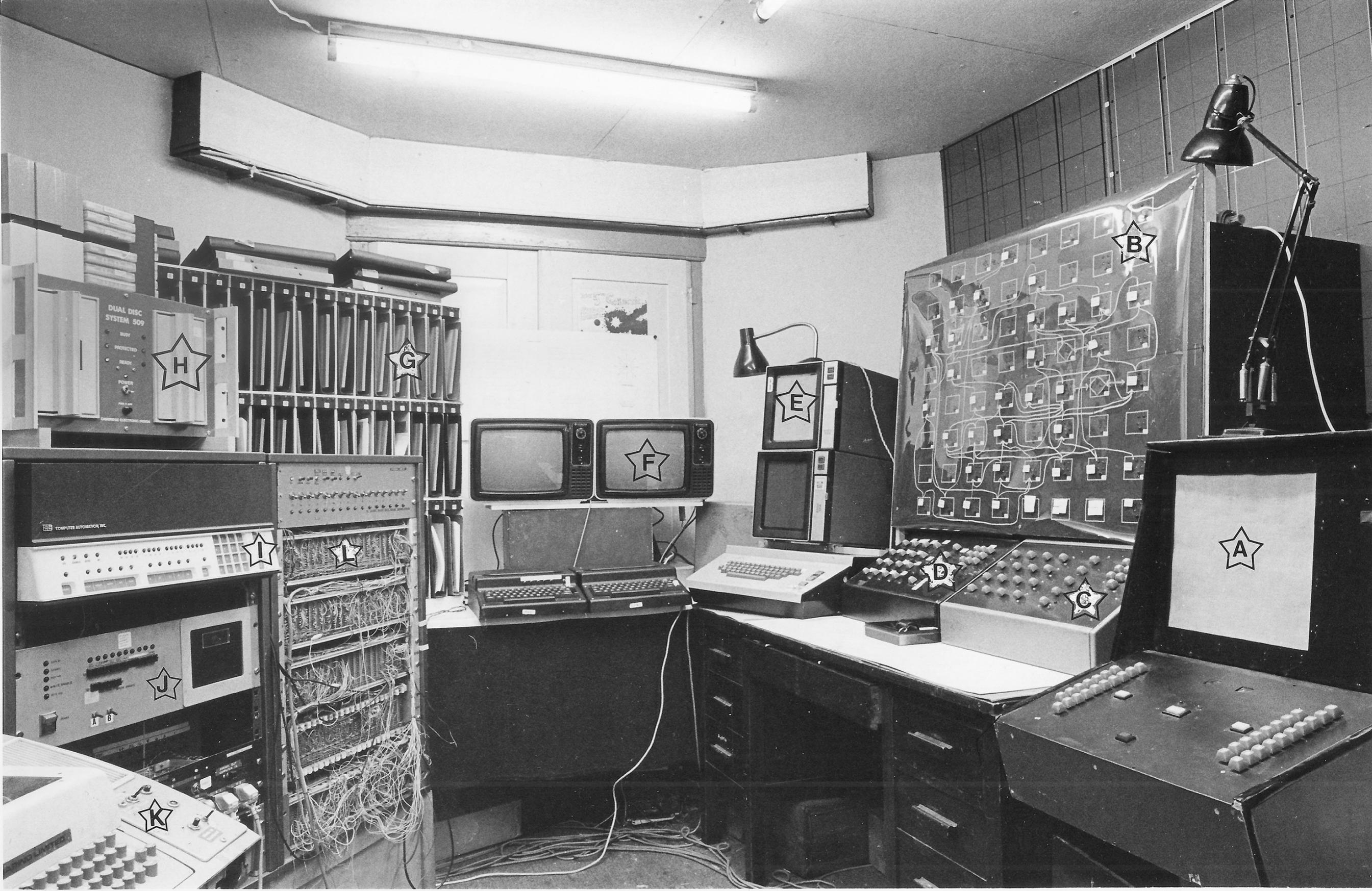
DEMONSTRATIONS
BEHAVIOURAL
SCIENCES

DEMONSTRATIONS
GAMES OF CHANCE

DEMONSTRATIONS
PLANT BREEDING

DEMONSTRATIONS
ABSTRACT

DEMONSTRATIONS
MAIN TEXT



Tutorial

This is a tutorial to help you become familiar with Zmacs. The tutorial software is called THOUGHTSTICKER and has been developed by PANGARO Incorporated.

Associated Topics:

HELP
PANGARO
THOUGHTSTICKER
Tutorial
Zmacs

User Serialist in Explore Mode

Next
More (1/2)
Which?

Back
Jump
List
Other

thoughtshuffler iOS 2013

UX by Miriam Simun

UI by See-ming Lee

concept & heuristics by Paul Pangaro



Streamfully mobile 2014

UI design & coding by John Katagawa
UX & heuristics by Paul Pangaro





Got a tip? [Let us know.](#)

Apply to the Startup Battlefield at Disrupt SF and Disrupt Europe



All The News From WWDC 2014

by Matt Burns



Apple Announces Swift Programming Language

APPLE LAUNCHES SWIFT, A NEW PROGRAMMING LANGUAGE FOR WRITING IOS AND OS X APPS

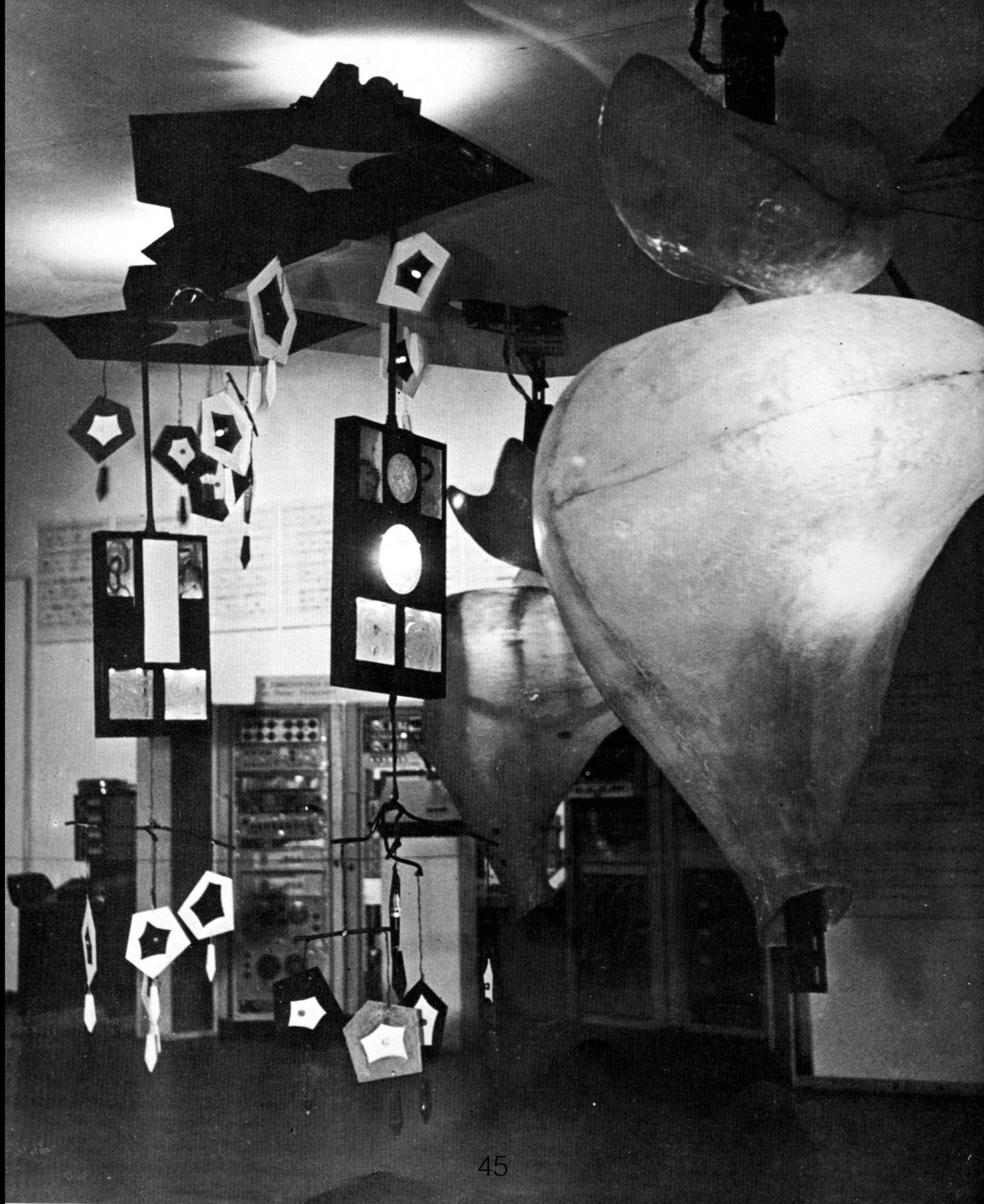


- Objective-C was always a hard language to pick up for new developers. We will also have to see if Swift makes getting started with app development on Apple's platforms easier, but from a first look at the documentation, it definitely feels more accessible than Objective-C.
- It should feel familiar to those who are already used to Objective-C, Apple says, and is meant to "unify the procedural and object-oriented portions of the language." It does

Have a tip, pitch or guest



- RELATED**
- [iTunes - Books - The Swift Programming Lan...](#)
Swift is a new programming language for creating iOS and OS X apps. Swift builds on the best of C and Objective-C, without the
 - [Xcode - Downloads - Apple Developer](#)
Find a comprehensive set of programming guides, reference, and sample code for developing with the latest tools and











Soft Architecture Machines

Negroponte



Soft

Archi
tec
ture

Ma
chines

Nicholas
Negroponte

Soft Architecture Machines

Negroponte



Soft

Archi
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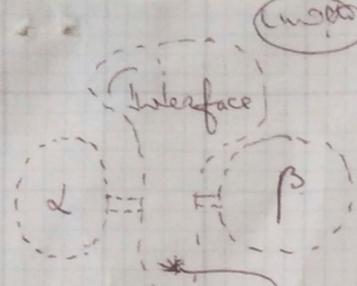
Nicholas
Negroponte

Aspects of
Machine
Intelligence

Introduction by Gordon Pask

Aspects of Machine Intelligence

Introduction by Gordon Pask



Some fun the logic ...
with ...
to ...
without ...

$$L^1 \quad A \rightleftharpoons B$$

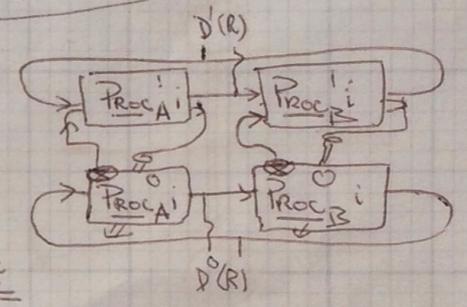
$$L^0 \quad A \rightleftharpoons B$$

1 Fig 1.

Observers Recording Equipment

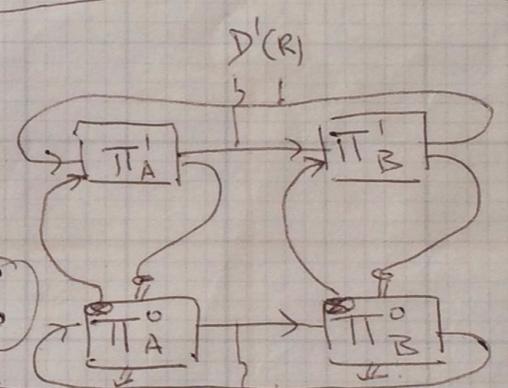
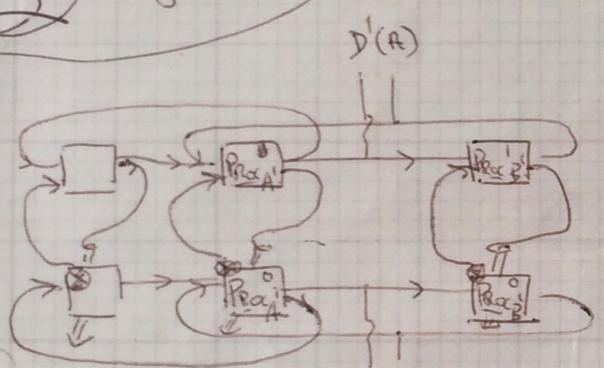
3 Fig 3.

$$A \rightleftharpoons B$$



2 Fig 2.

4 Fig 4.

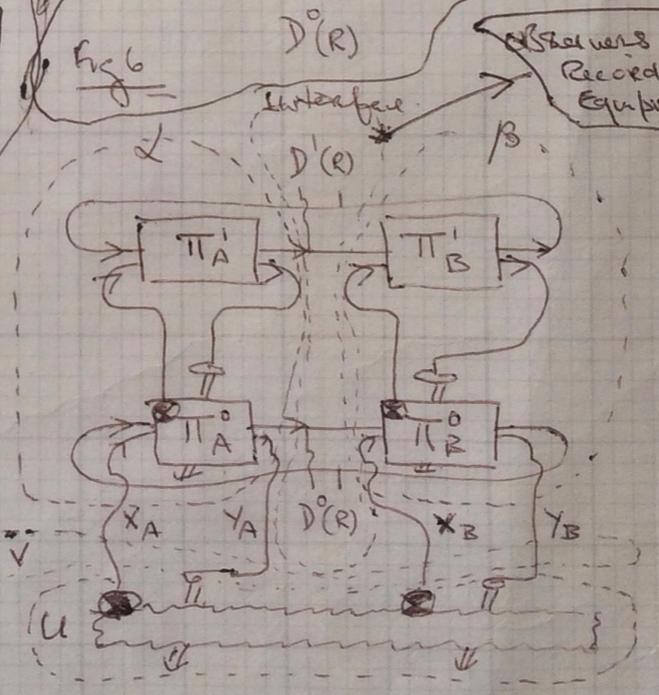
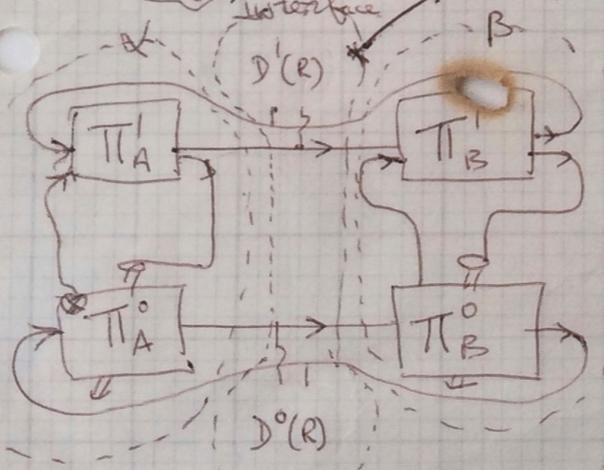


5 Fig 5.

Observers Recording Equipment

6 Fig 6.

Observers Recording Equipment



7 Fig 7.

8 Fig 8.

8

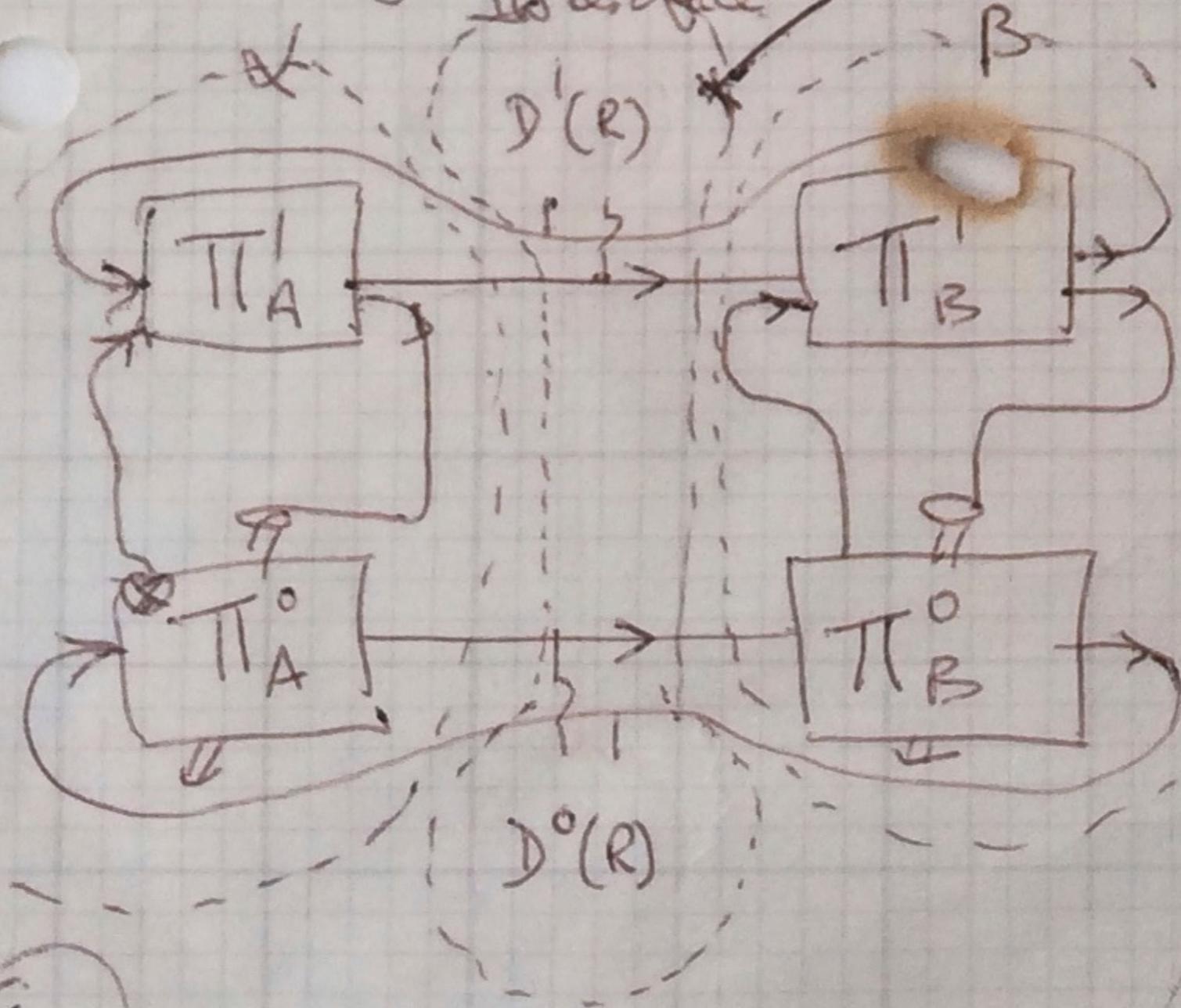
5

Fig 5.

$D^0(R)$

Observer's Recording Equipment

Interface

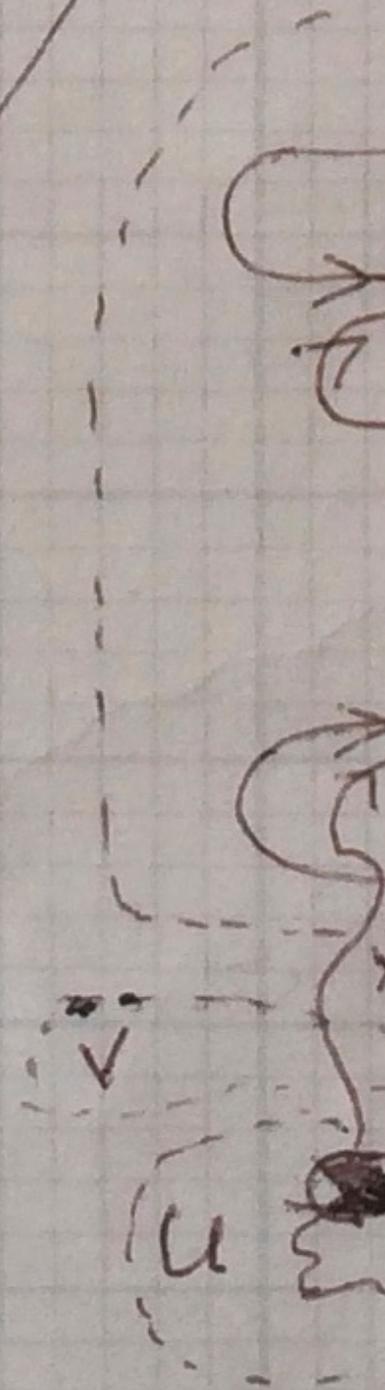


1

Fig 7.

Fig 8.

Fig 6



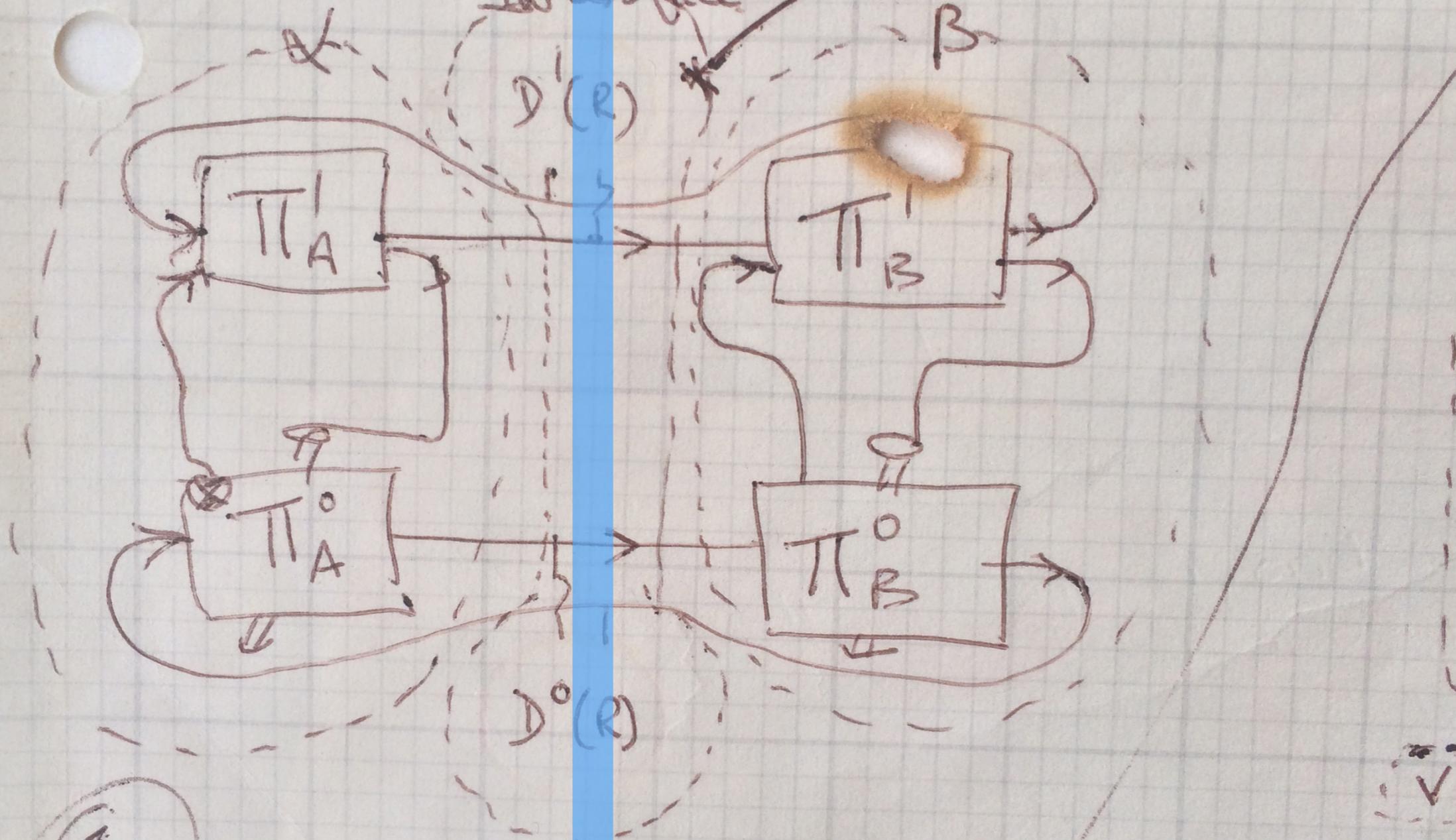
S

Fig 5.

$D^0(R)$

Observer's Recording Equipment

Interface



↑

Fig 7

Fig 8

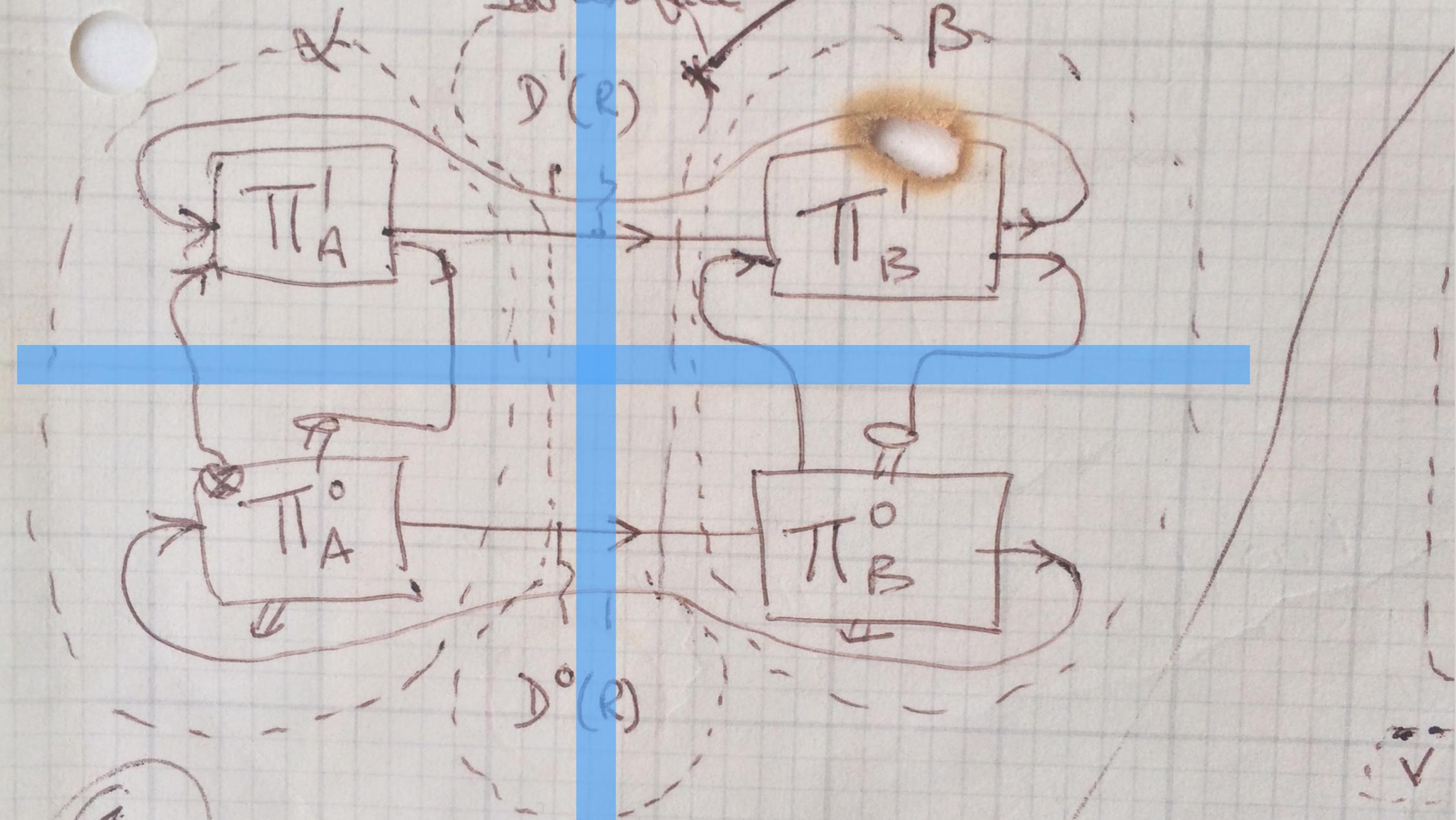
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Fig 5.

$D^0(R)$

Observer's Recording Equipment

Interface



1

Fig 7

Fig 8

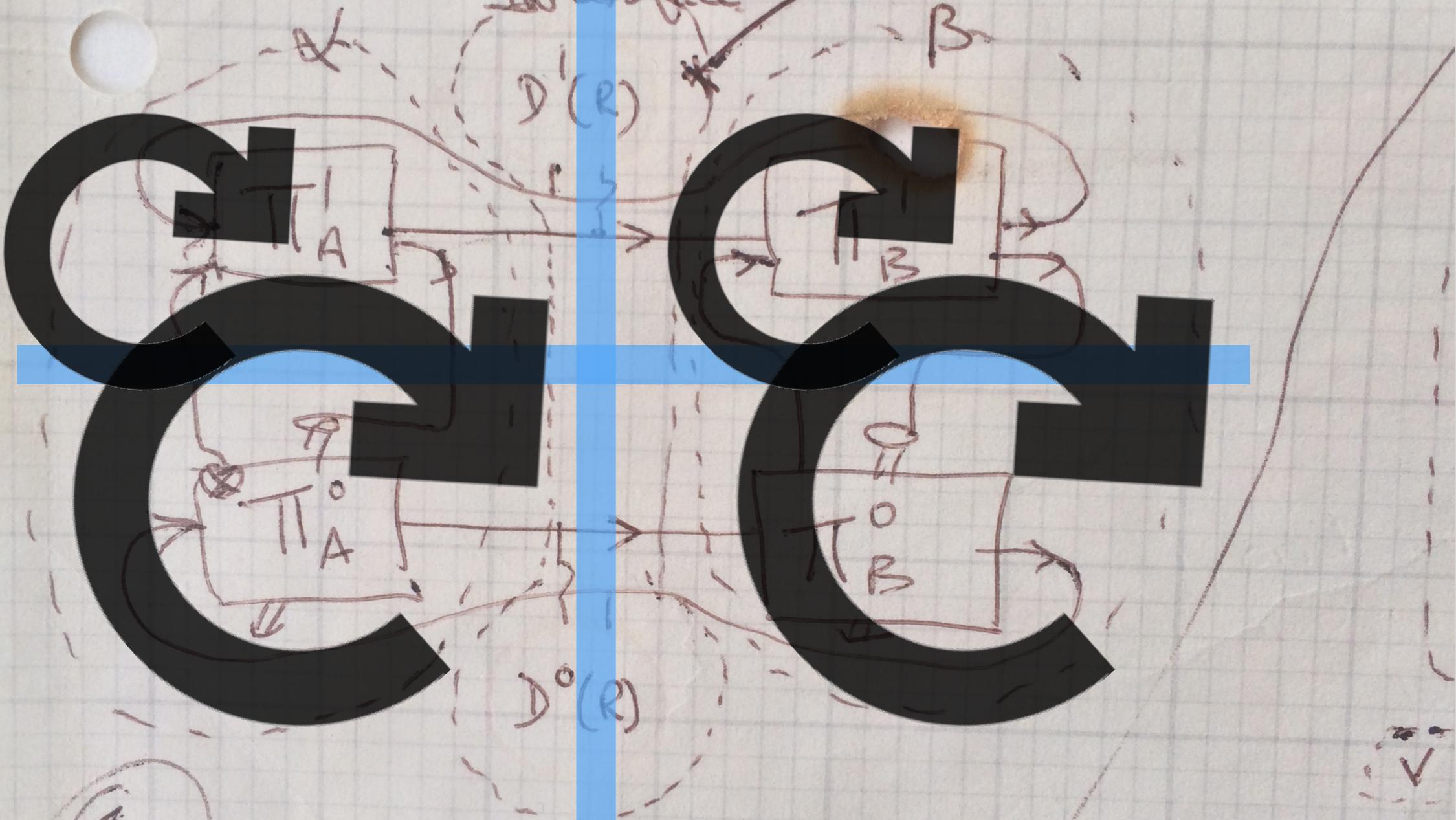
5

Fig 5.

$D^0(R)$

Observer's Recording Equipment

Interface

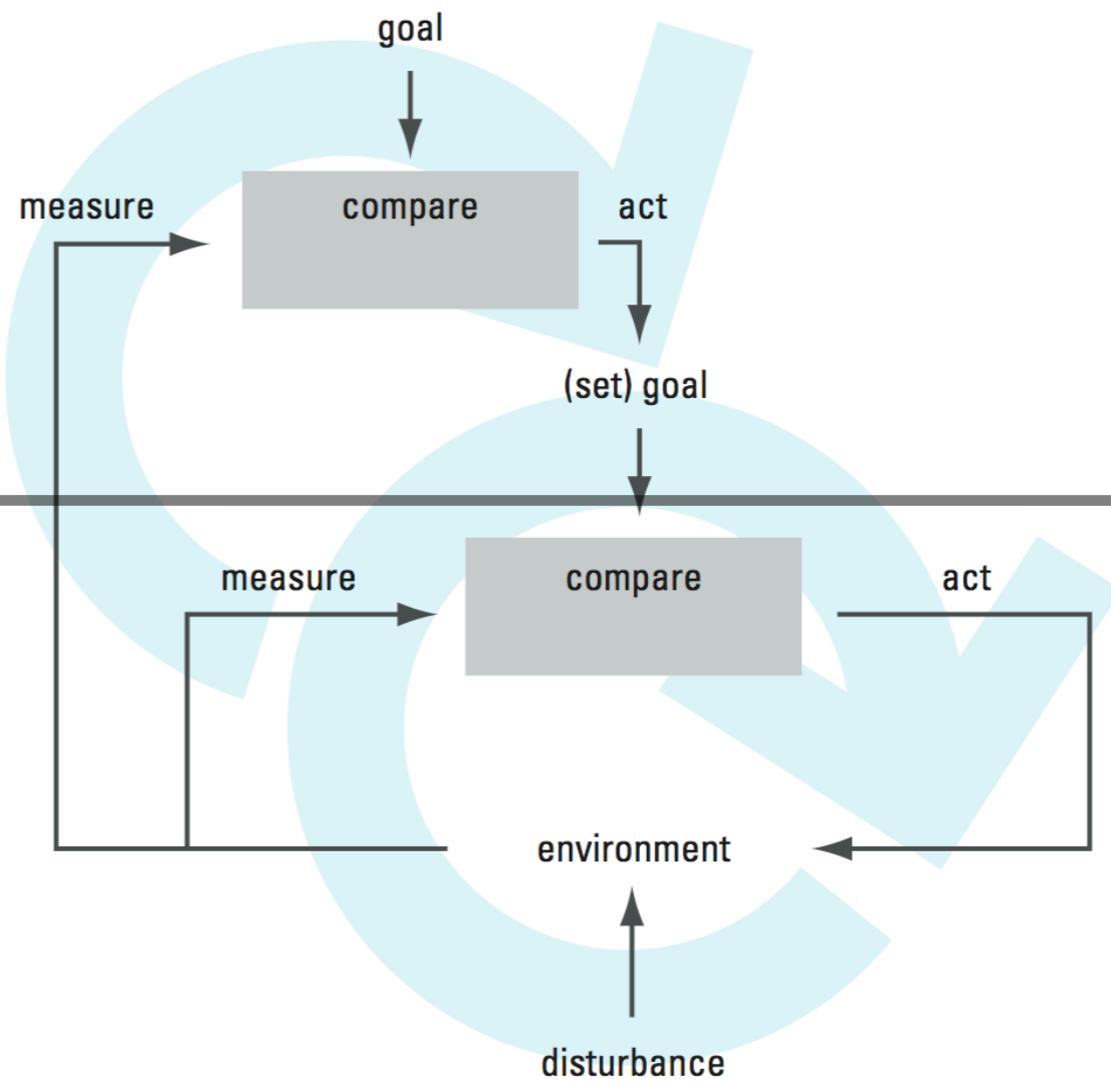
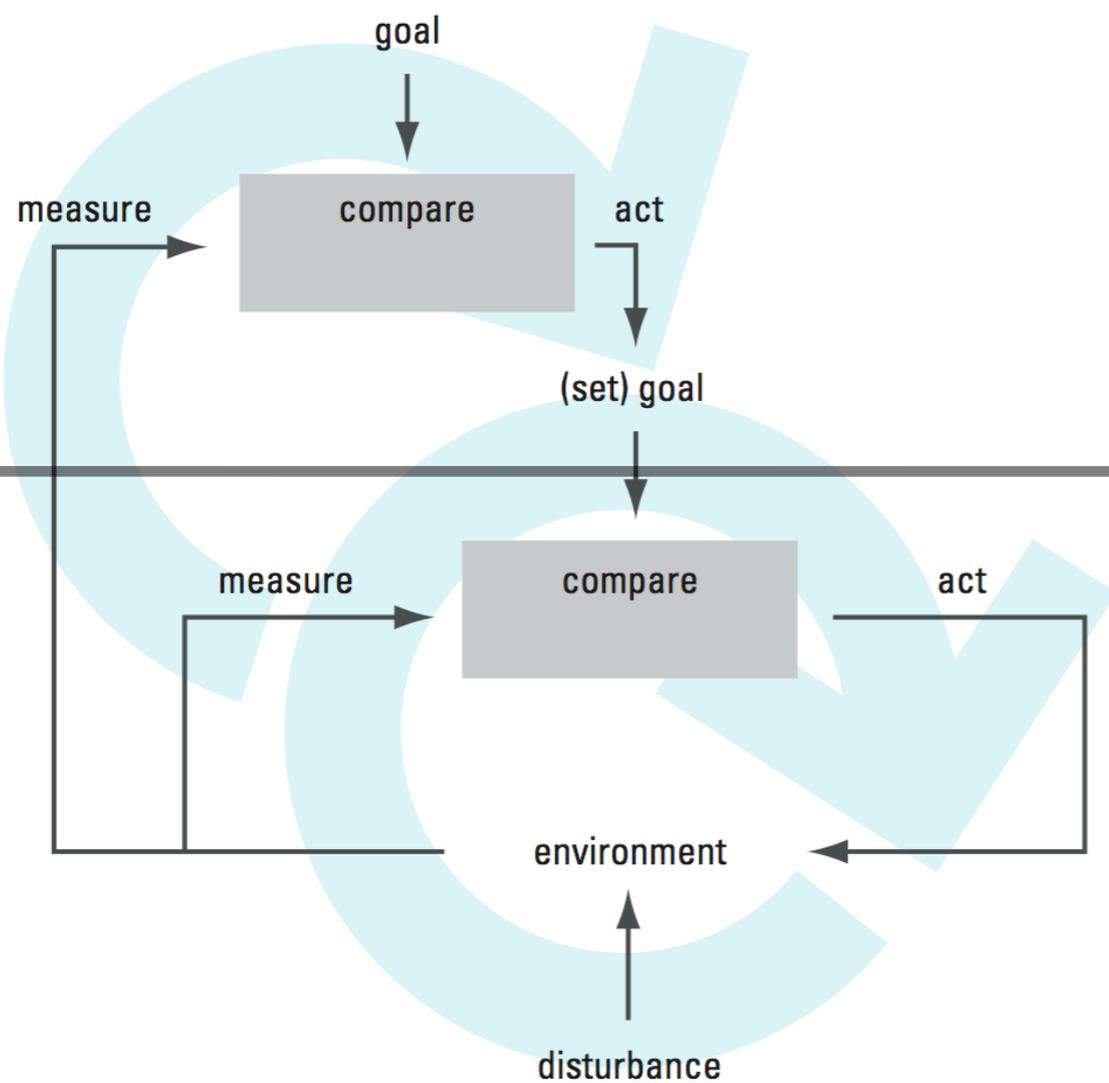


1

Fig 7

Fig 8

conversation



5

Fig 5.

$D^0(R)$

Observer's Recording Equipment

Interface

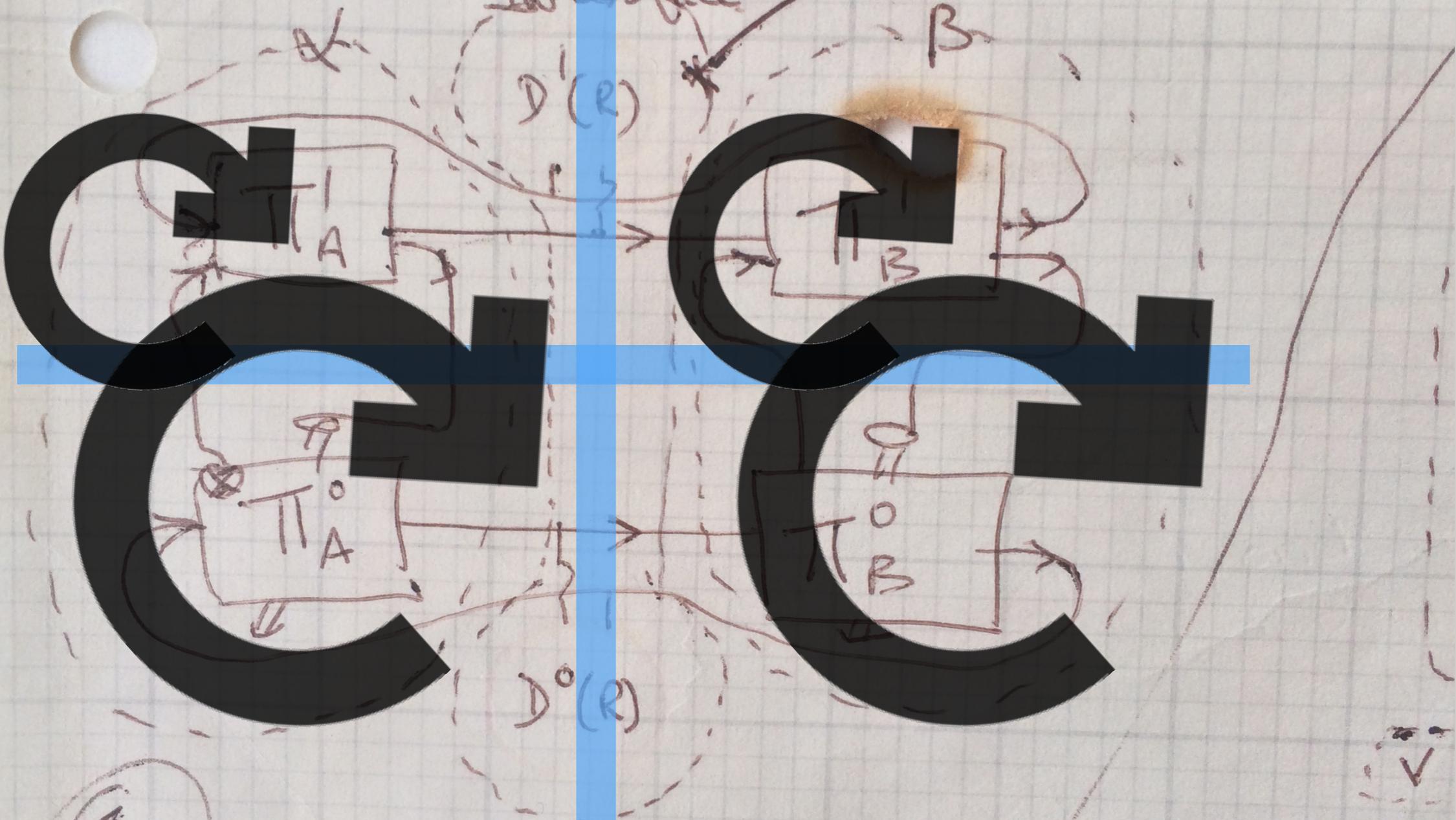
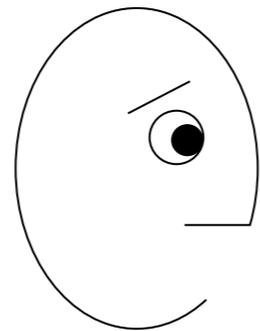


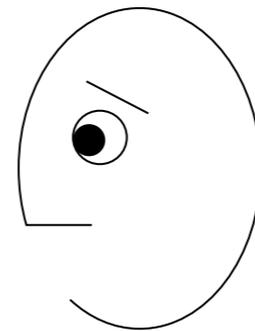
Fig 7

Fig 8

how does conversation work?

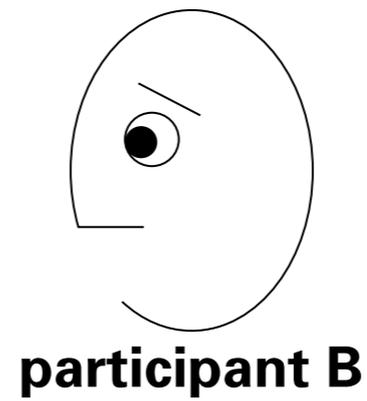
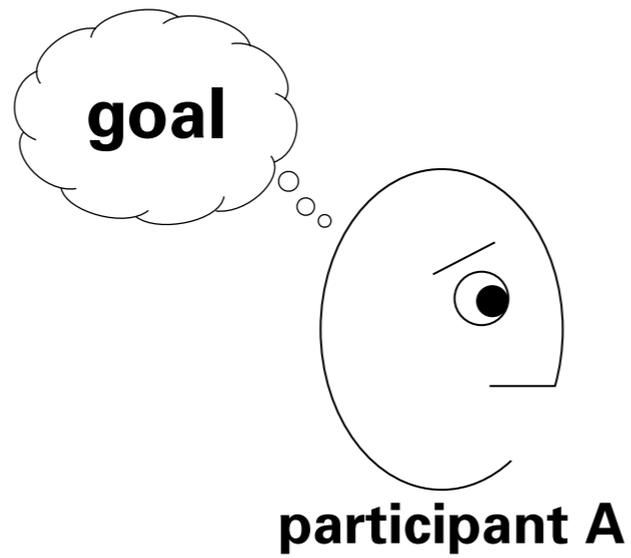


participant A

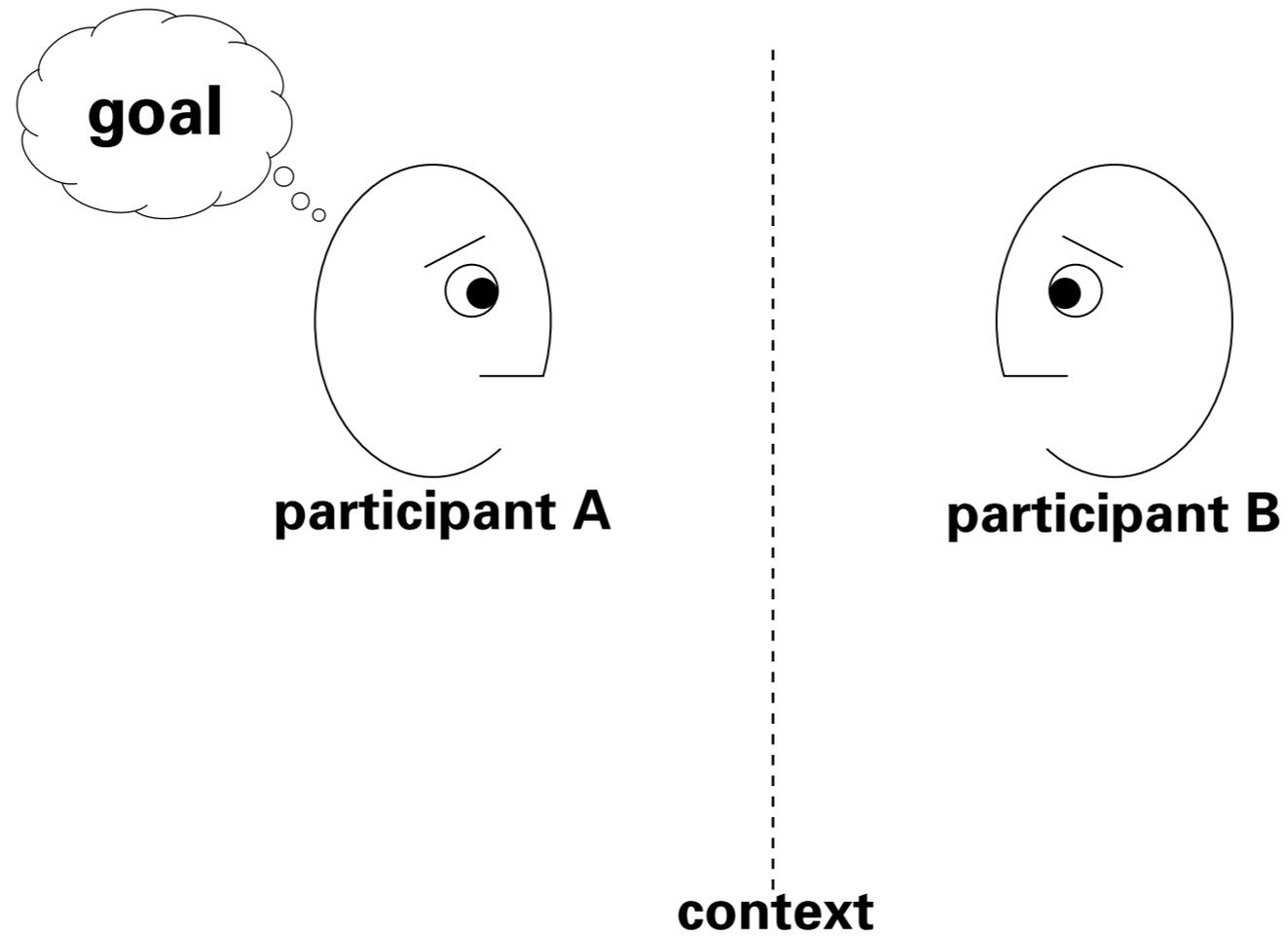


participant B

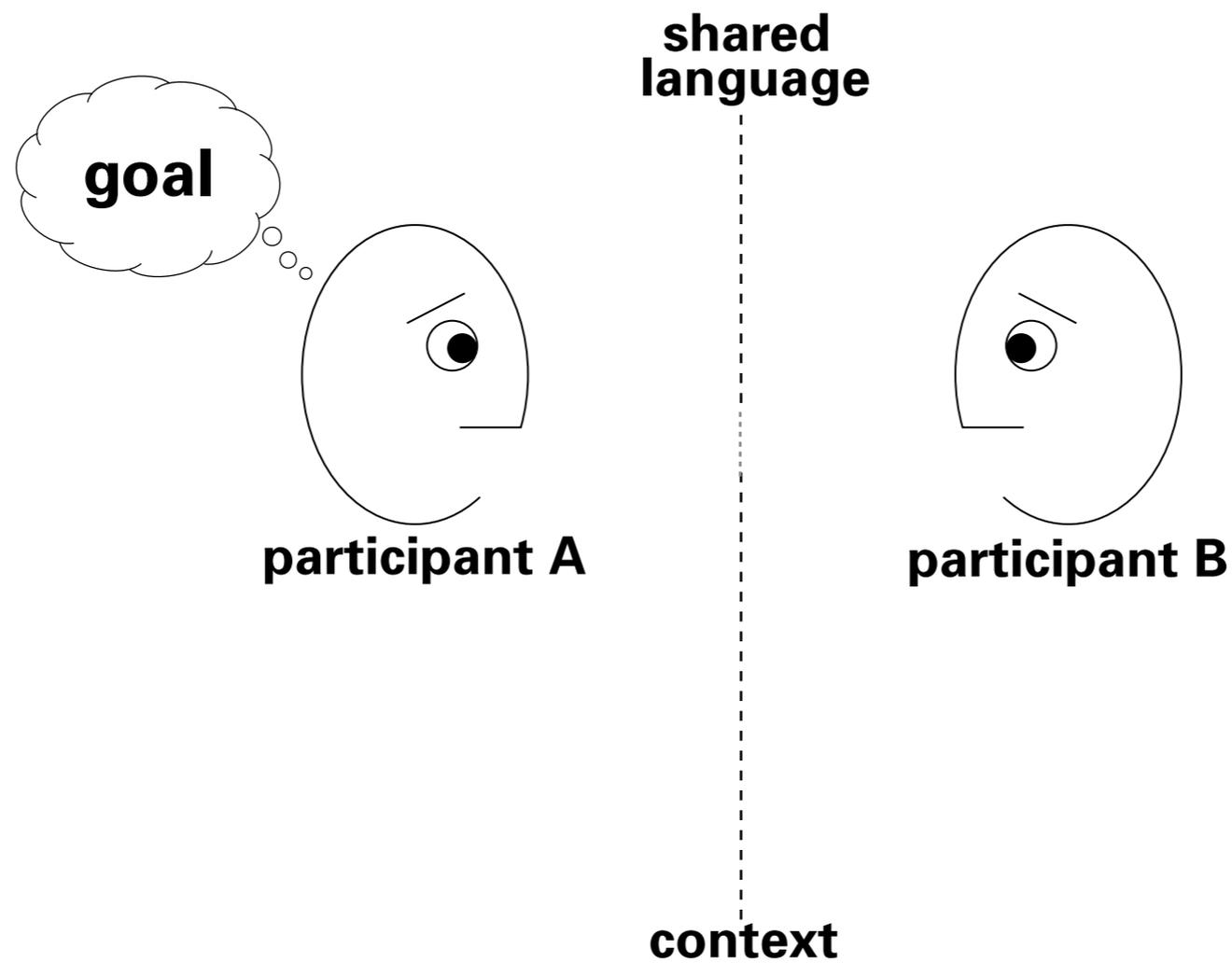
a participant has a goal



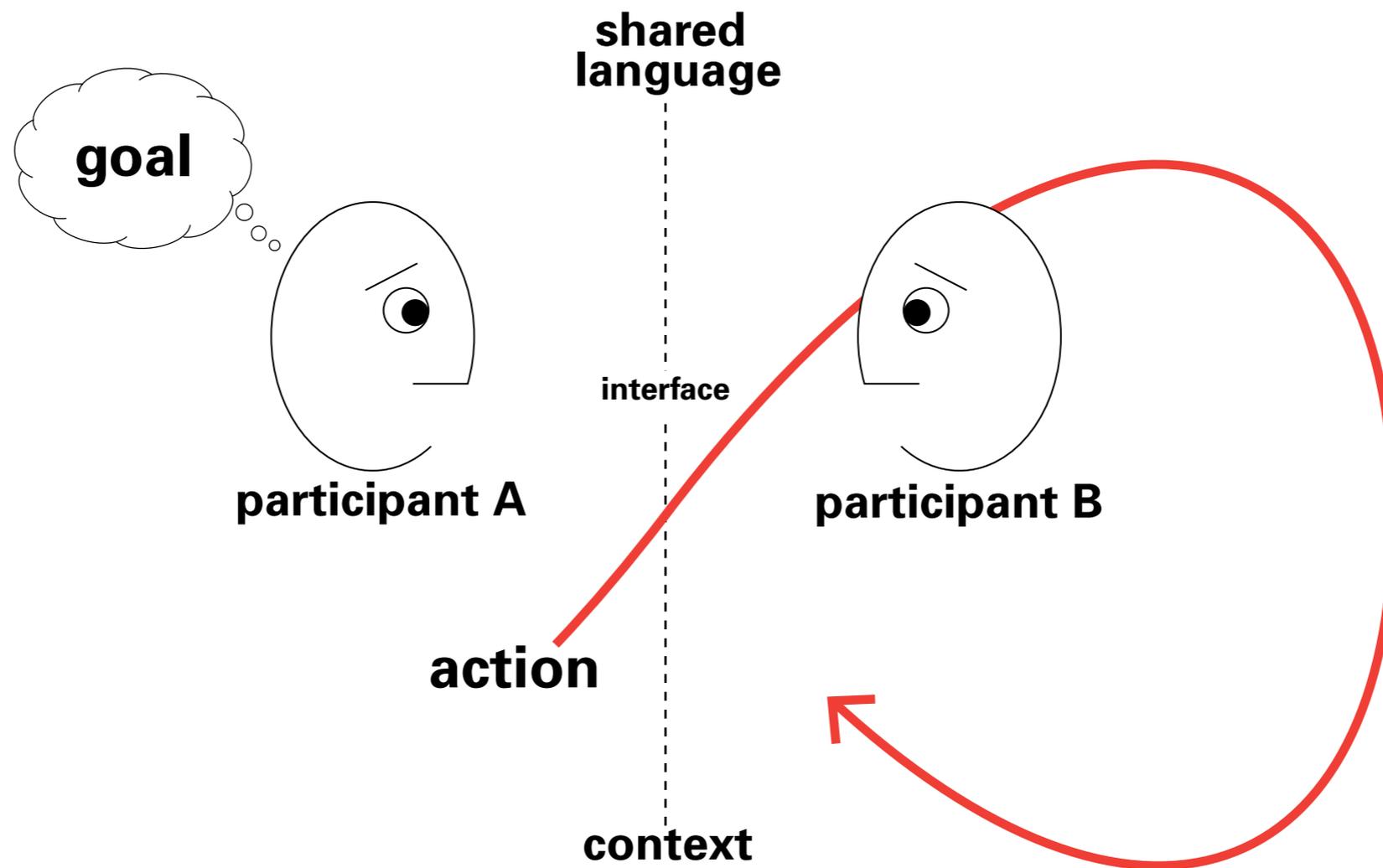
chooses a context



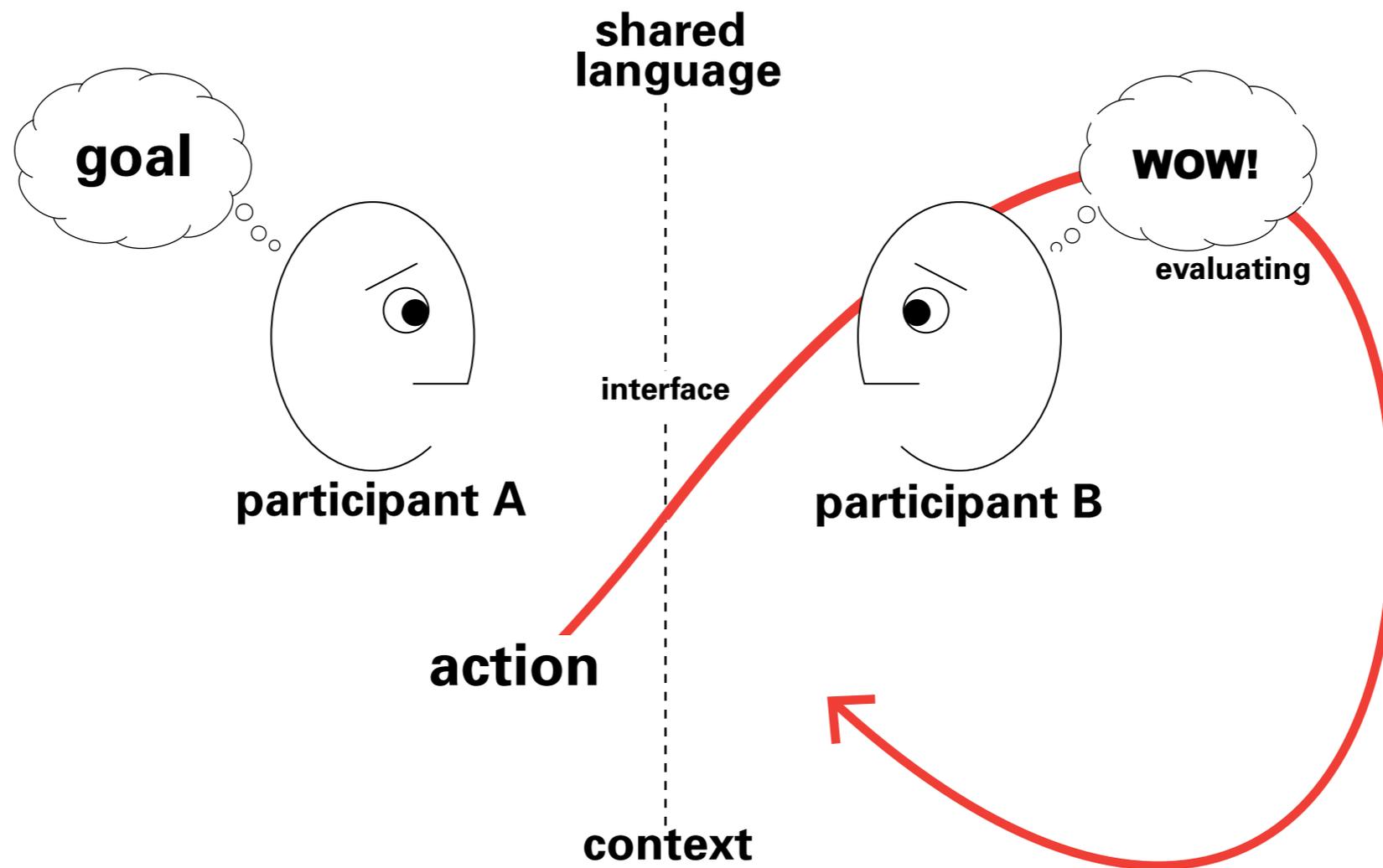
chooses a language



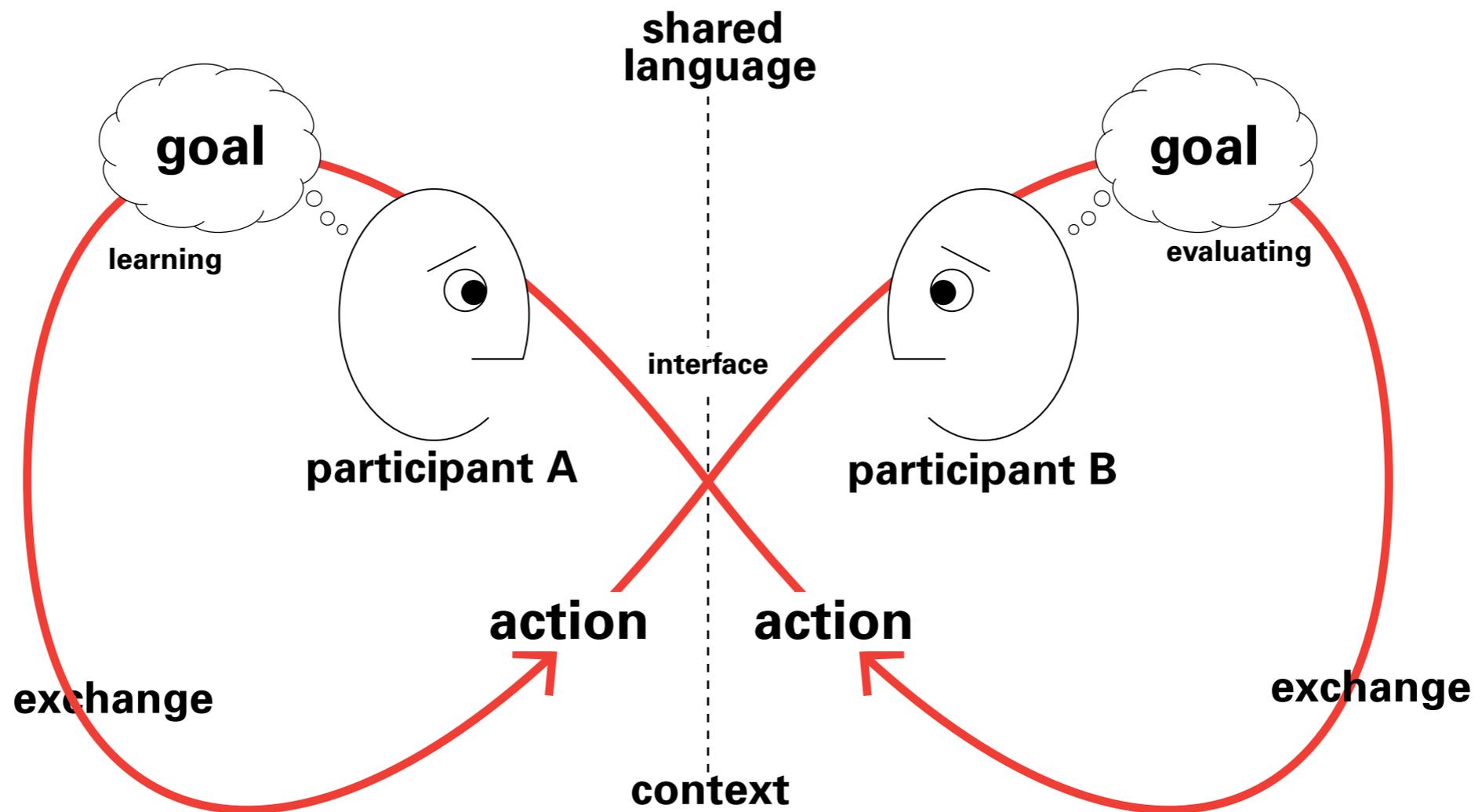
begins an exchange



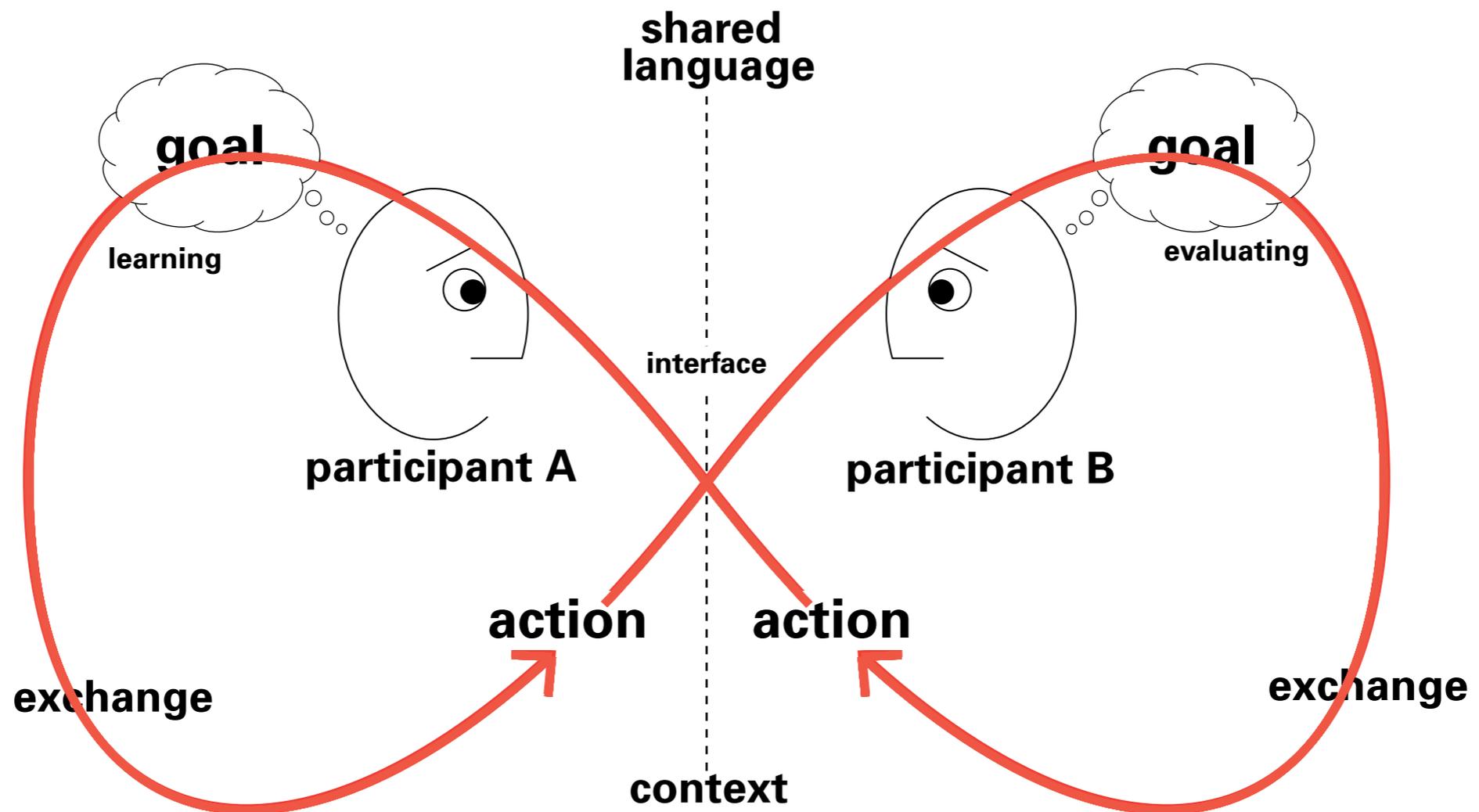
evokes a reaction...



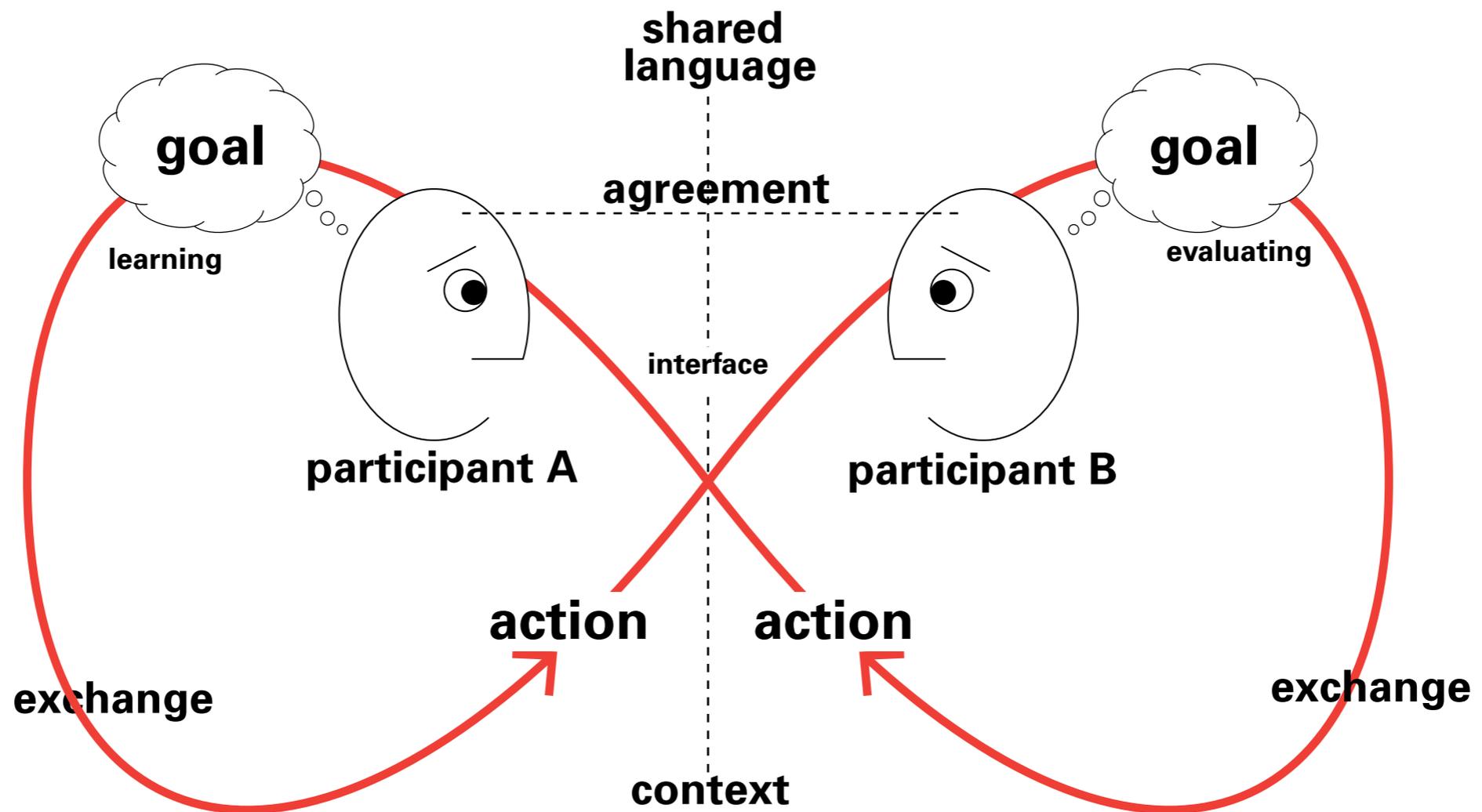
...that evokes a reaction



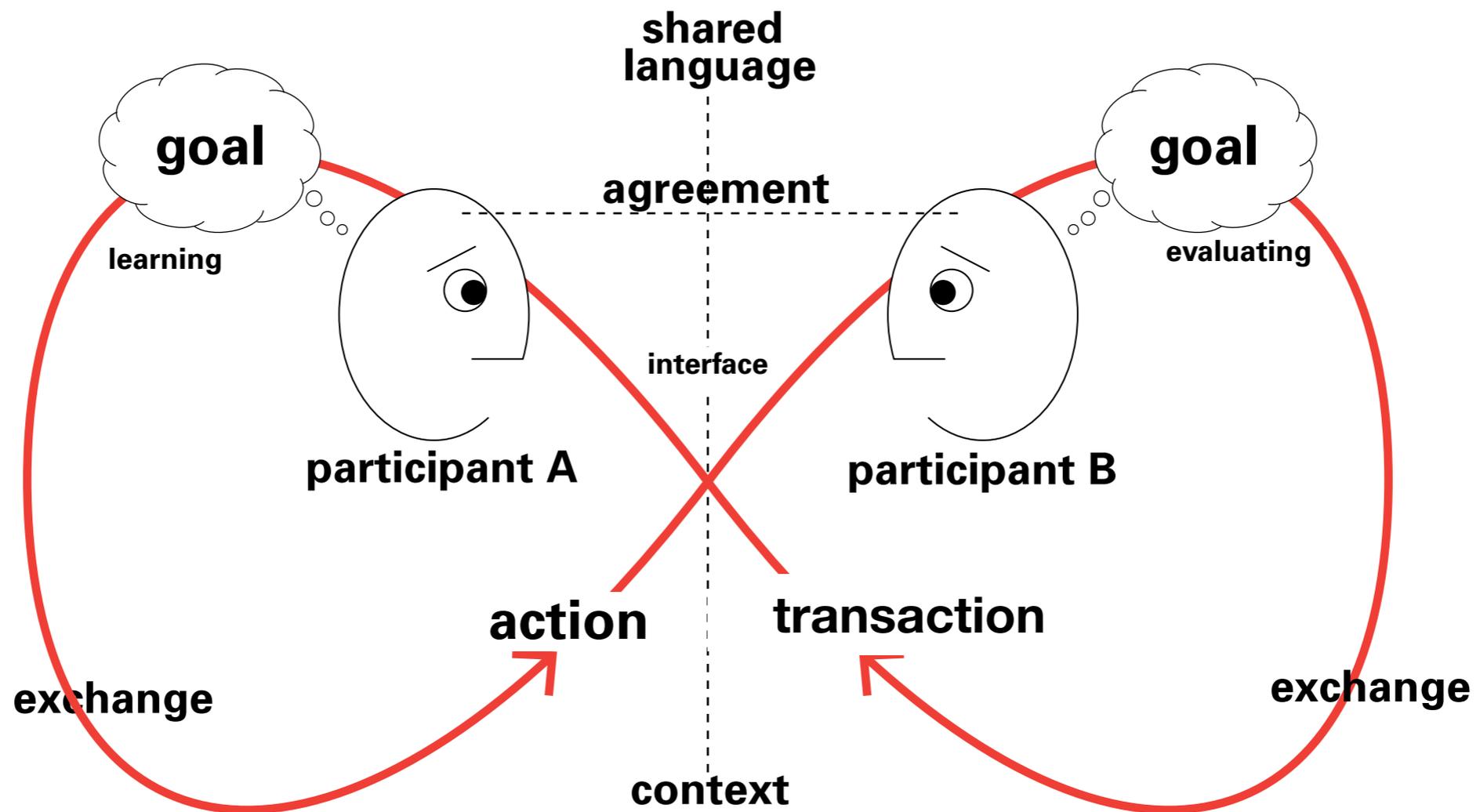
the exchange may continue



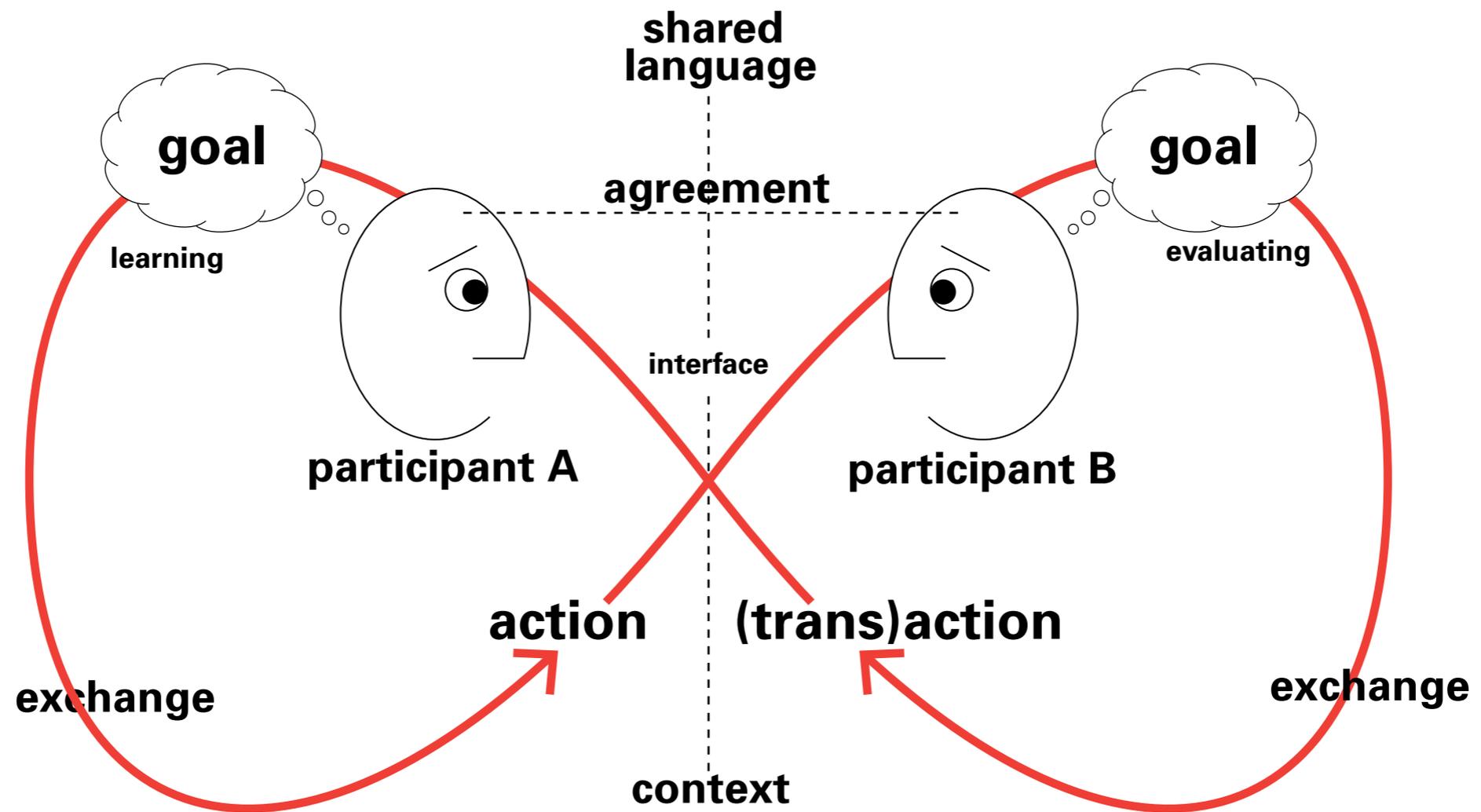
agreement may be reached



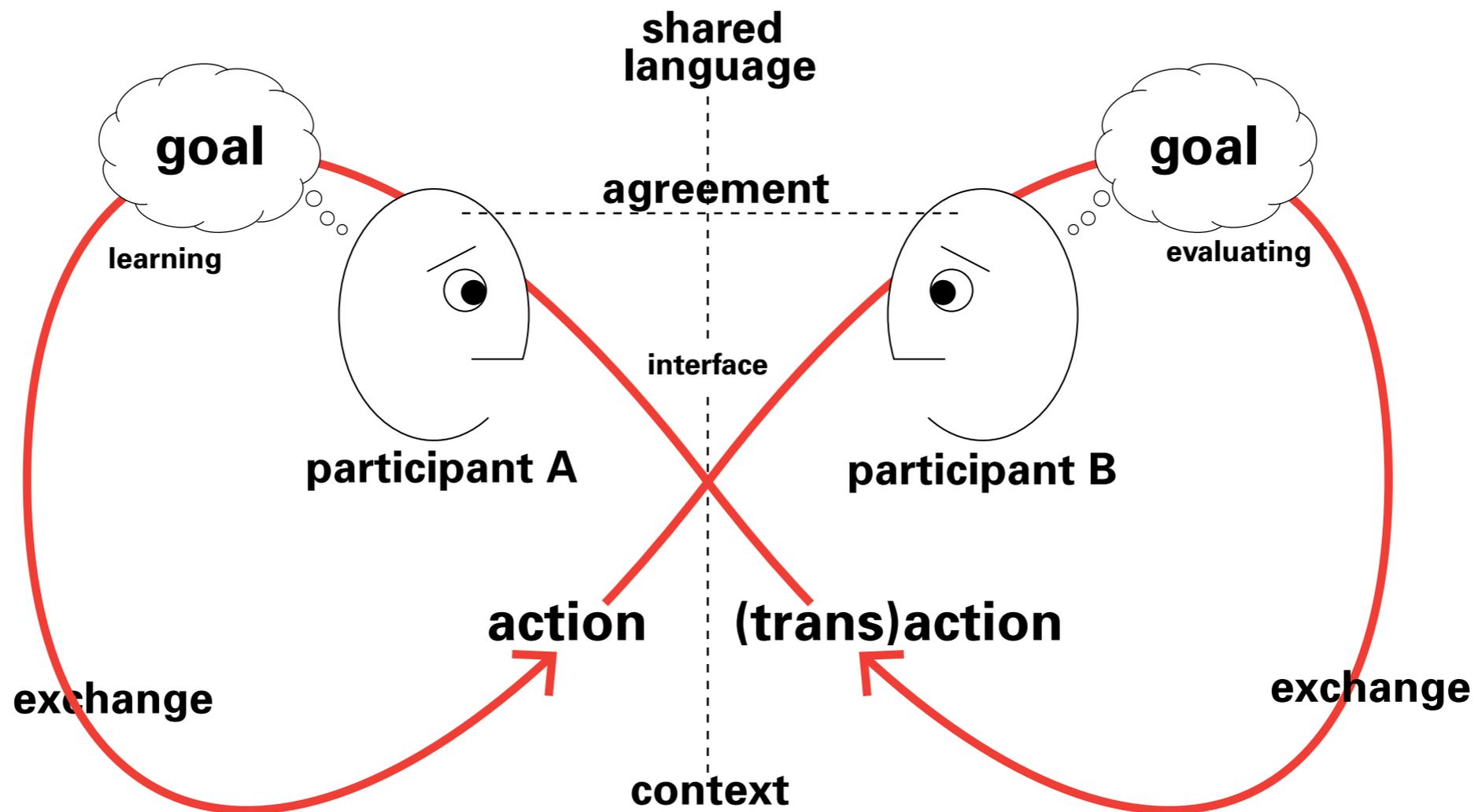
a transaction may occur



CONVERSATION REDUX



CONVERSATION = C-L-E-A-T



CONVERSATION = C-L-E-A-T

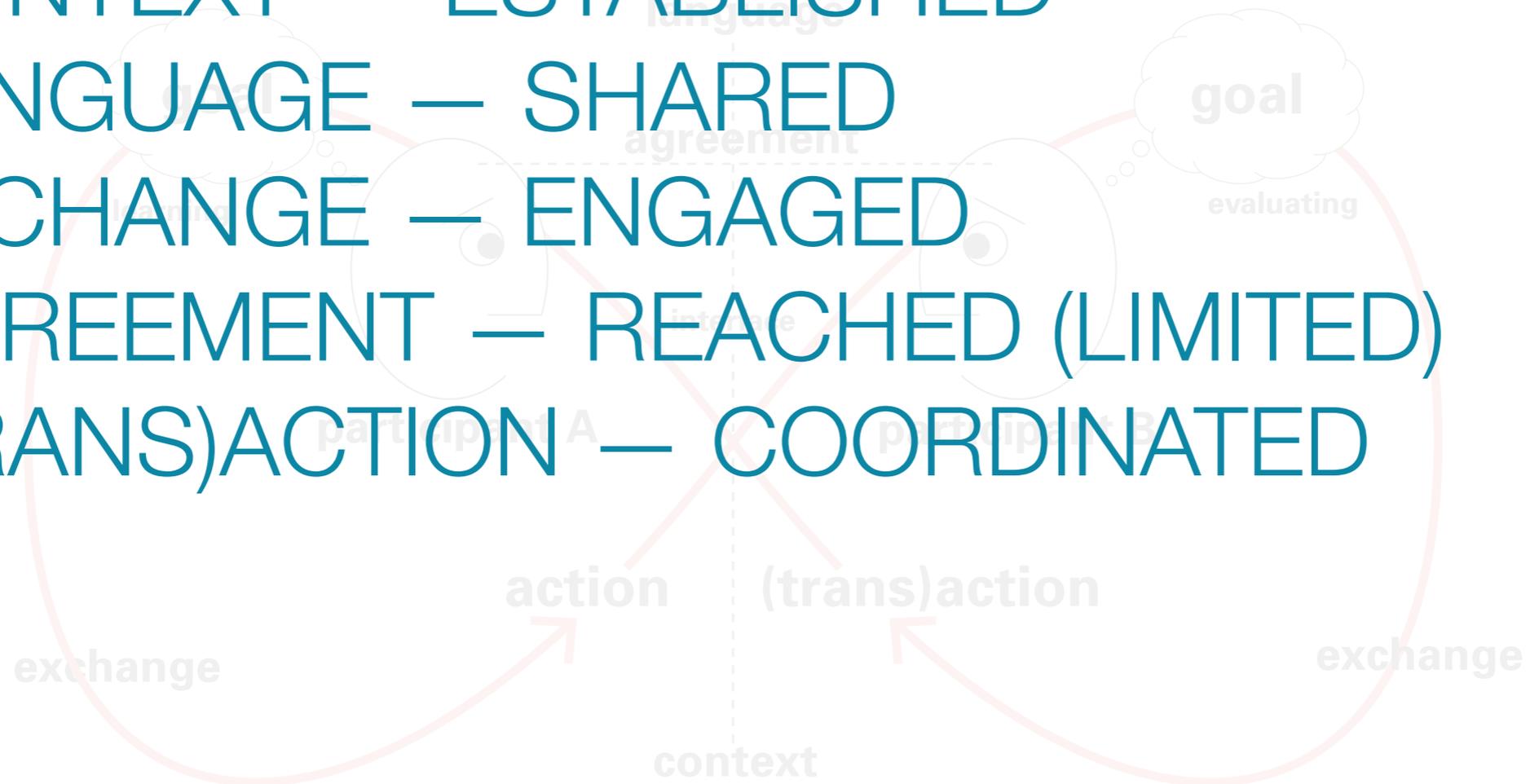
CONTEXT — ESTABLISHED

LANGUAGE — SHARED

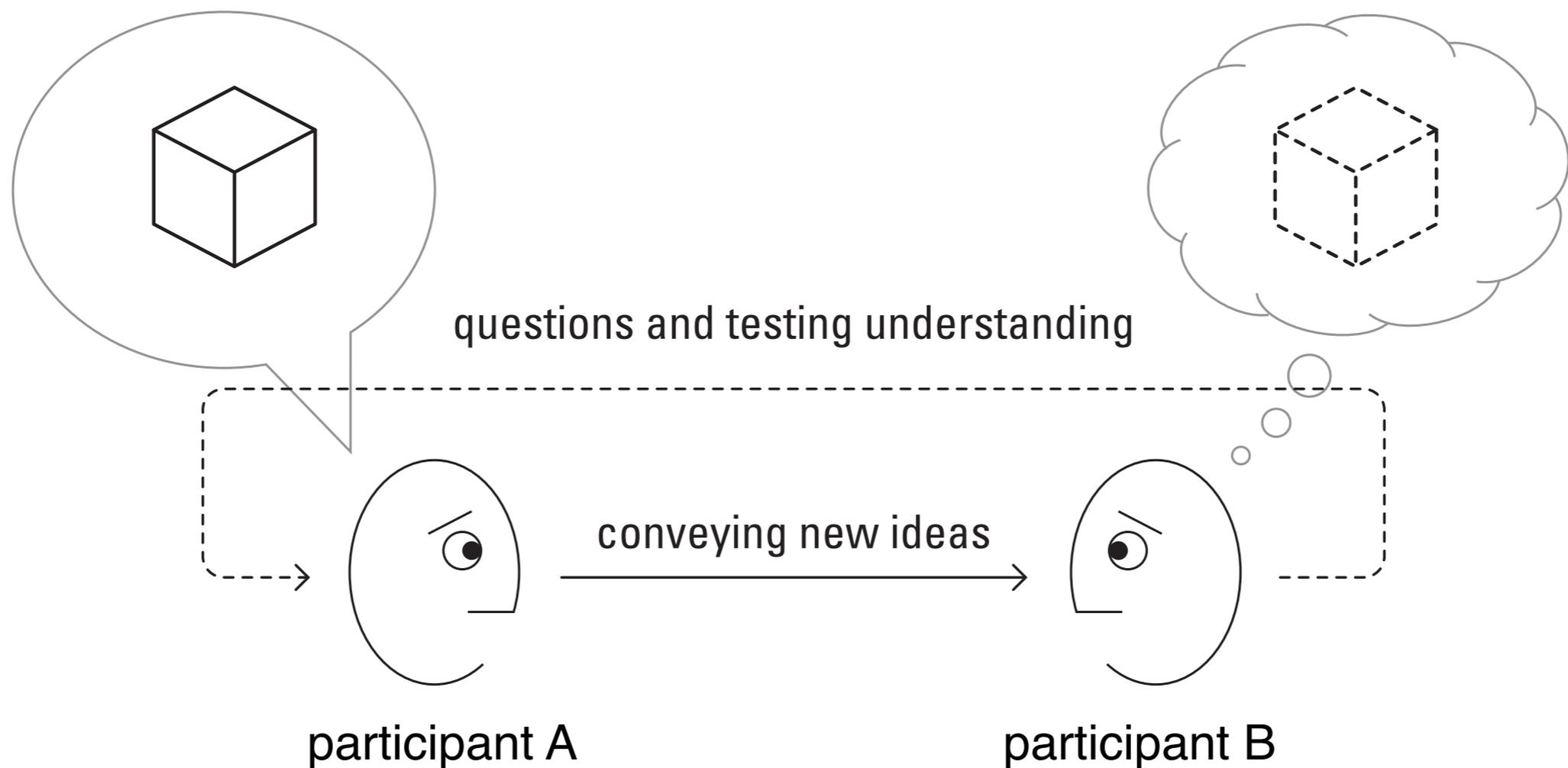
EXCHANGE — ENGAGED

AGREEMENT — REACHED (LIMITED)

(TRANS)ACTION — COORDINATED

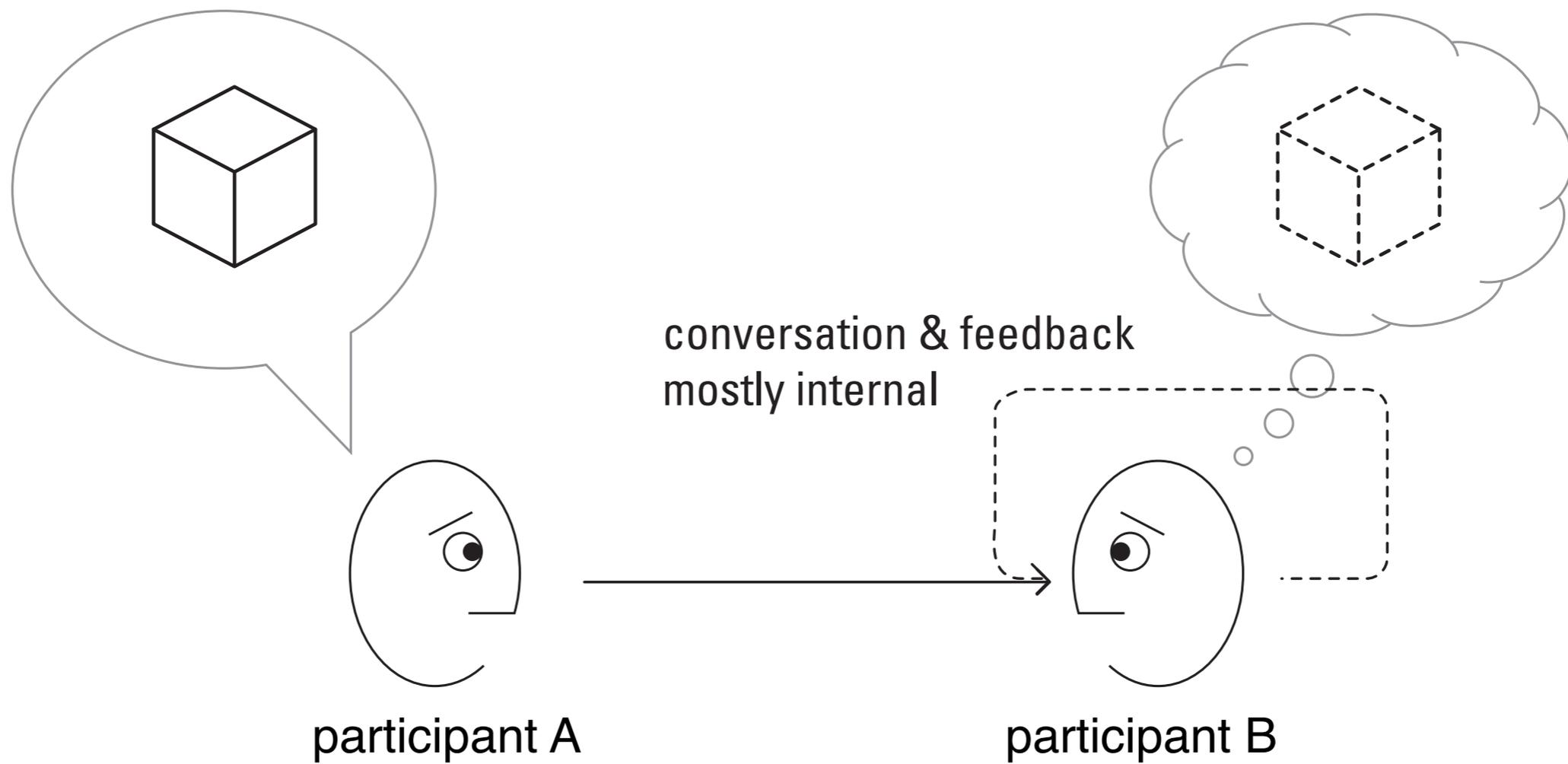


changing beliefs requires conversation

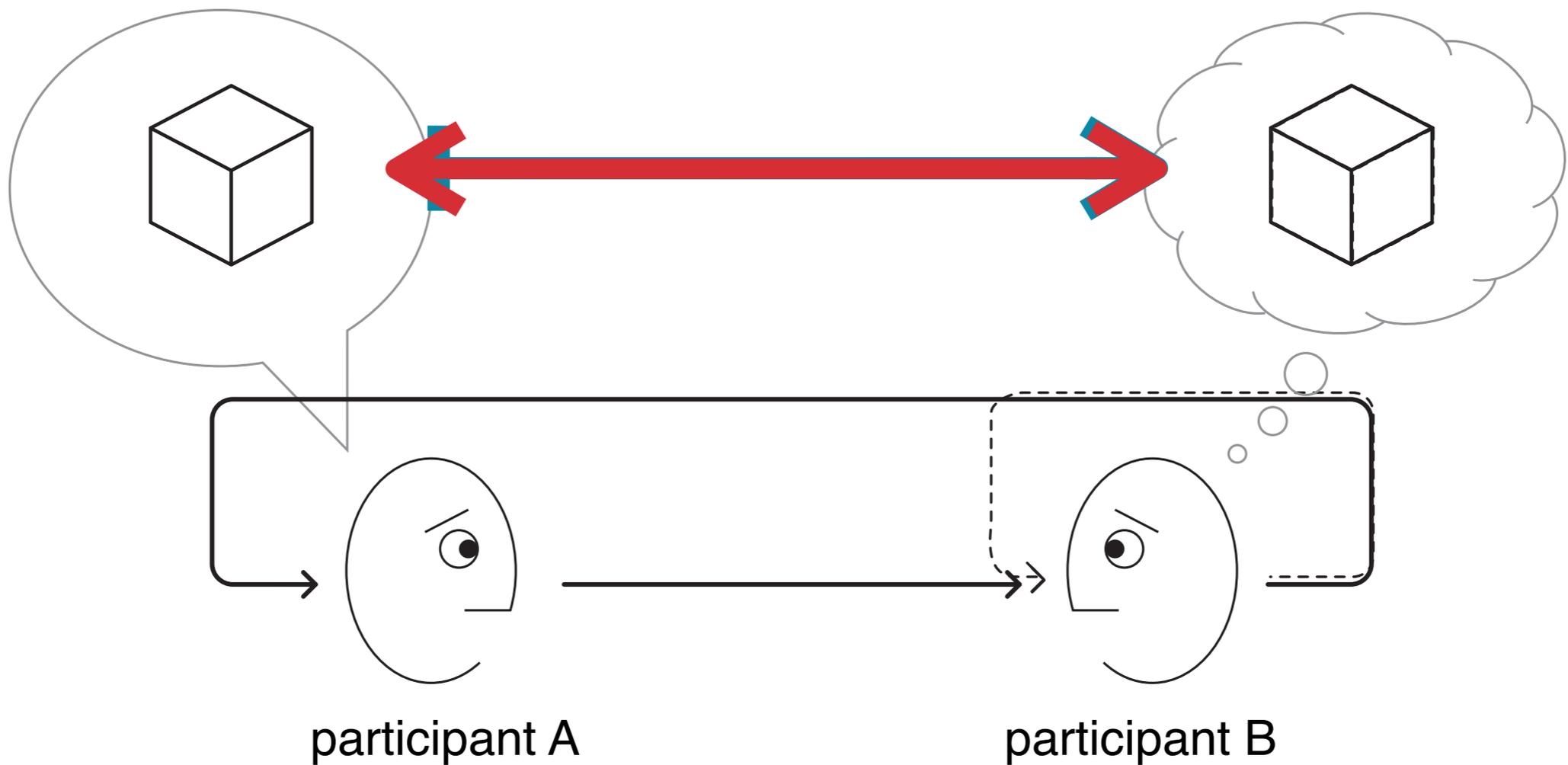


after Dubberly Design Office 2008

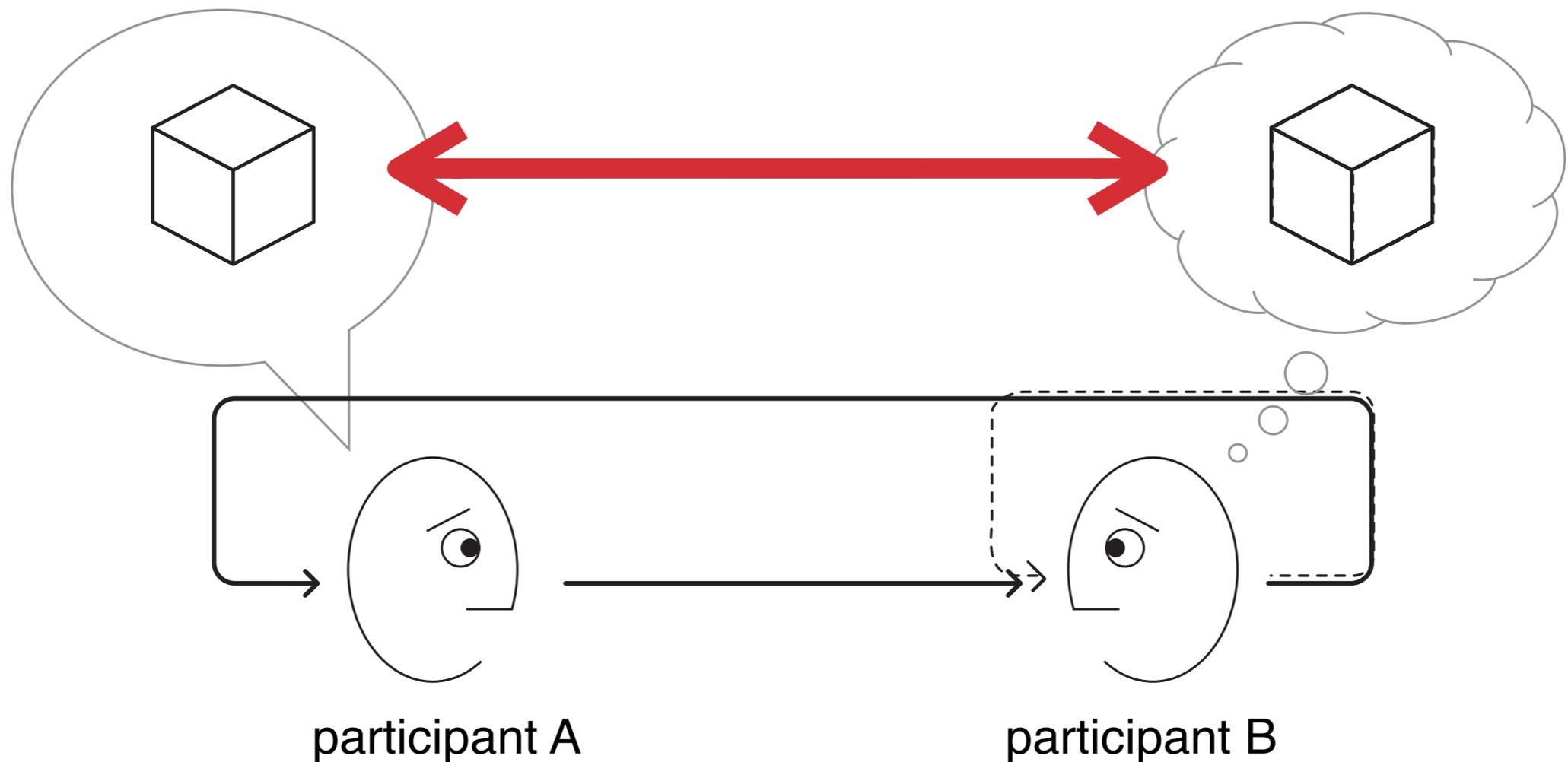
a lot of conversation is internal



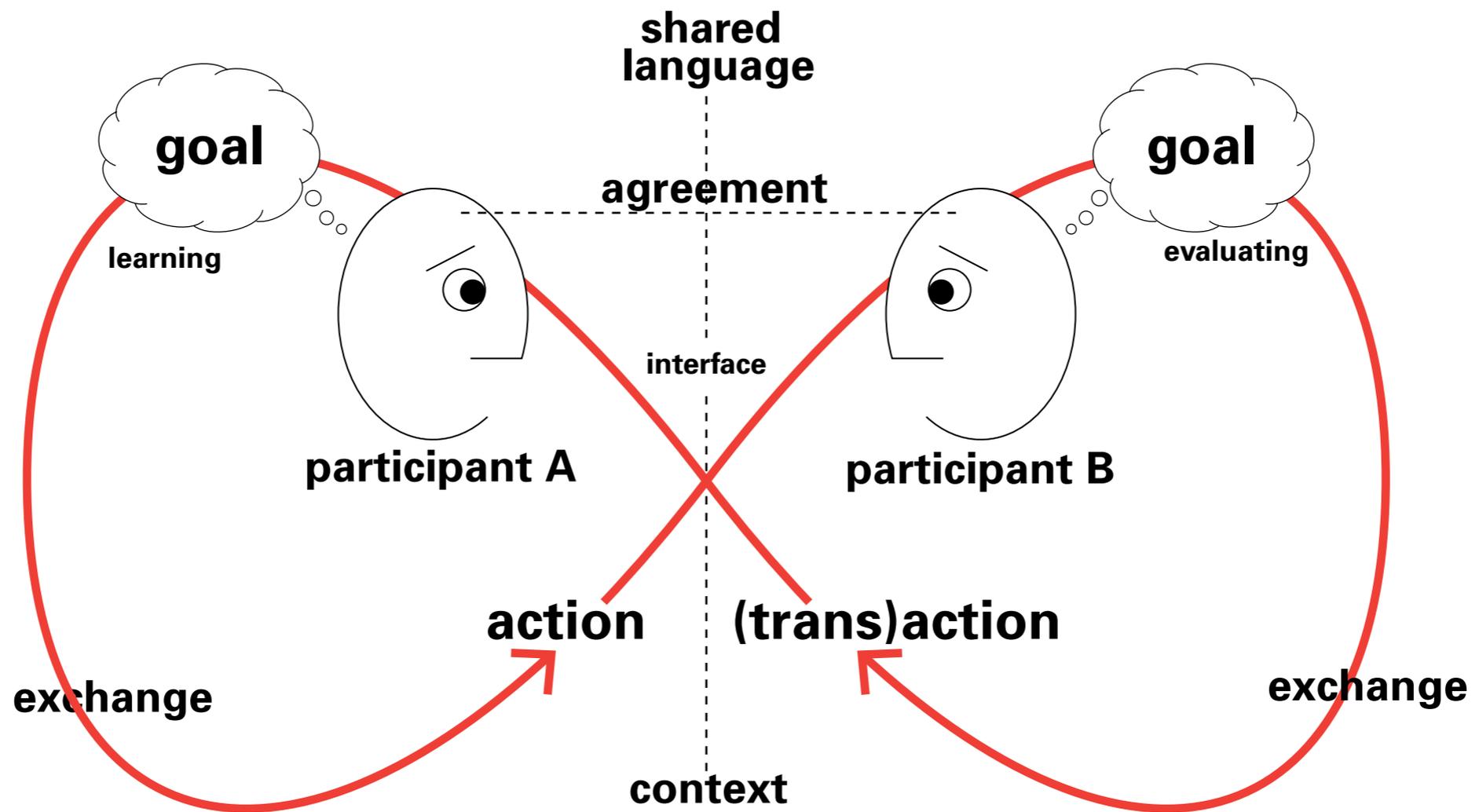
p2p + internal conversations are needed to ensure beliefs are shared



effective conversation is a co-evolution of shared ideas and possibilities



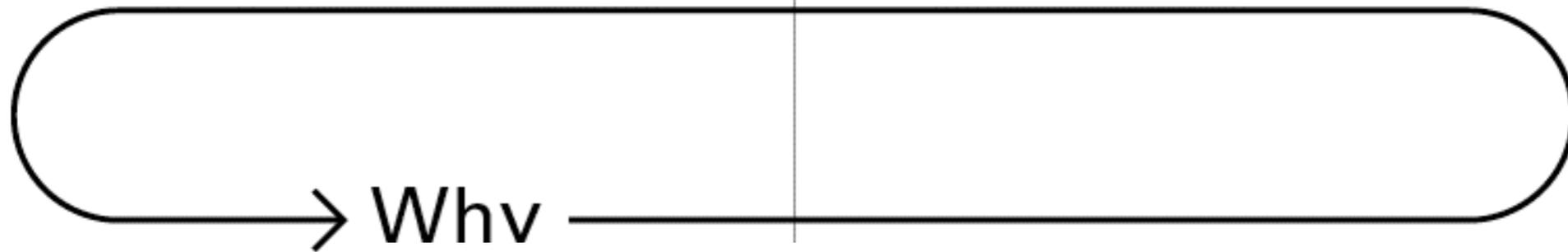
CONVERSATION = C-L-E-A-T



Participant A

Participant B

Description (L¹)



shared language

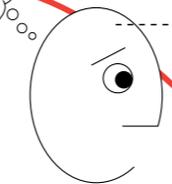
agreement

interface

context

goal

learning



participant A

goal

evaluating



participant B

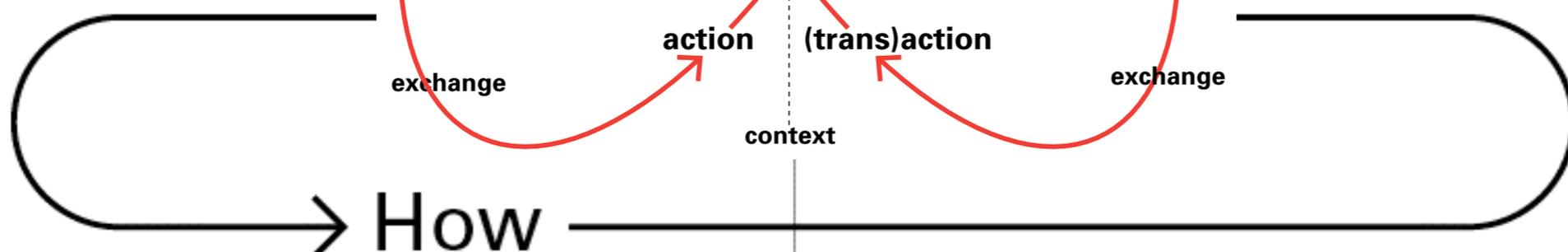
action

(trans)action

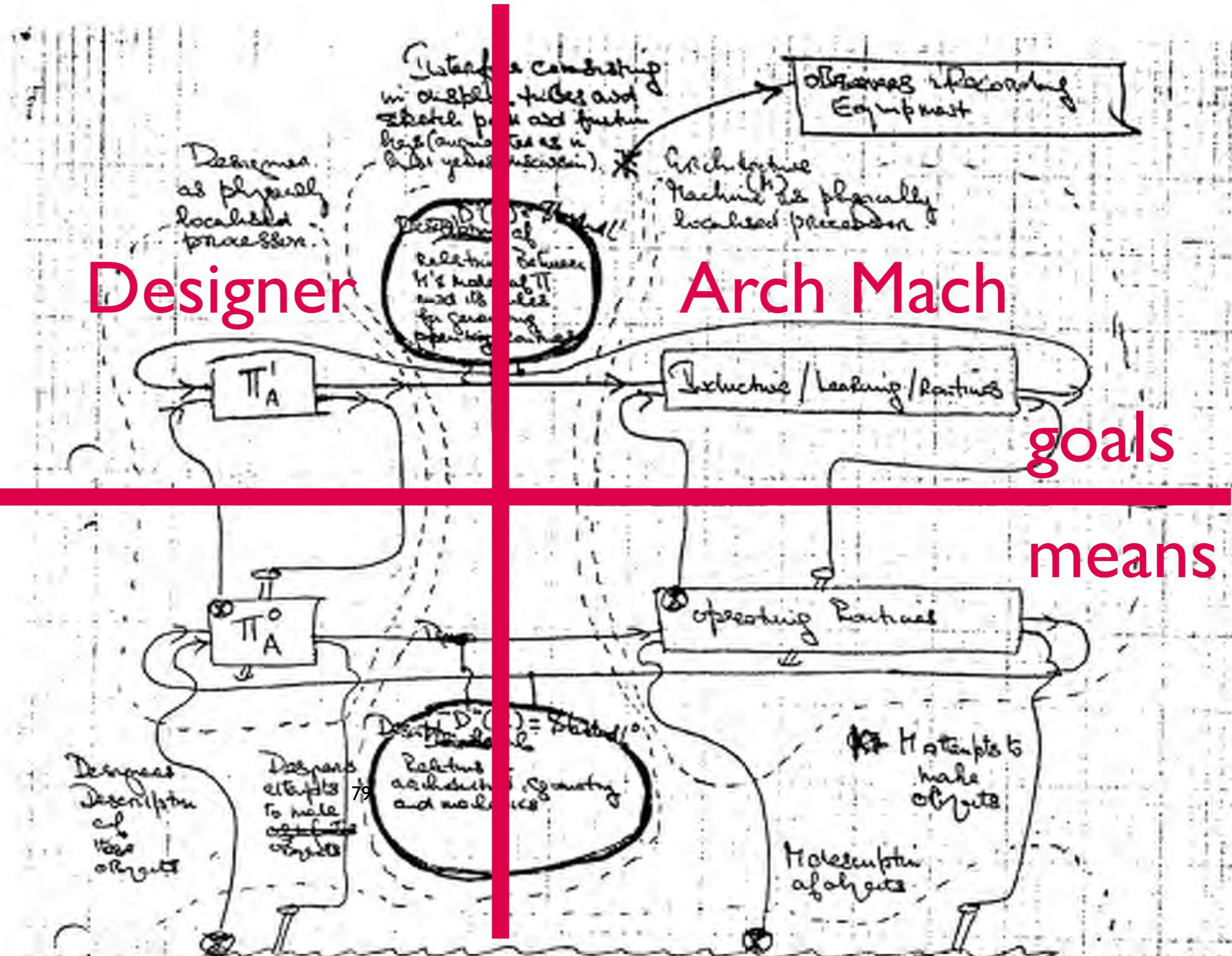
exchange

exchange

Prescription (L⁰)



goals
means



Designer

Arch Mach

goals

means

Interacts consisting in explicit rules and sketch plan and further bits (augmented as in last year's discussion).

Describes as physically localized processes.

Architecture Machine (M) as physically localized processor.

Description of Relations H's Model of TT used for generating operating routines

Inductive / Learning / Routines

π_A

Operating Routines

Description of Relations H's Model of TT used for generating operating routines

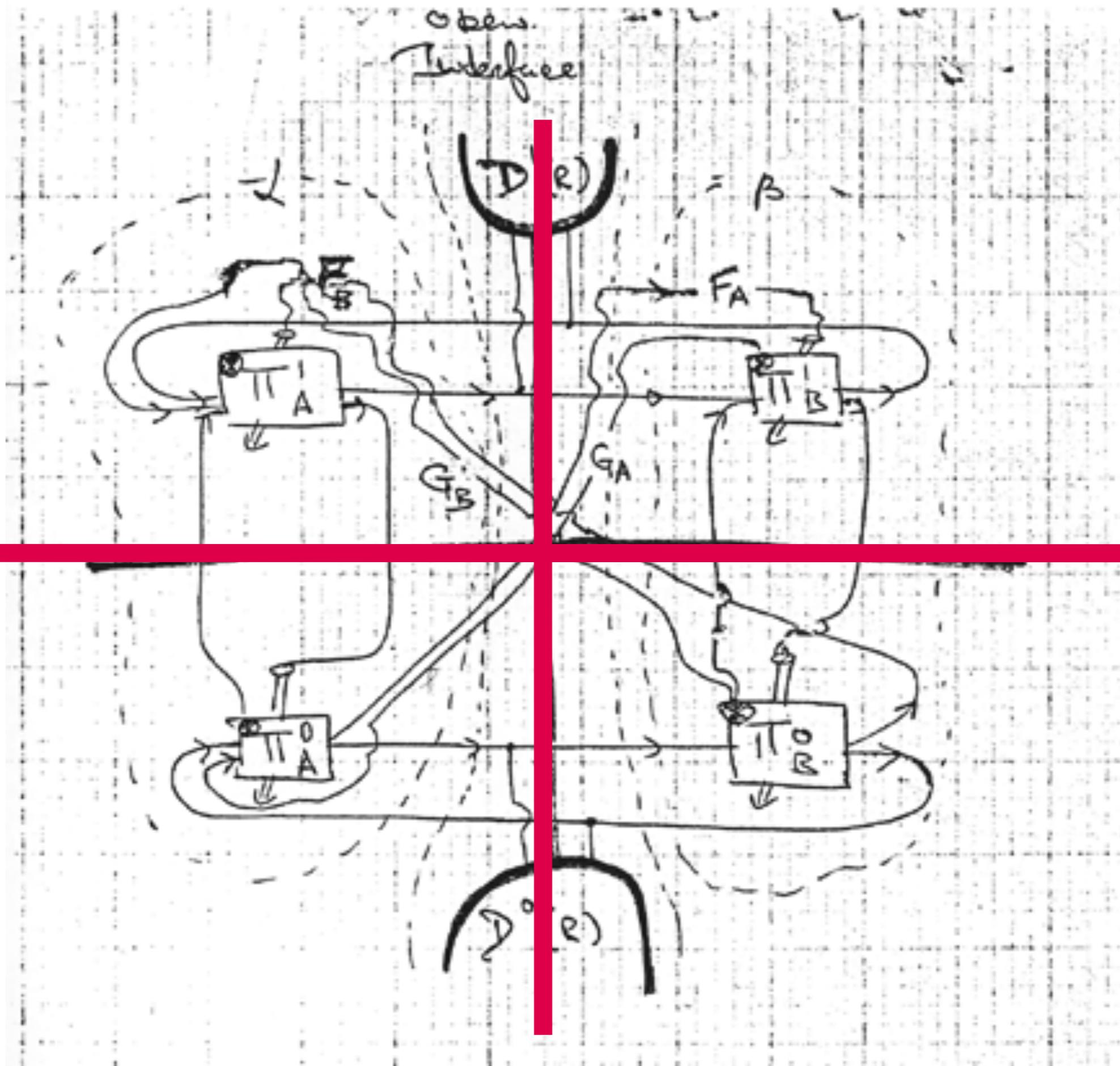
H attempts to make objects

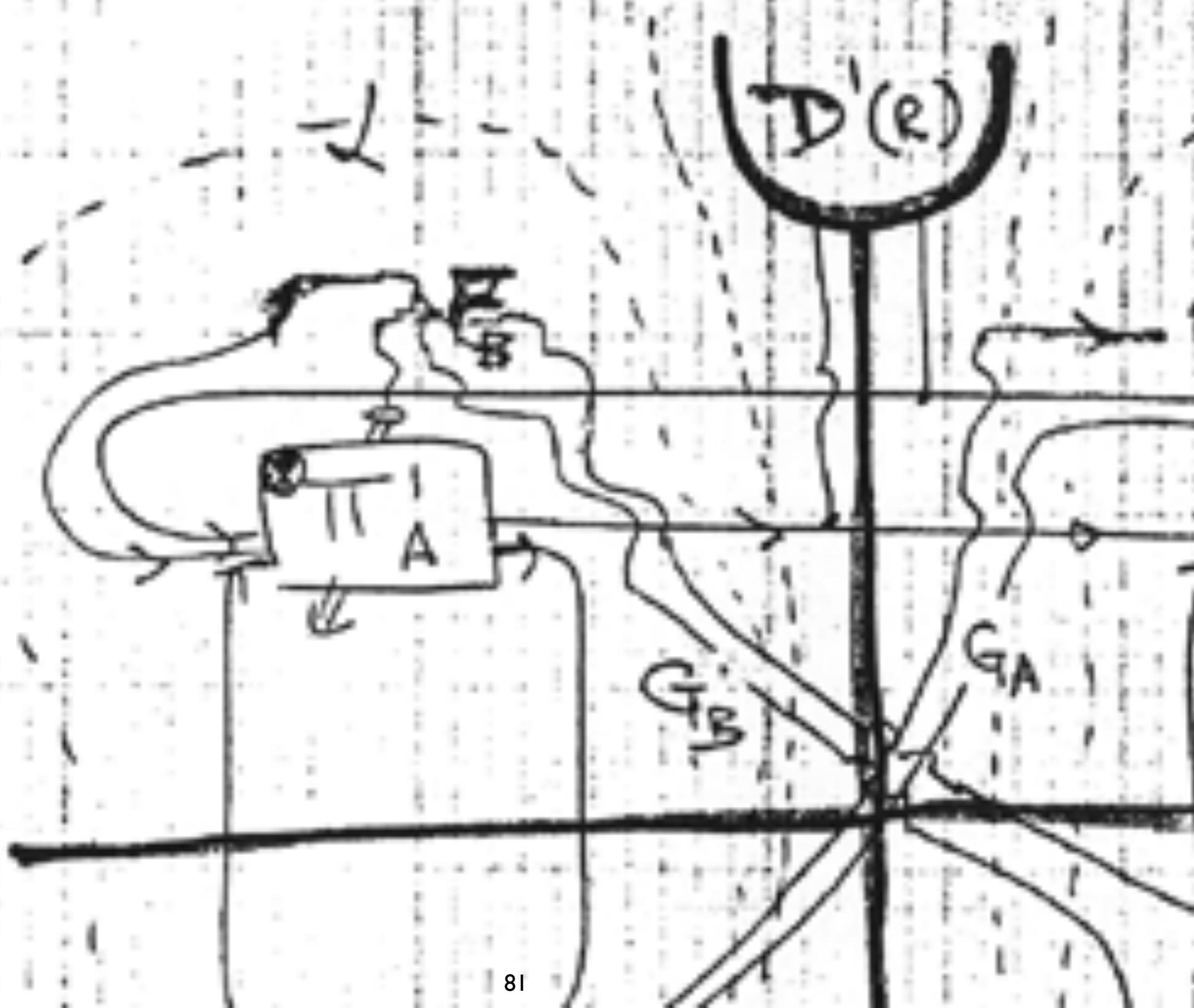
Makeup of objects

Describes Description of H's objects

Describes attempts to make objects

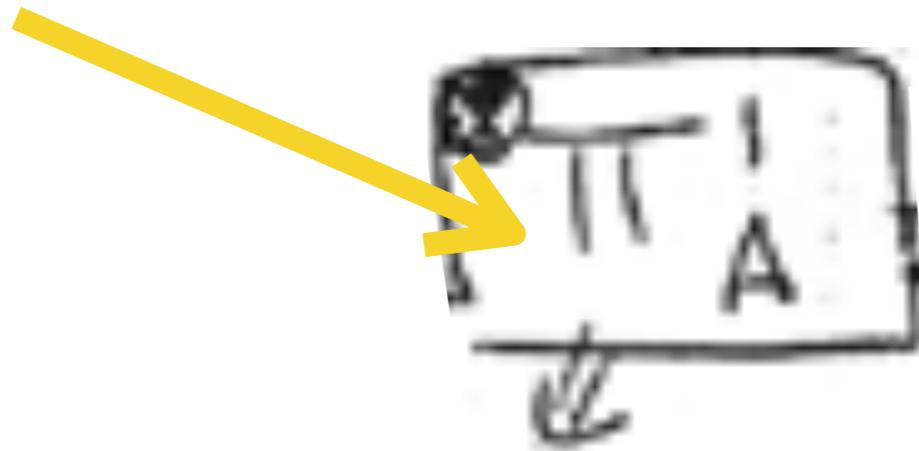
Environment of objects interacting Relations R; it includes internal "abstract" model output along to visual display as well as to "graphical" construction environment. It is a... of... objects... environment...



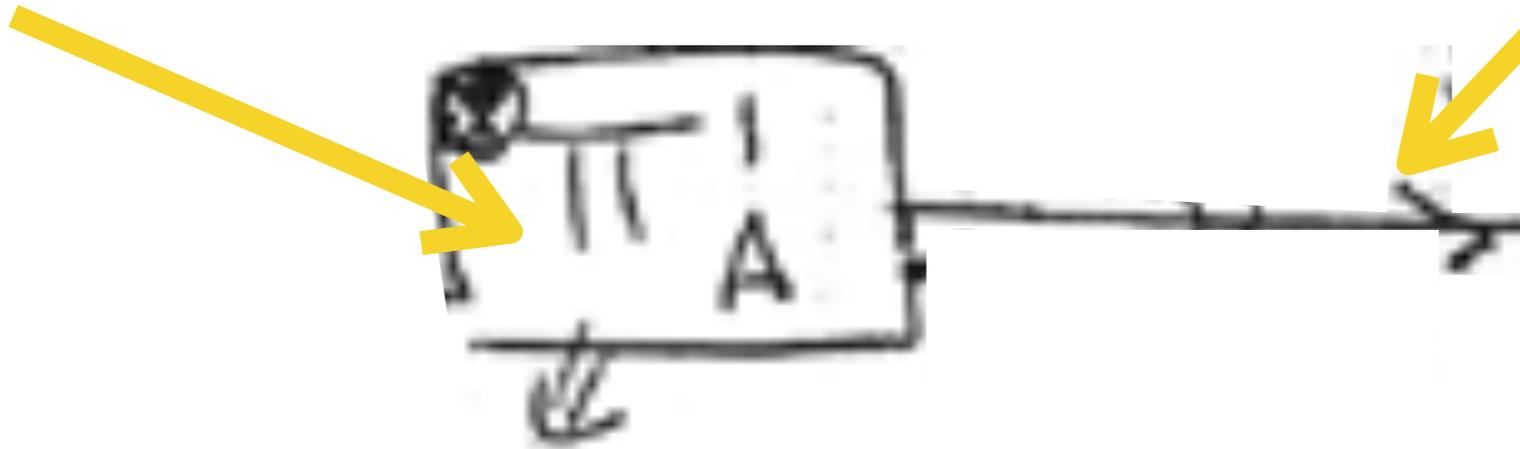




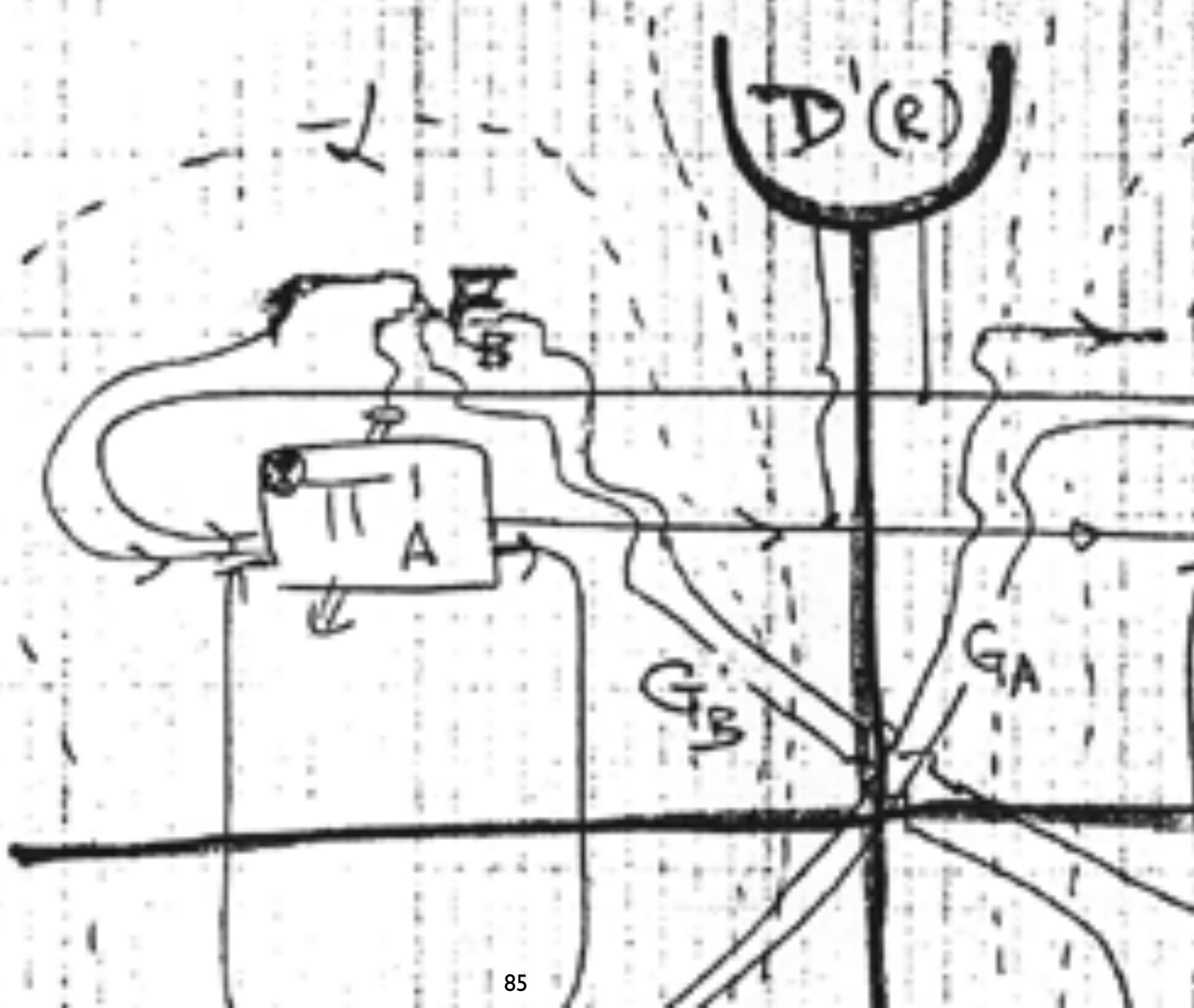
what goes on
inside here?

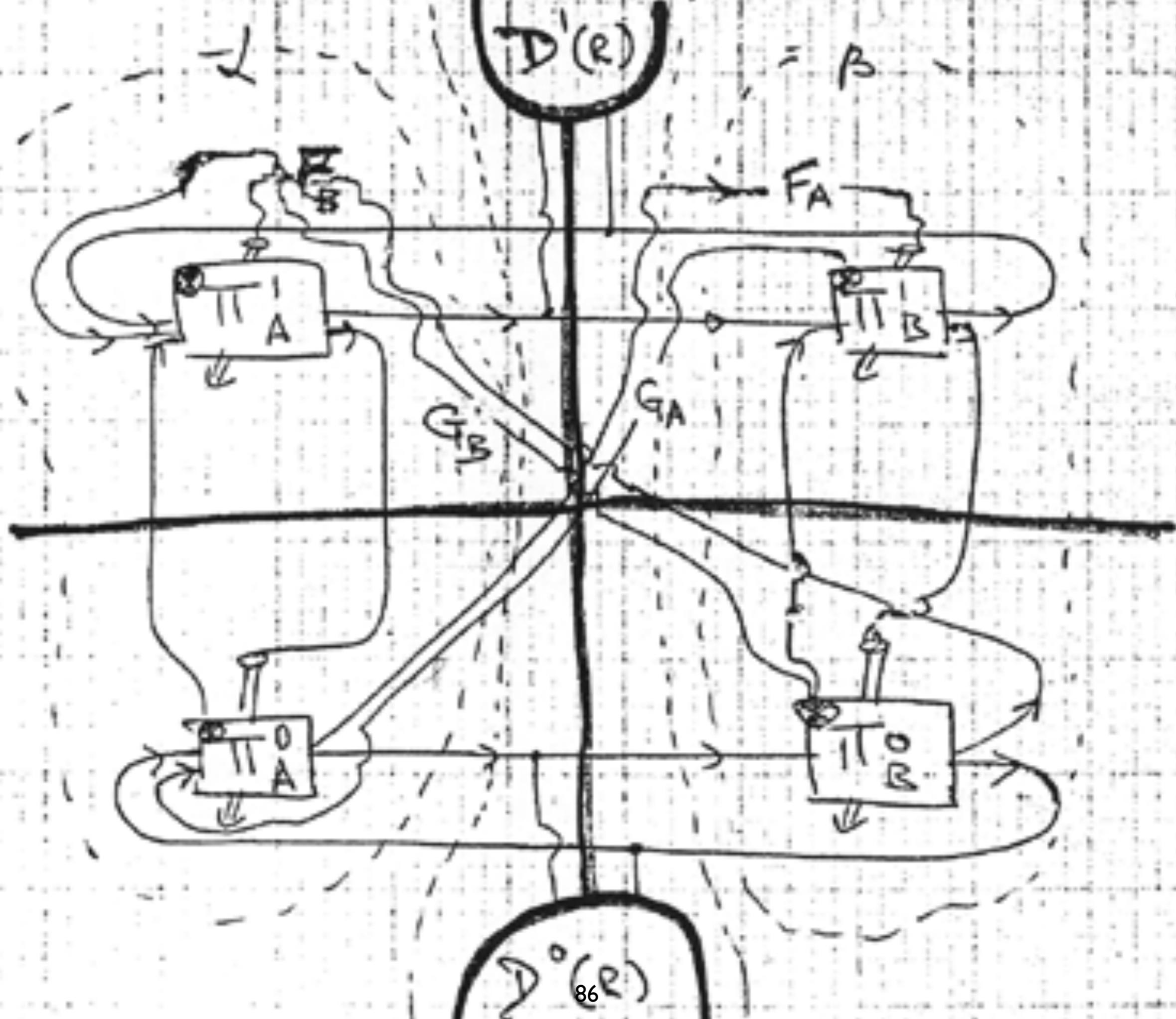


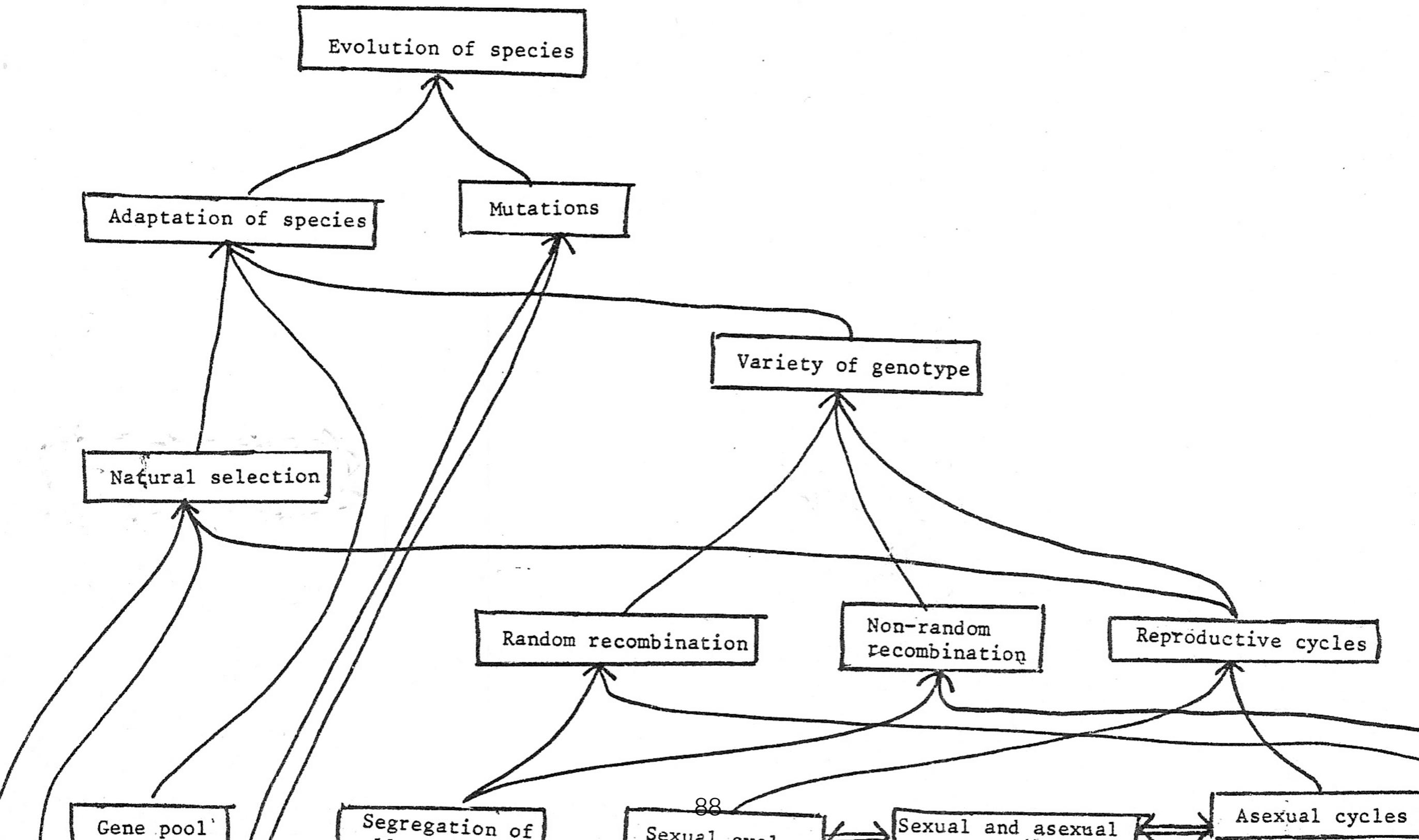
what goes on
inside here?

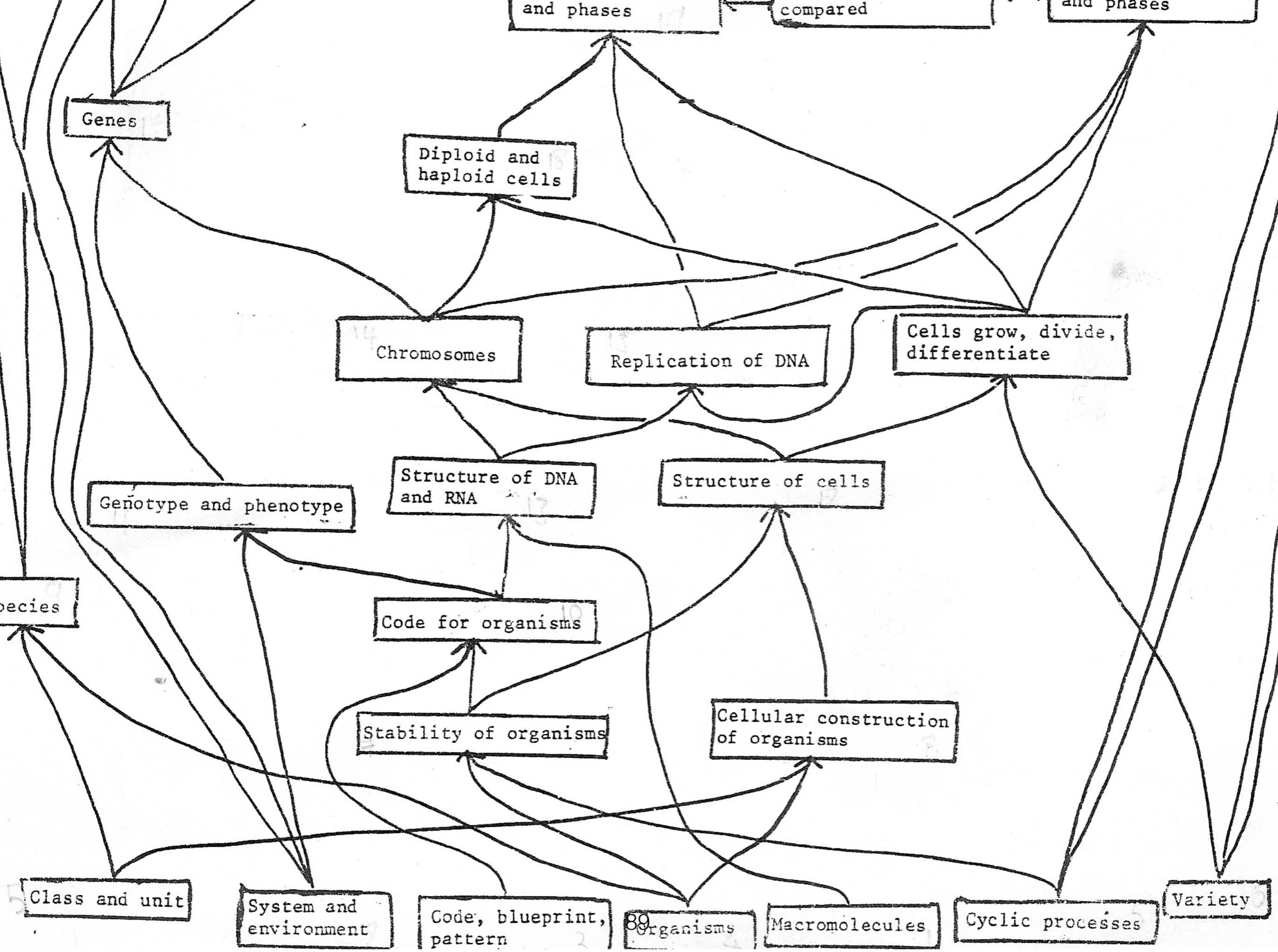


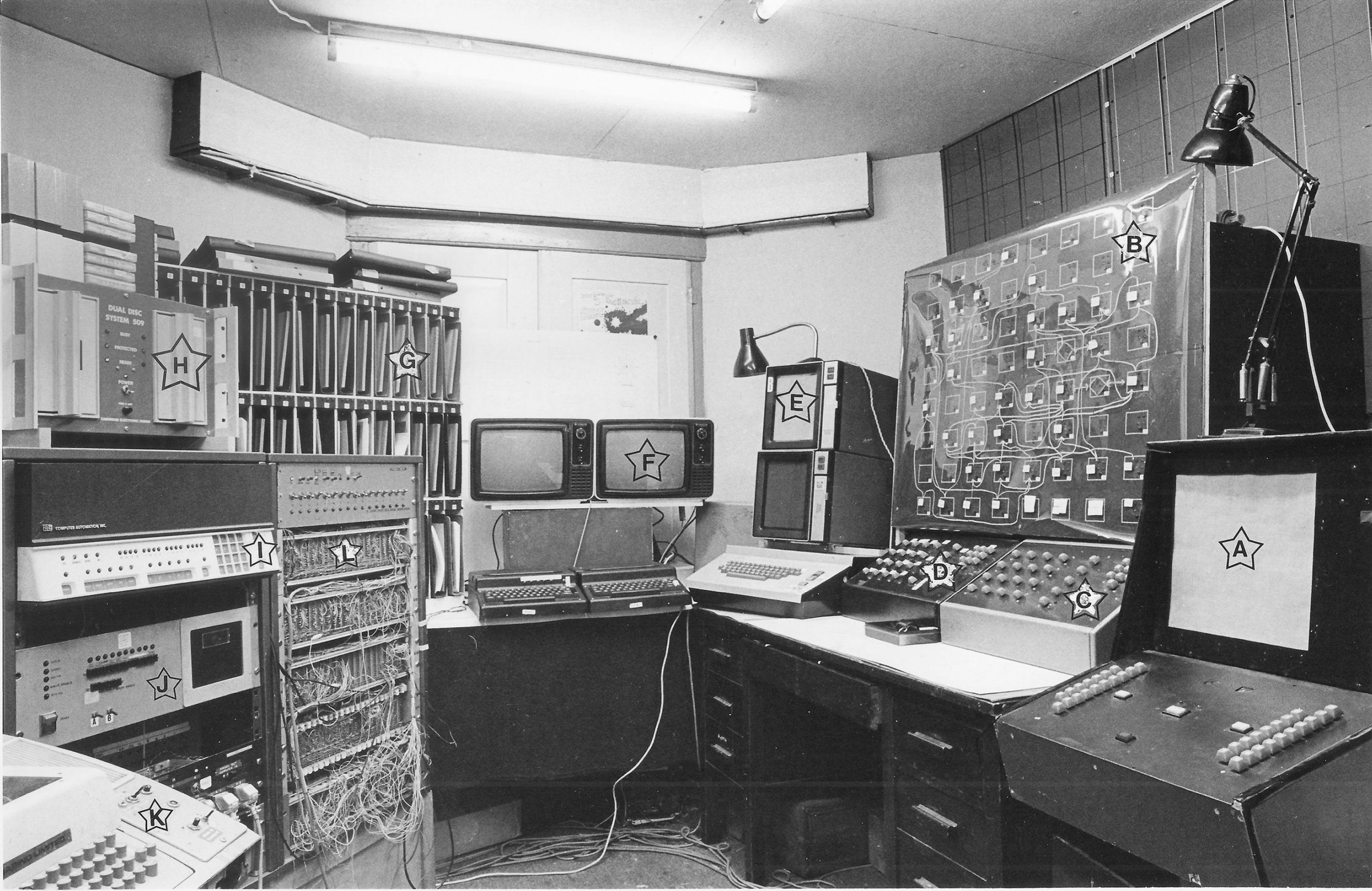
what traverses
along here?

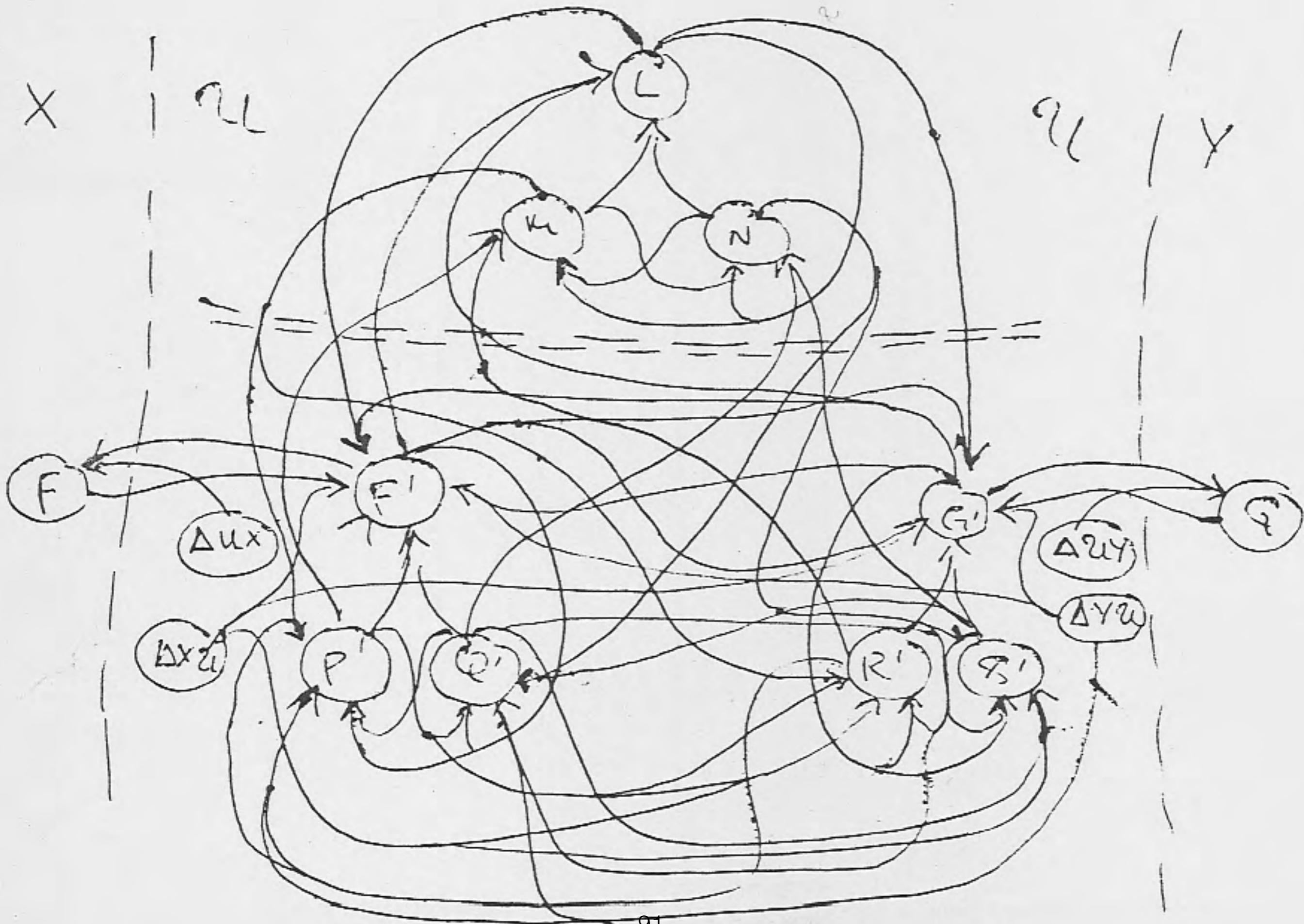


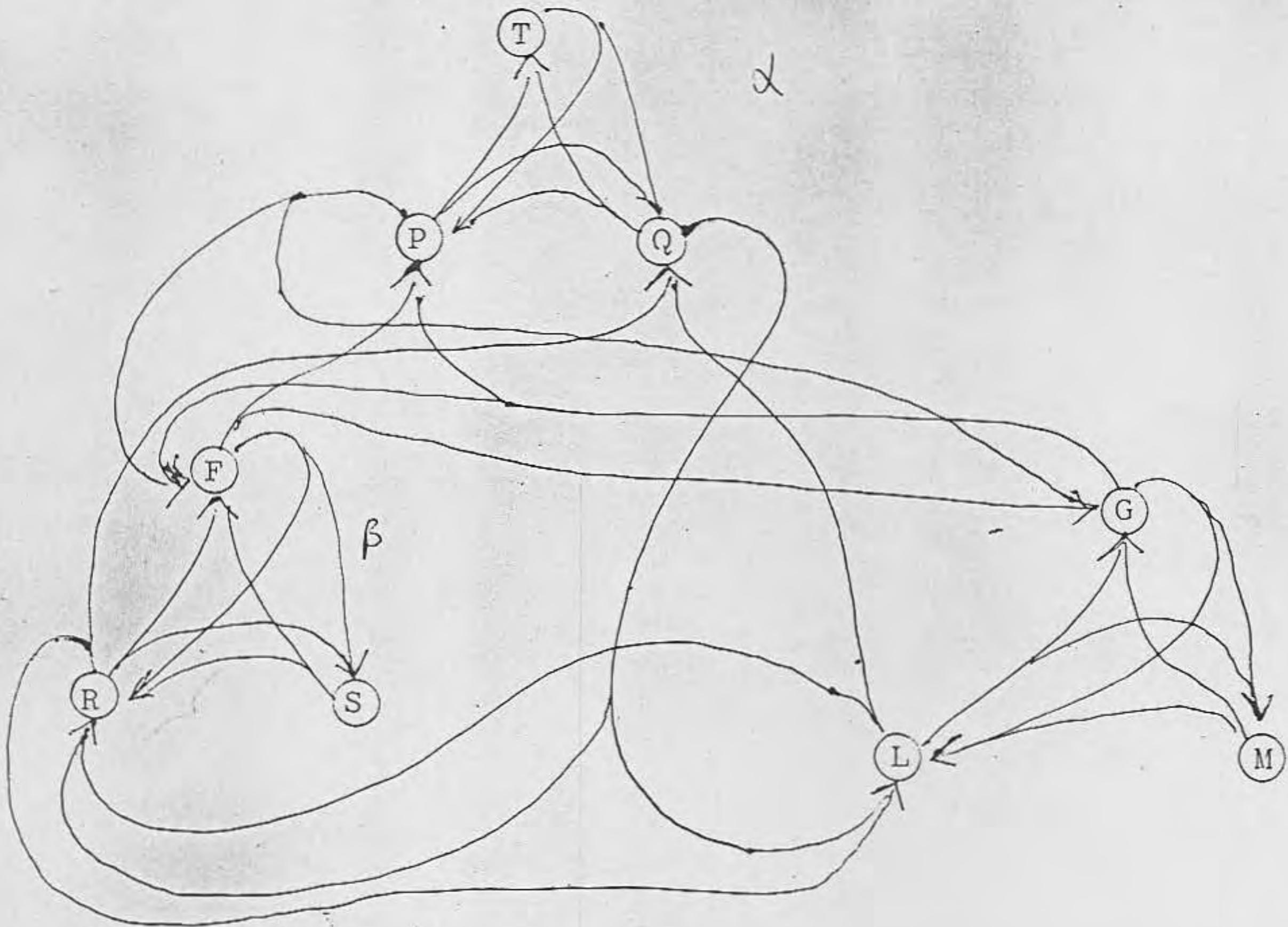




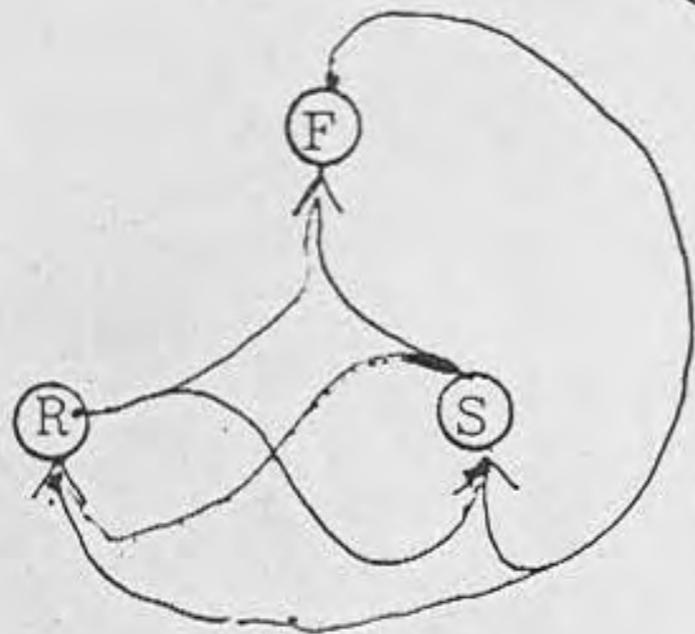




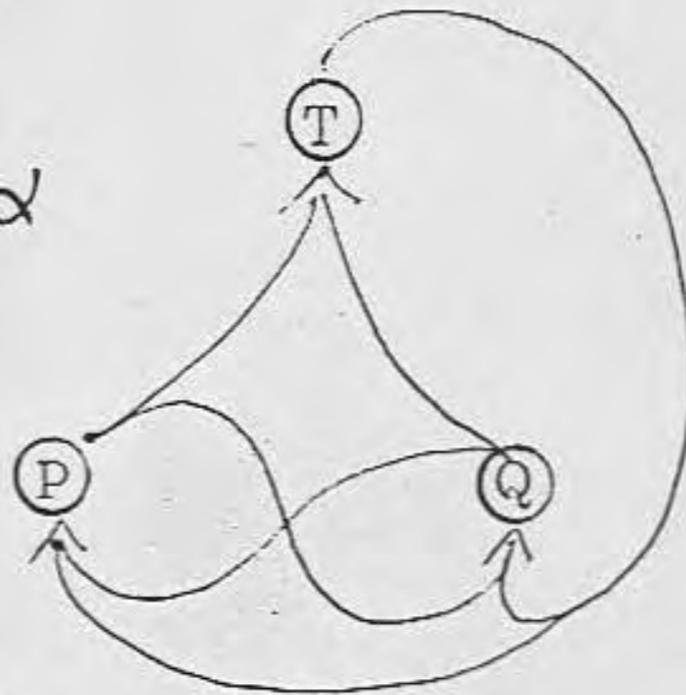




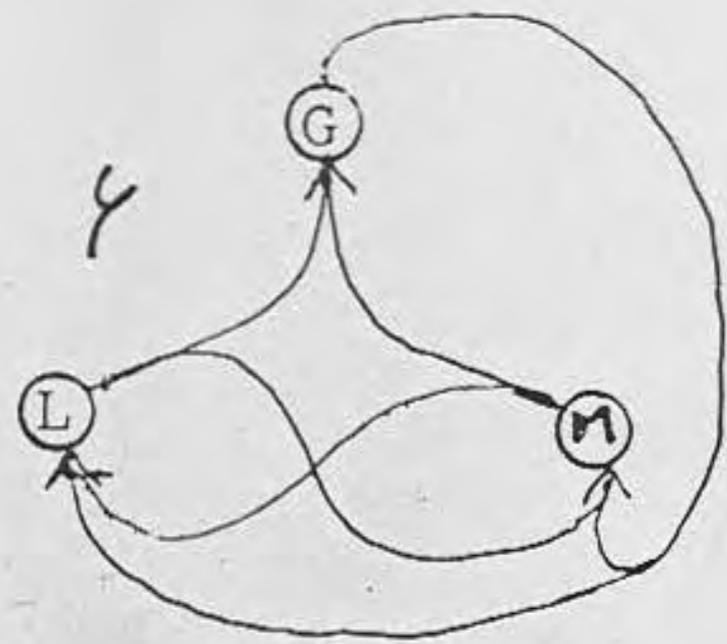
β



α



γ





Calculus of Knowing
via
Conversation Theory

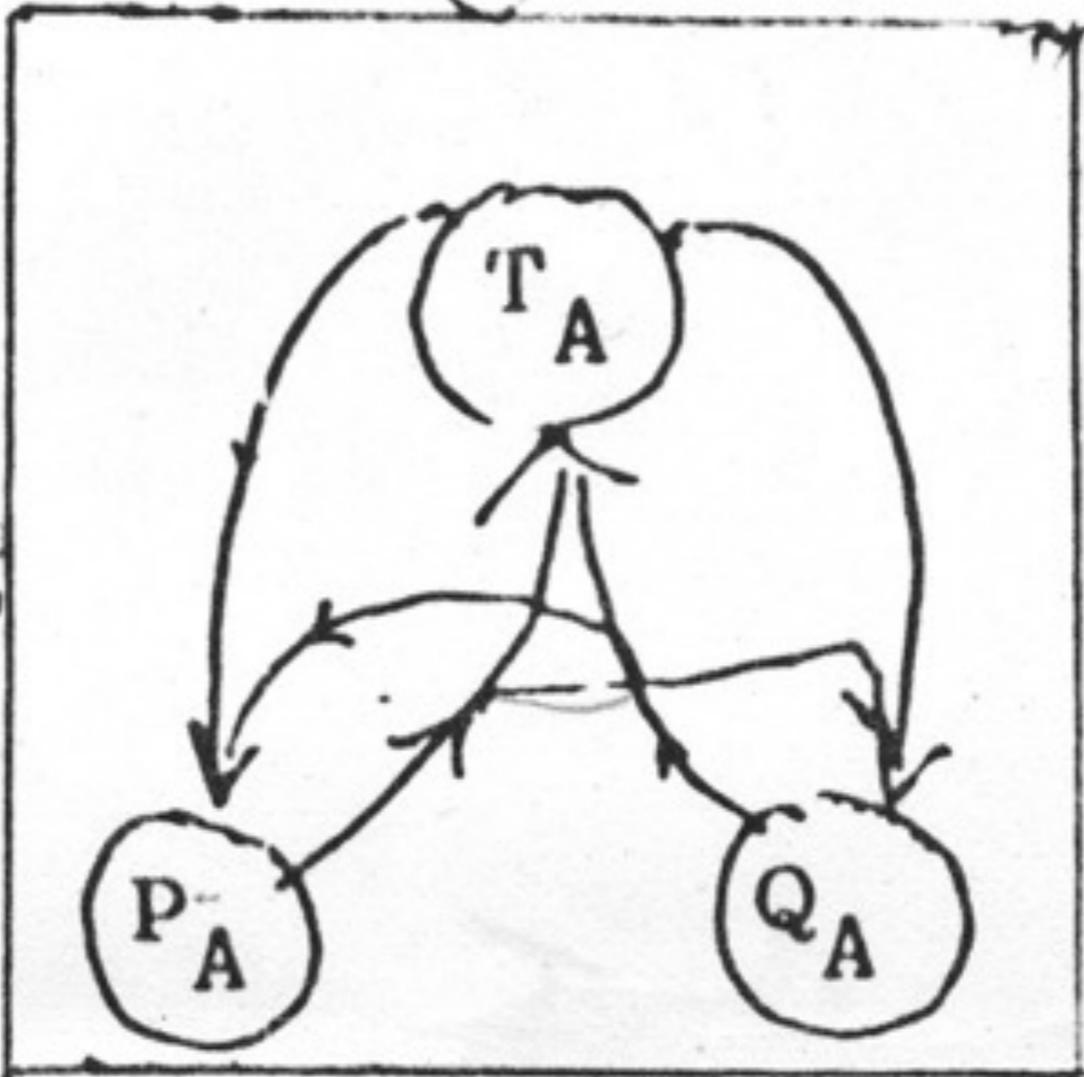


Fig 3.2. Ap.1.

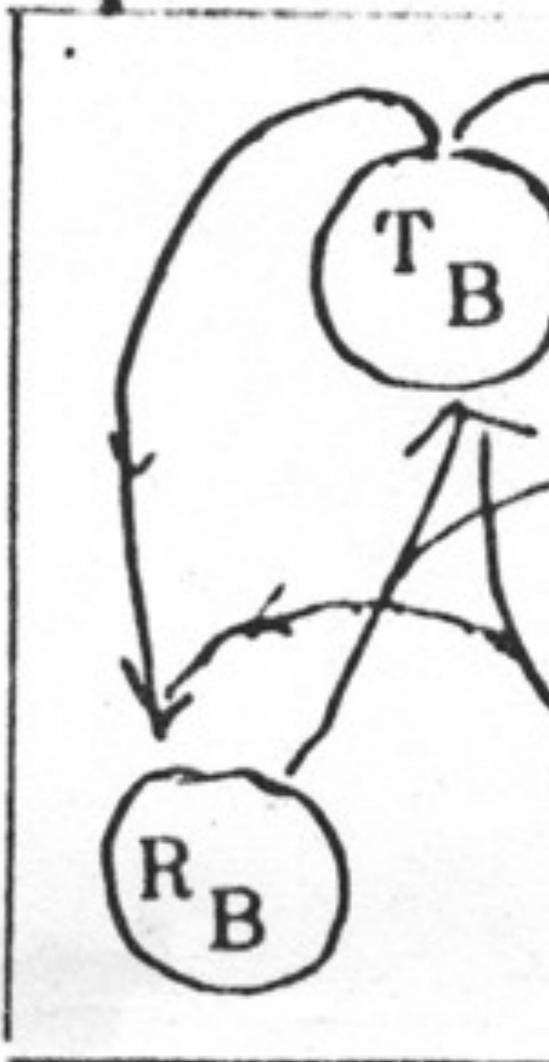


Fig 3.

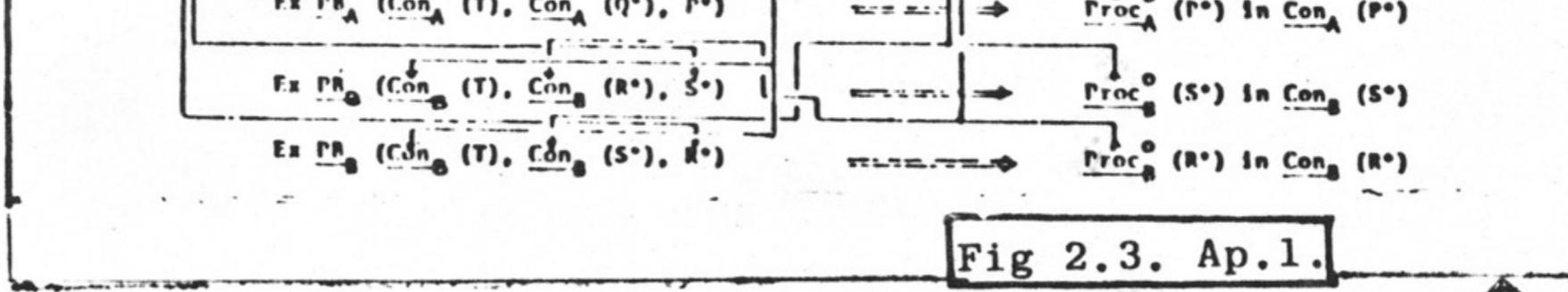


Fig 2.3. Ap.1.

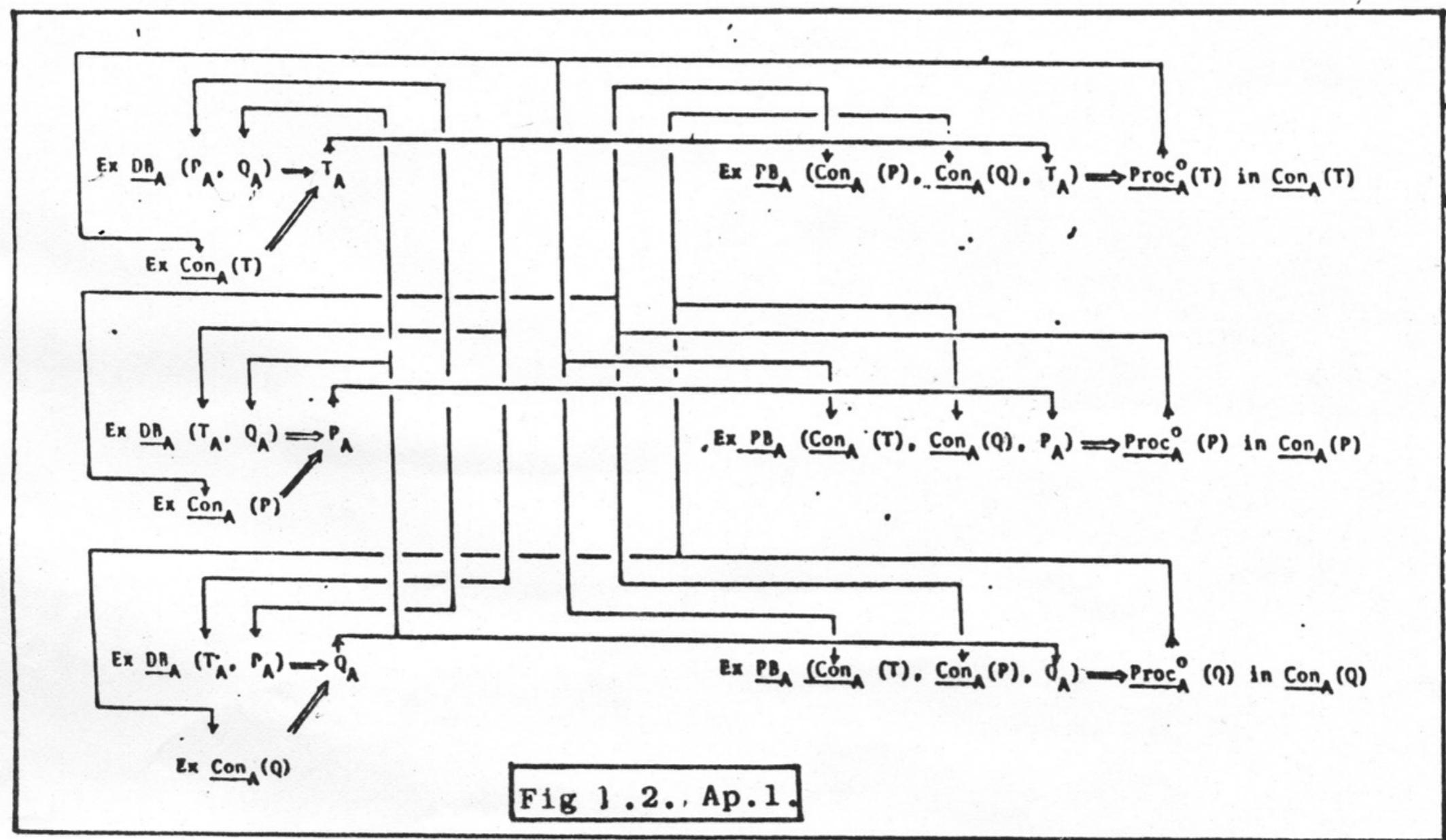


Fig 1.2. Ap.1.

48
"2nd ord
Expans

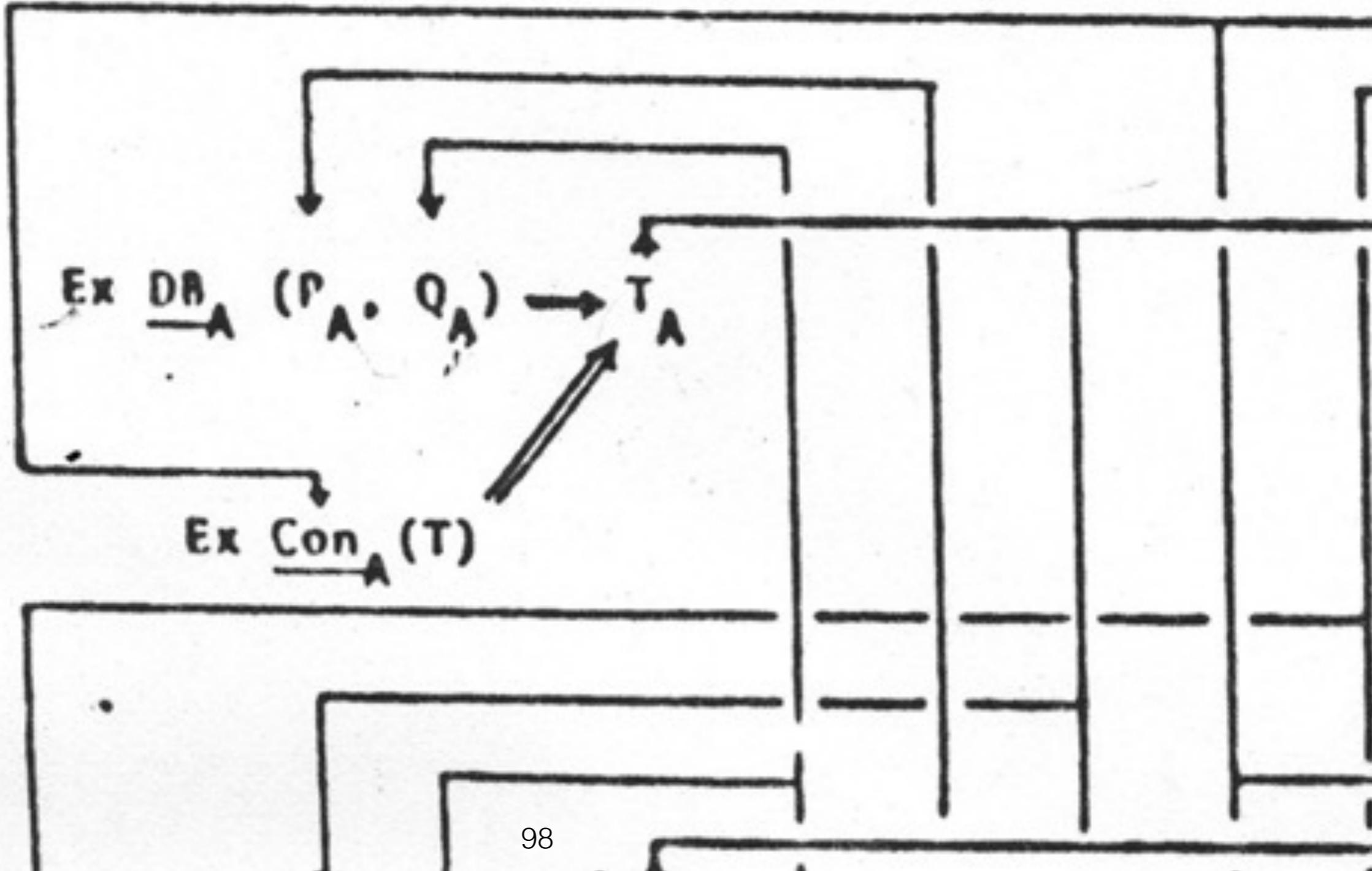


Fig 2.3. Ap.1.

Ex $\Gamma_B \wedge (\text{Con}_\wedge(P), \text{Con}_\wedge(Q), T_\wedge) \Rightarrow \text{Proc}_\wedge^0(T)$ in $\text{Con}_\wedge(T)$

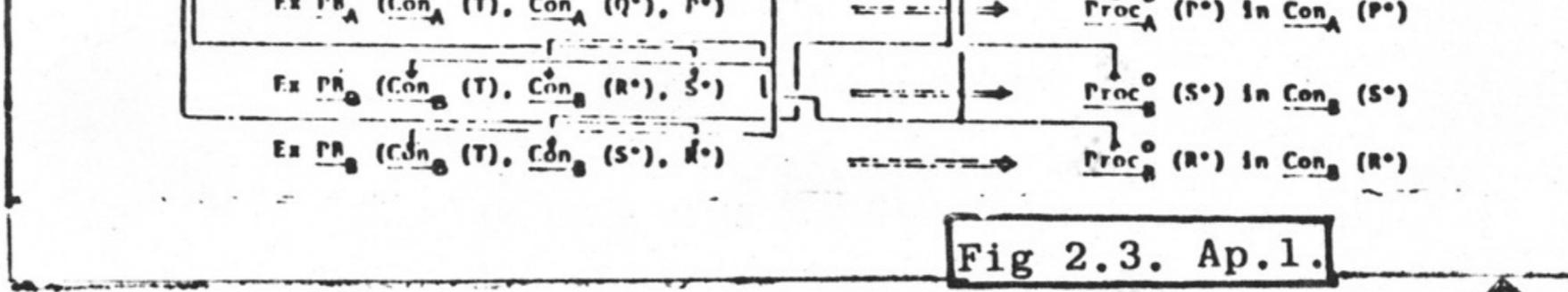


Fig 2.3. Ap.1.

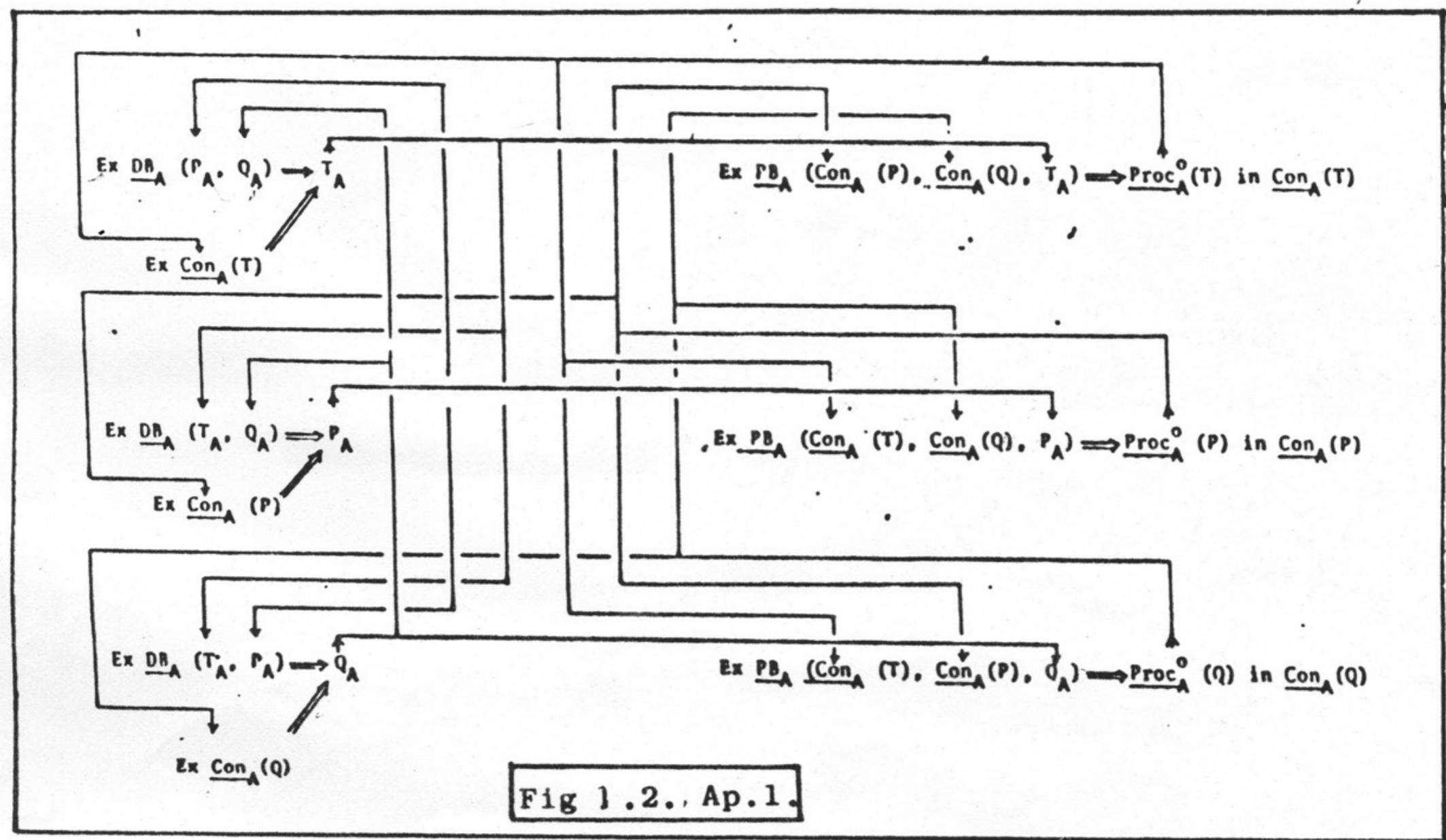


Fig 1.2. Ap.1.

48
"2nd ord
expans

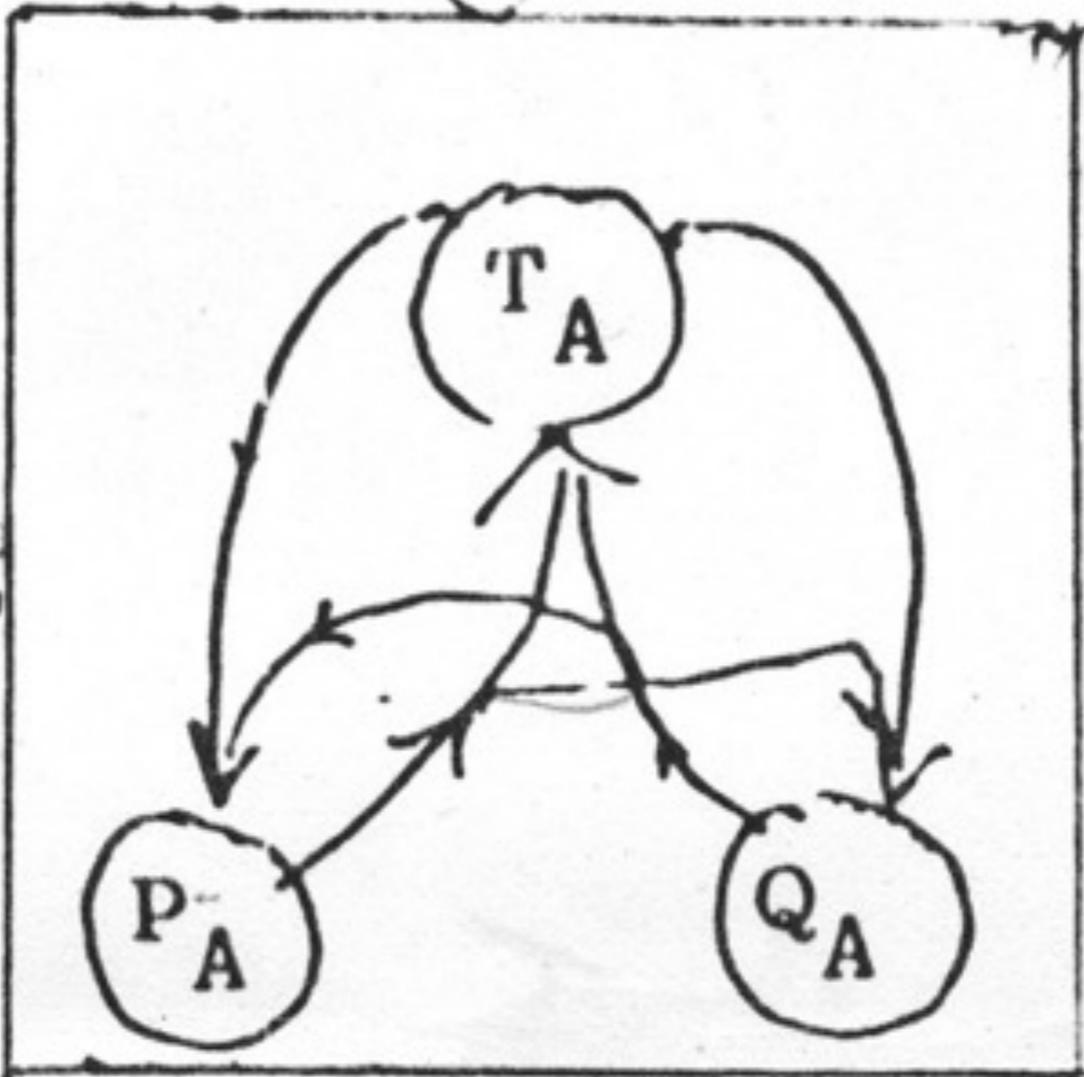


Fig 3.2. Ap.1.

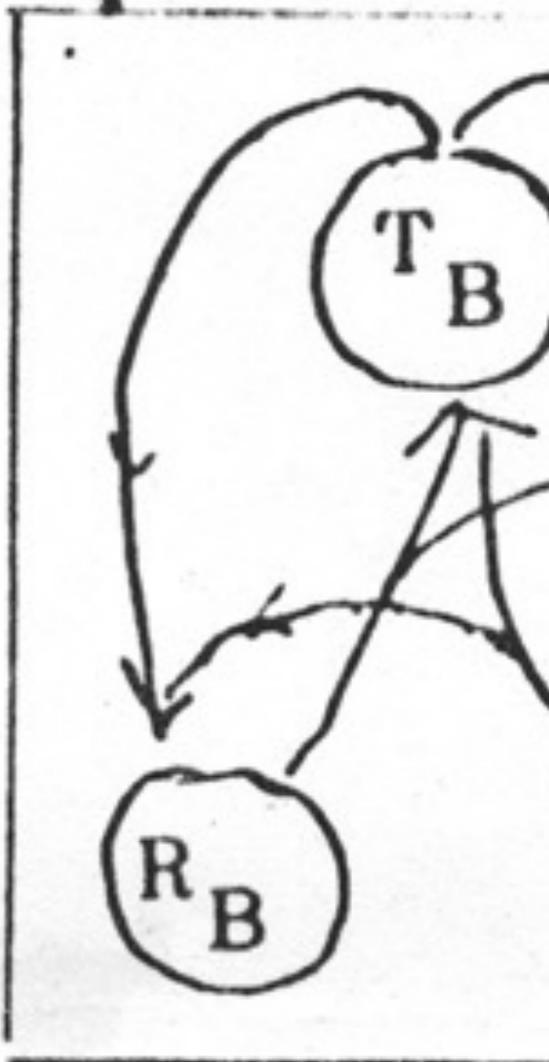


Fig 3.

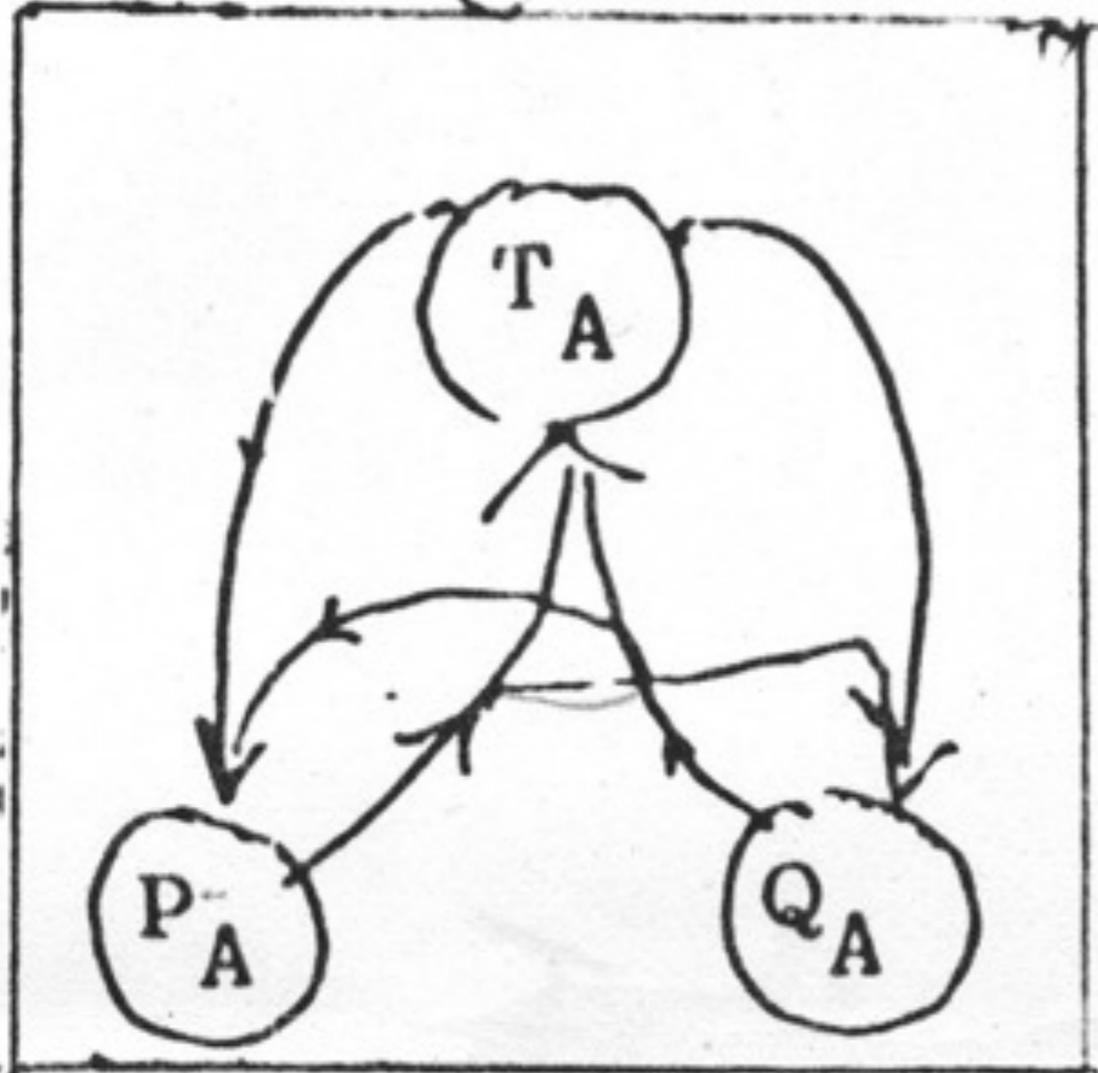


Fig 3.2. Ap.1.

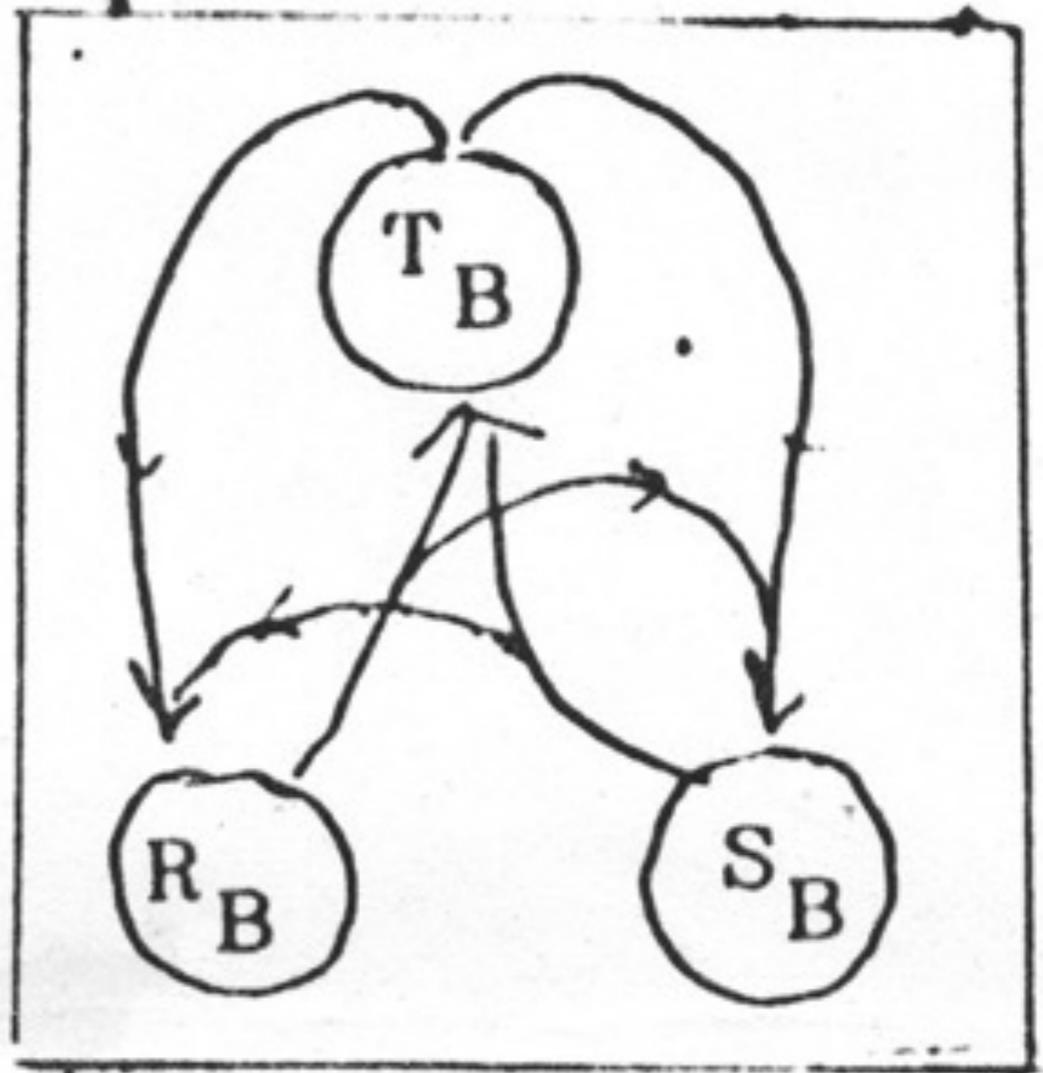


Fig 3.3. Ap.

Static Inscription
of process

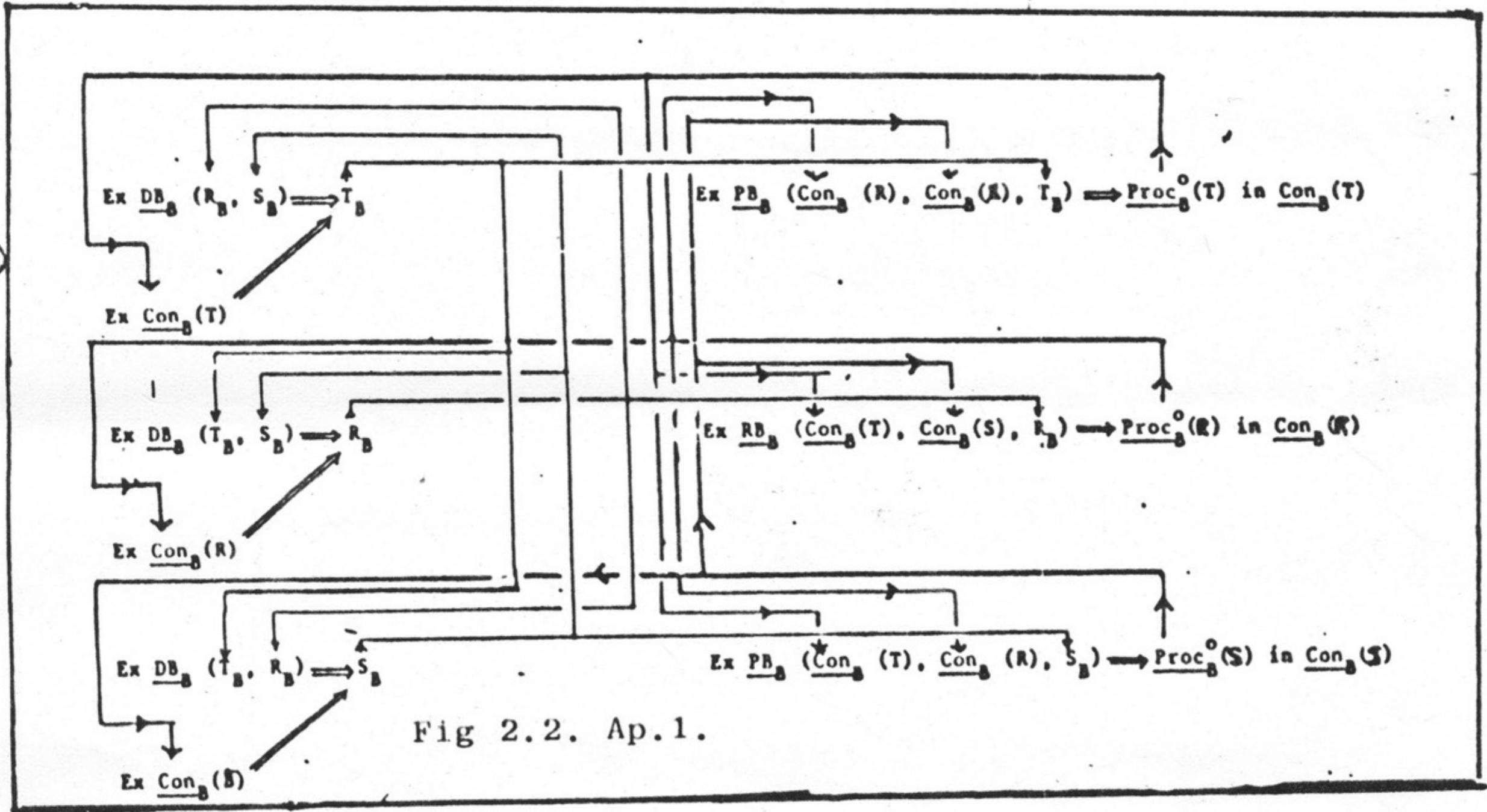


Fig 2.2. Ap.1.

ure underlying this expansion is not shown explicitly (it involves the terms $P_A, Q_A, R_B, S_B, \underline{Con}_B$ and " \rightarrow " as well as a specific minimal realisation of an organisationally closed and ... The derivations shown in the picture are of some interest. If A and B agree over an under-ree they are distinct, but analogous (under β_B as before) relating Fig 1.2. and Fig 2.2. session analogy, γ , reflecting the distinction between t and $t + \Delta t$), that the common

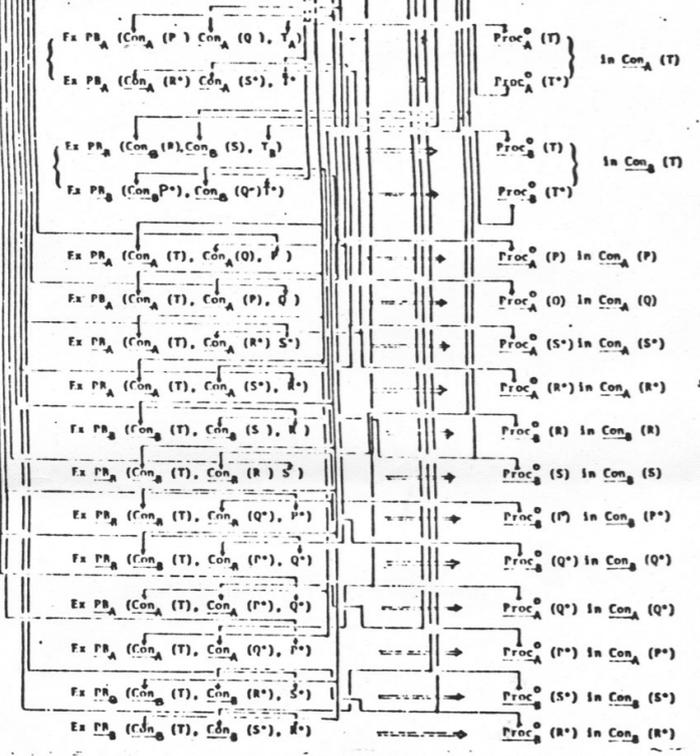


Fig 2.3. Ap.1.

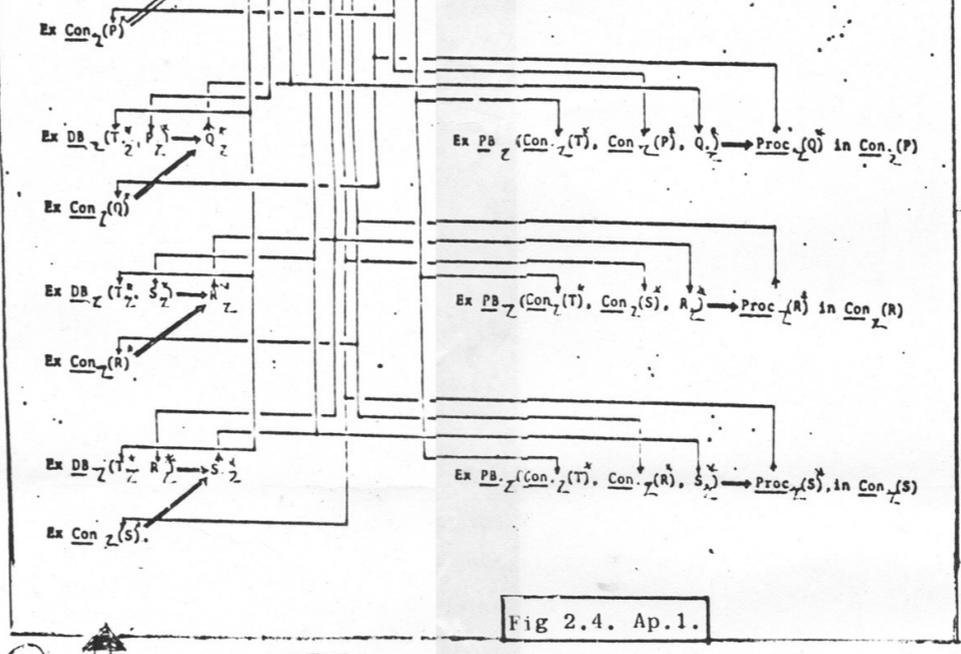
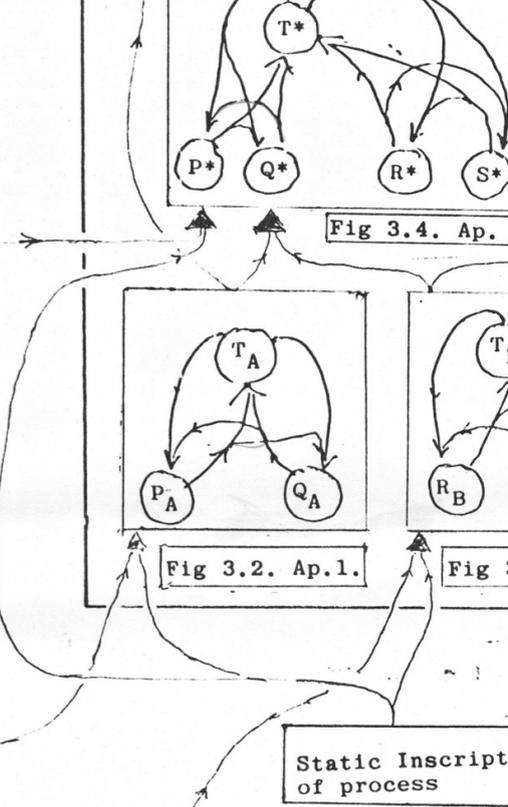


Fig 2.4. Ap.1.



Static Inscript of process

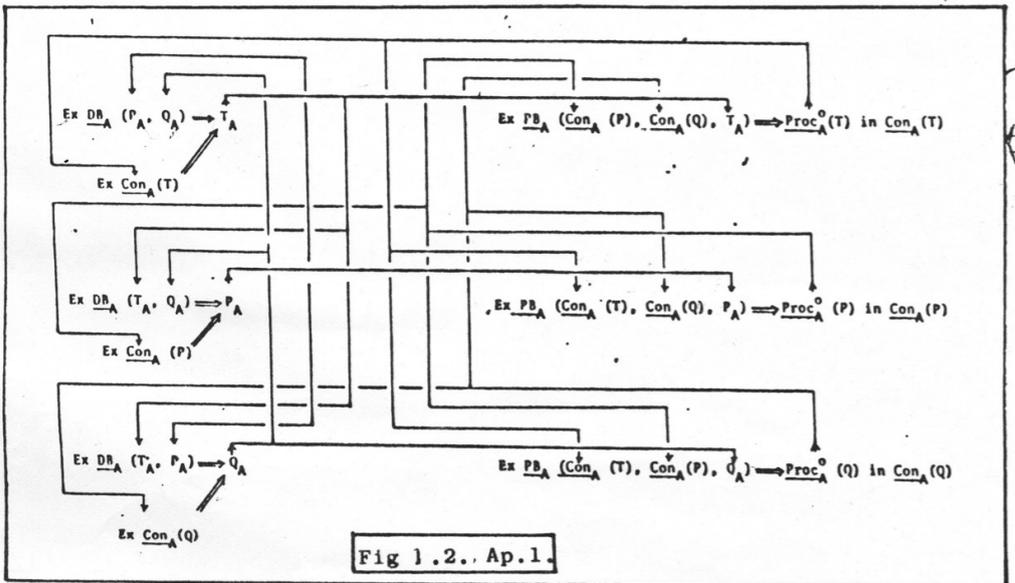


Fig 1.2. Ap.1.

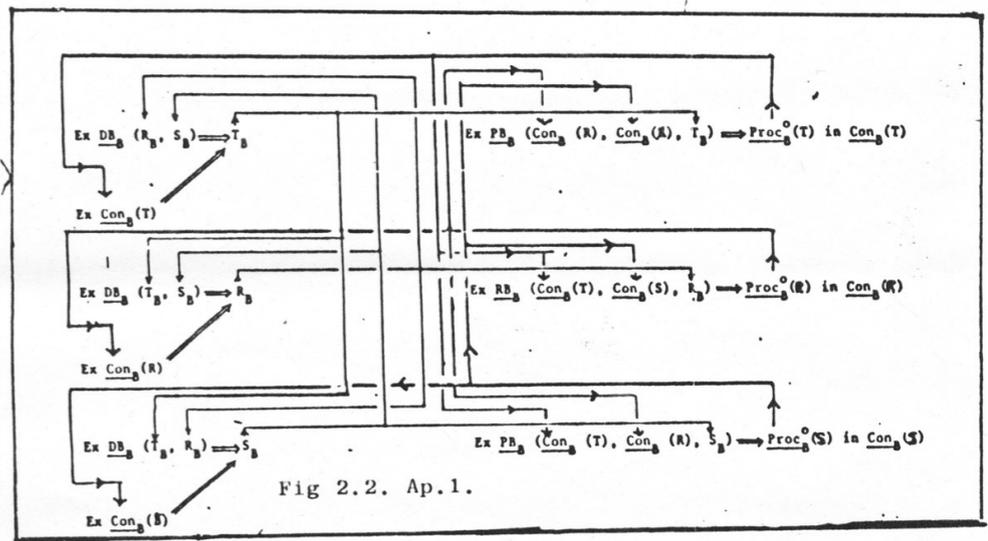
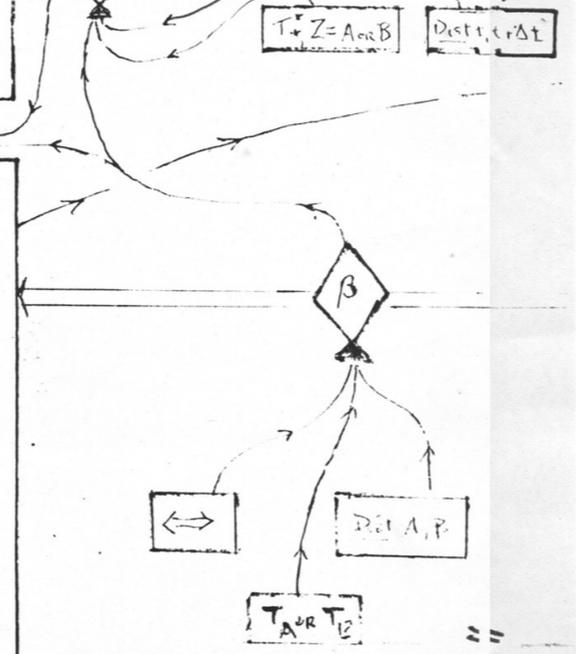
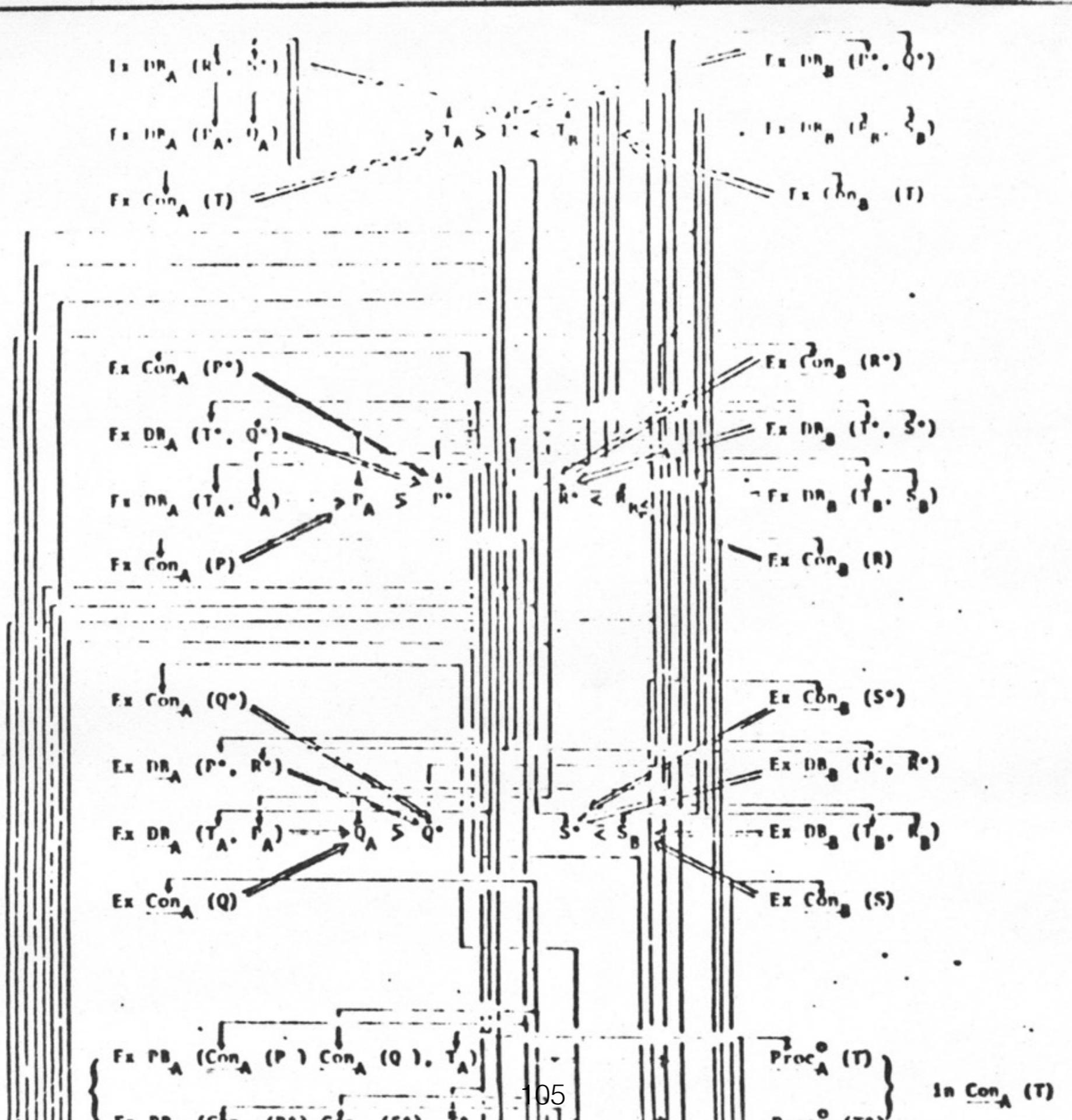


Fig 2.2. Ap.1.



4 sheet 2
"2nd order expansion"

Fig 1. Ap. 1. The derivational structure underlying this expansion is not shown explicitly (it involves the terms $P_A, Q_A, R_B, S_B, Con_B, DB_A, DB_B, PB_A, PB_B, Ex \Rightarrow$ and \Rightarrow as well as a specific minimal realisation of an organisationally closed and informationally open production system). The derivations shown in the picture are of some interest. If A and B agree over an understanding (Fig 2.3.) then before they agree they are distinct, but analogous (under β , as before) relating Fig 1.2. and Fig 2.2. After their agreement (the temporal succession analogy, γ , reflecting the distinction between t and $t + \Delta t$), that the common understanding of T^*, P^*, Q^*, R^*, S^* in Fig 2.4. permits the derivation of Fig 2.3. from β and γ . Under these circumstances it is legitimate to derive static (but cyclic) inscriptions (Fig 3.2., Fig 3.3., Fig 3.4) and to justify the operation of pruning (in Fig 3.5). The picture thus exhibits the necessary interaction between the fundamental distinctions of individuals (A, B), of temporal succession ($t, t + \Delta t$) and the process Ex of a stable concept "of" some individual. This essential but often obfuscated interdependence seems to account for the "difficulty" (as well as the potential power) of conversation theory. Notice, for example that if (as an easy way out of difficulty) we had asserted "A and B have agreed to understand T^* " then Fig 2.3. could be derived, simple derivation, from Fig 1.2 and Fig 2.2. but such a statement would render the picture of descriptive value only.



Ex
Ex
Ex
Ex
Ex

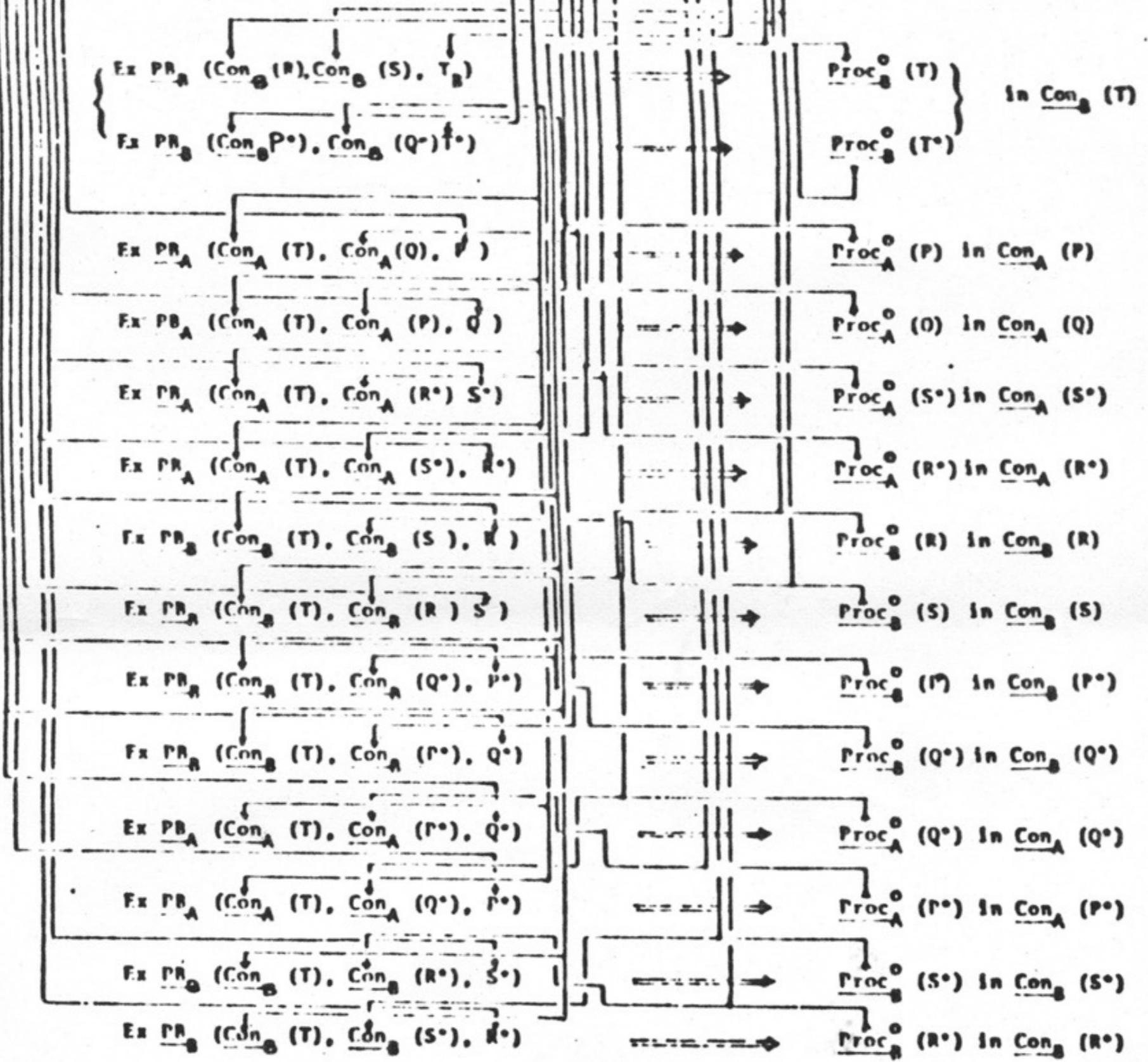


Fig 2.3. Ap.1.

$Ex\ Con_2(R^*)$
 $Ex\ DB_2(T^*, S^*)$
 $Ex\ DB_2(T^*, S^*)$
 $Ex\ Con_2(R)$
 $Ex\ Con_2(S^*)$
 $Ex\ DB_2(T^*, R^*)$
 $Ex\ DB_2(T^*, R^*)$
 $Ex\ Con_2(S)$
 $Proc_A^0(T)$
 $Proc_A^0(T^*)$
 $Proc_B^0(T)$
 $Proc_B^0(T^*)$
 $Proc_A^0(P)$ in $Con_A(P)$
 $Proc_A^0(Q)$ in $Con_A(Q)$
 $Proc_A^0(S^*)$ in $Con_A(S^*)$
 $Proc_A^0(R^*)$ in $Con_A(R^*)$
 $Proc_B^0(R)$ in $Con_B(R)$
 $Proc_B^0(S)$ in $Con_B(S)$
 $Proc_B^0(P^*)$ in $Con_B(P^*)$
 $Proc_B^0(Q^*)$ in $Con_B(Q^*)$
 $Proc_A^0(Q^*)$ in $Con_A(Q^*)$
 $Proc_A^0(P^*)$ in $Con_A(P^*)$

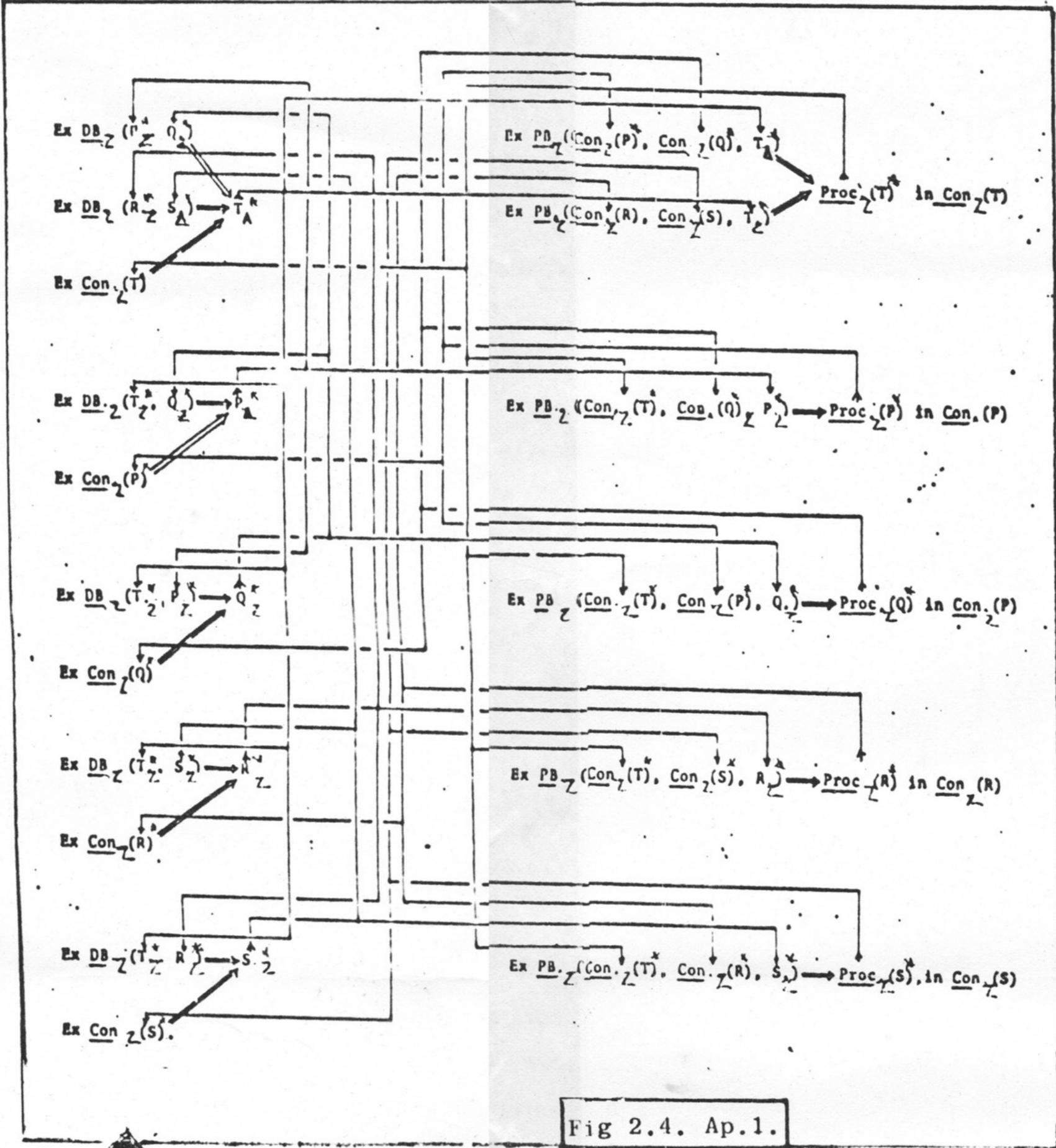


Fig 2.4. Ap.1.

Fig 3.5. Ap. 1.

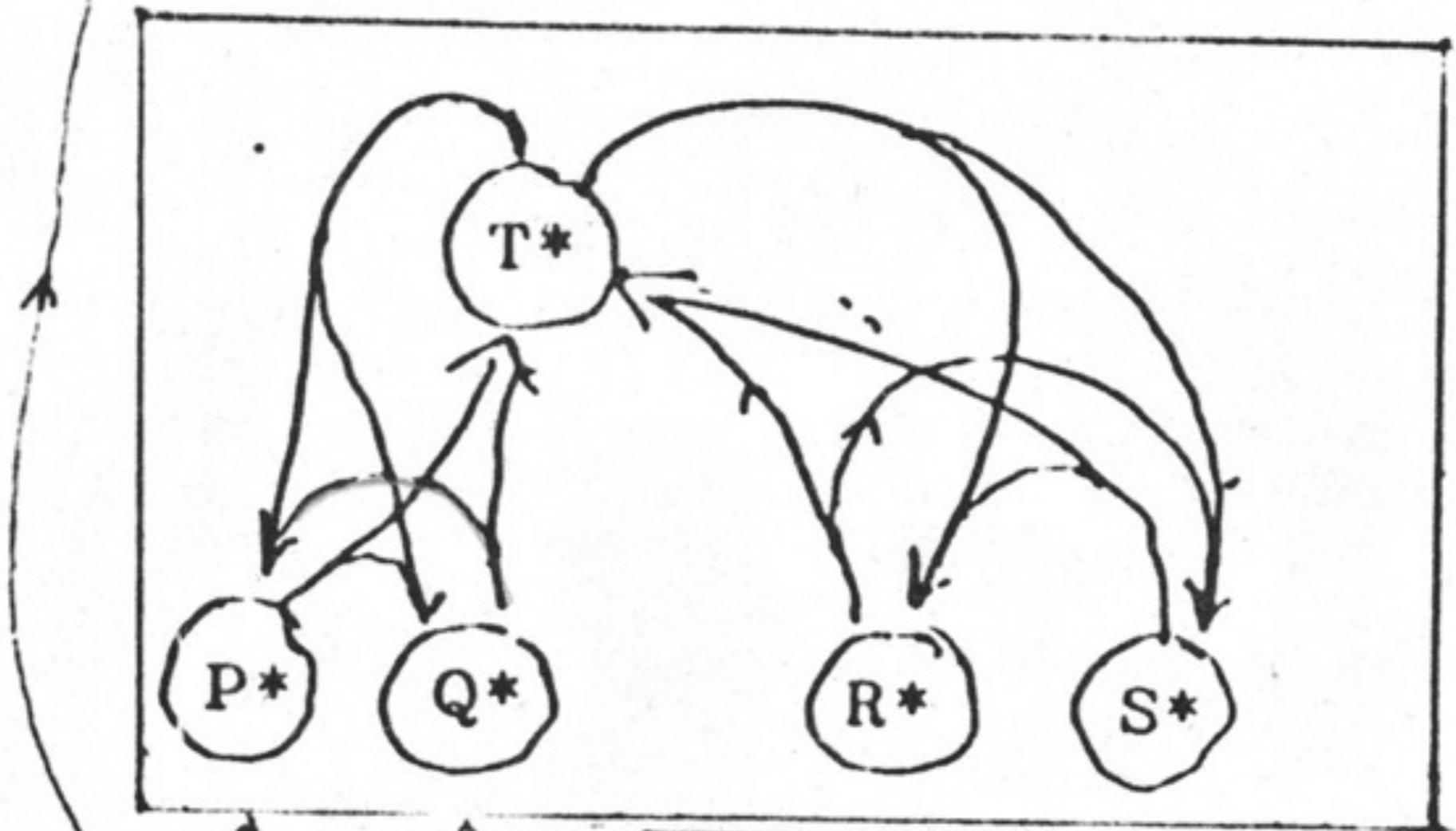
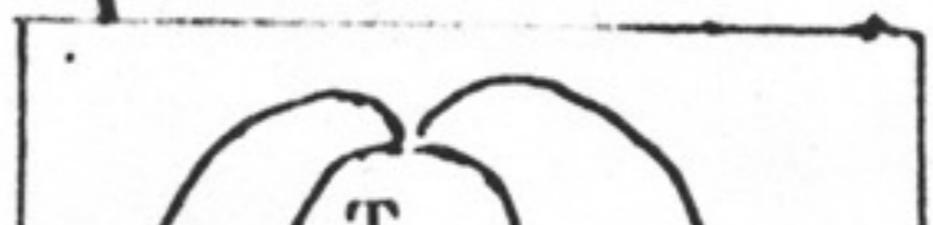
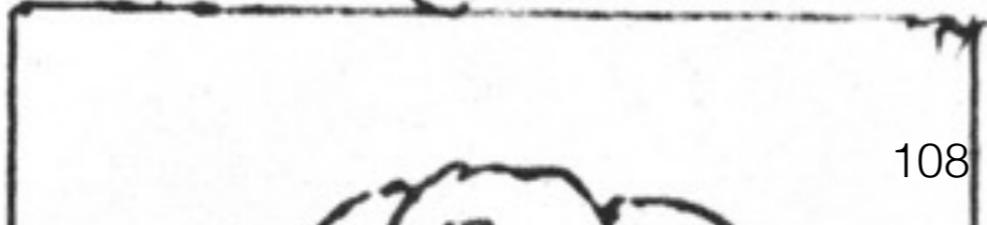


Fig 3.4. Ap. 1.



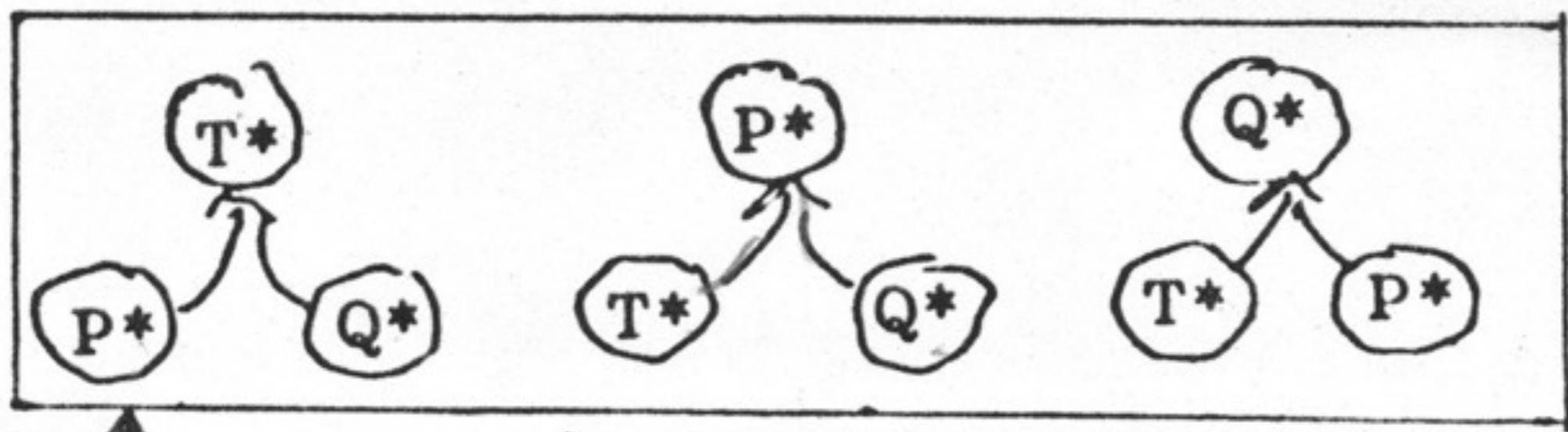
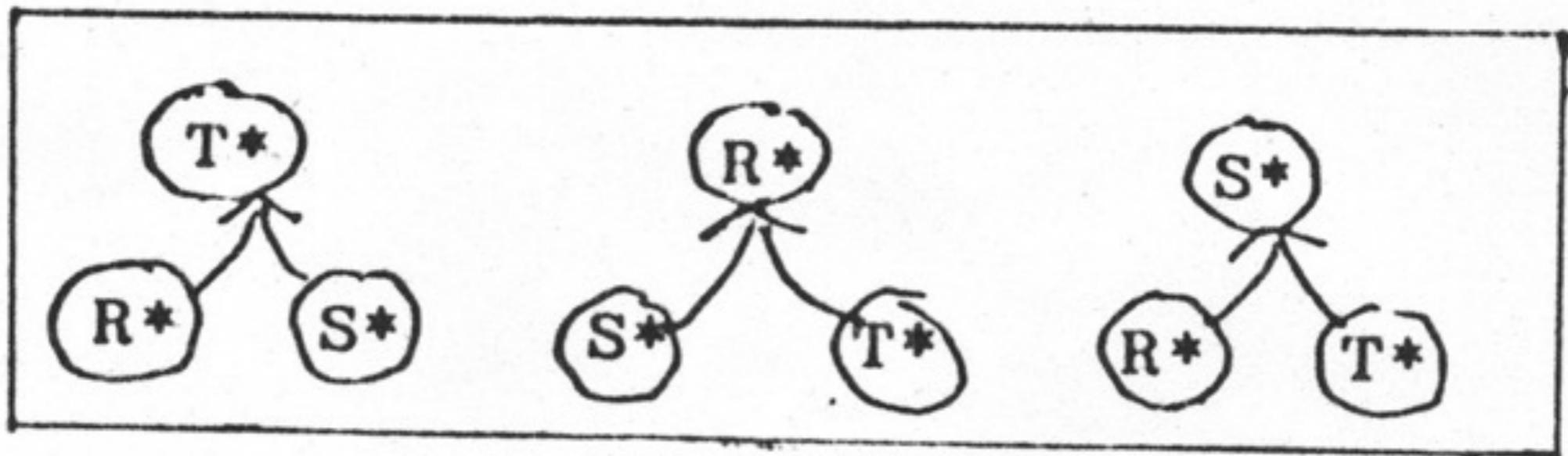


Fig 3.5. Ap. 1.

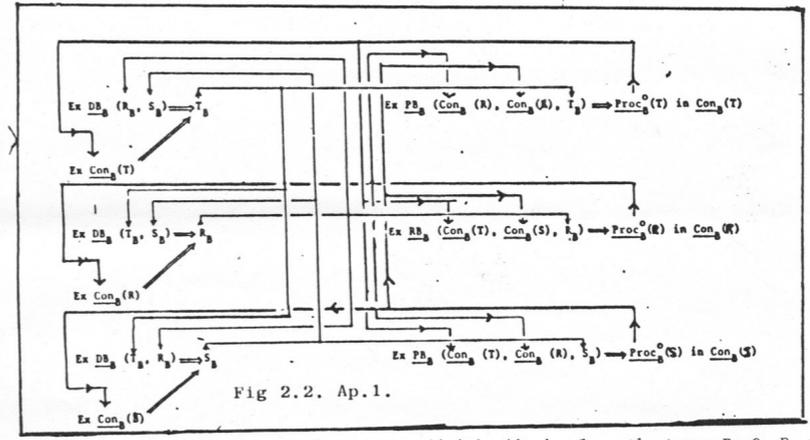
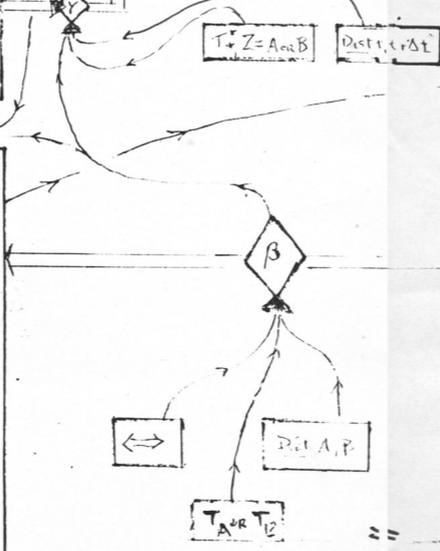
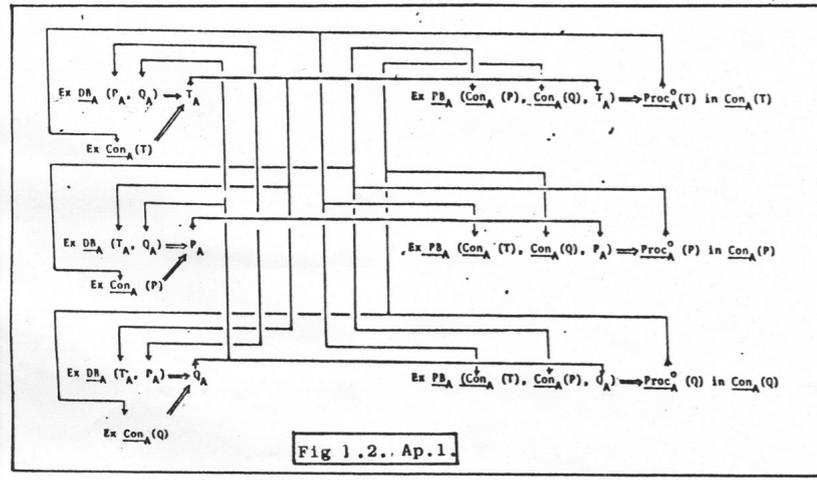
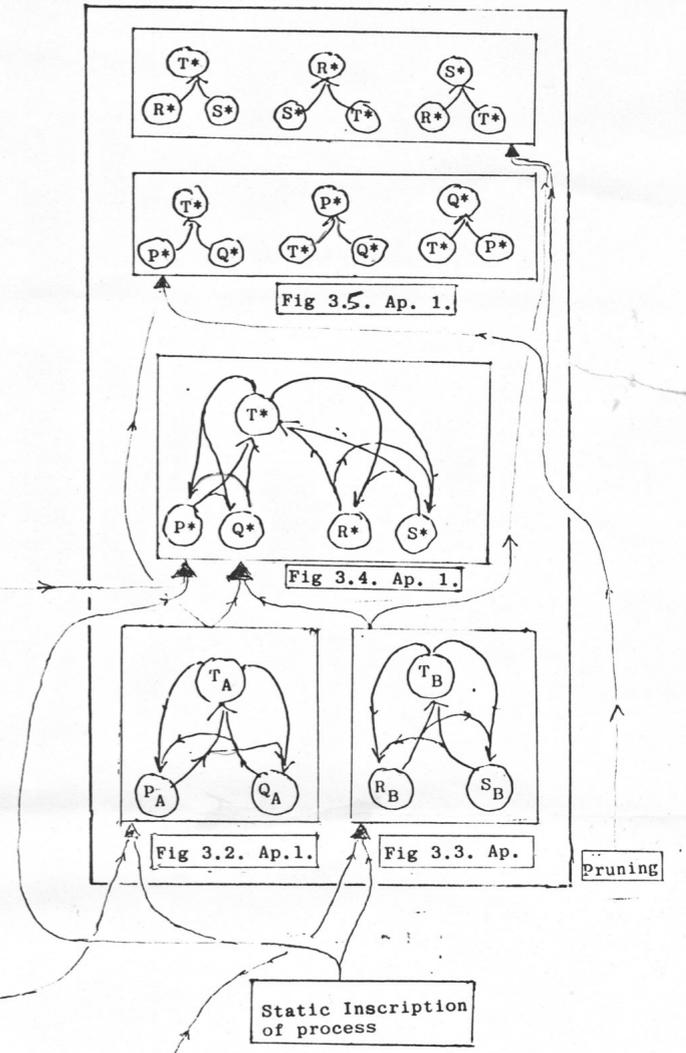
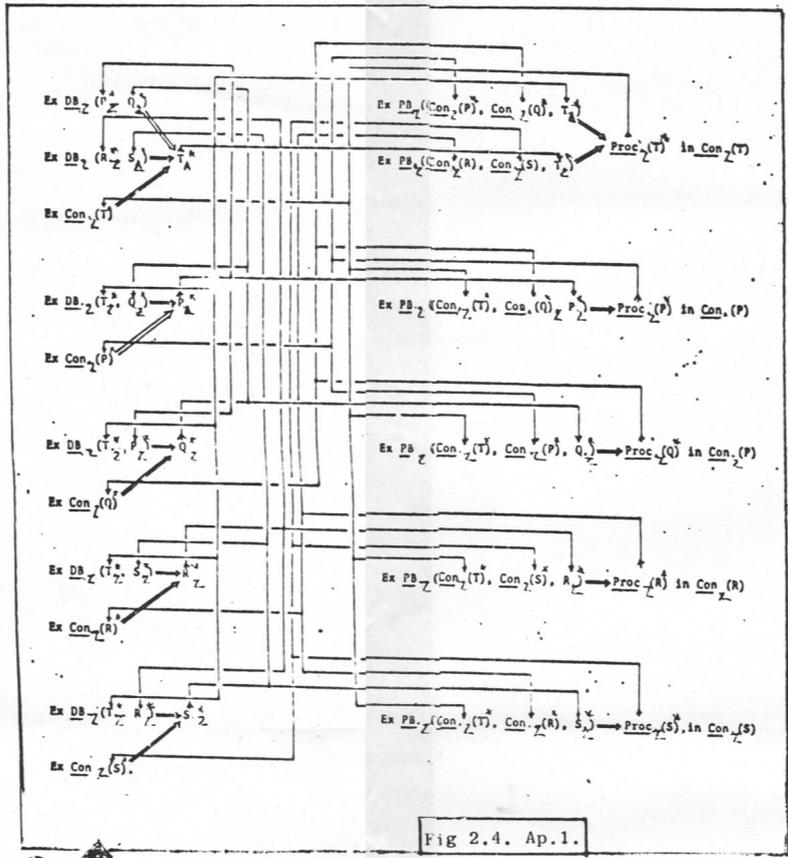
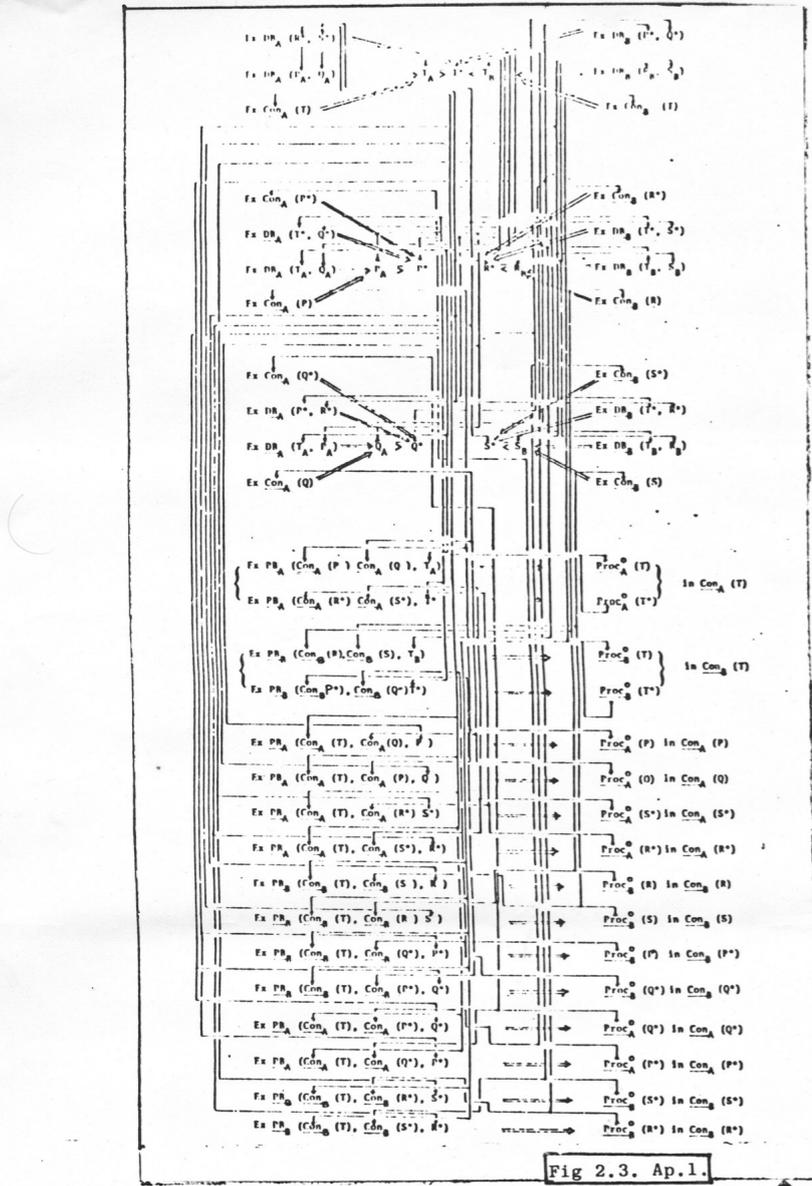


Fig 1. Ap. 1. The derivational structure underlying this expansion is not shown explicitly (it involves the terms $P_A, Q_A, R_B, S_B, Con_A, Con_B, DB_A, DB_B, PB_A, PB_B, Ex \Rightarrow$ and \rightarrow as well as a specific minimal realisation of an organisationally closed and informationally open production system). The derivations shown in the picture are of some interest. If A and B agree over an understanding (Fig 2.3.) then, before they agree they are distinct, but analogous (under β , as before) relating Fig 1.2. and Fig 2.2. After their agreement (the temporal succession analogy, γ , reflecting the distinction between t and $t + \Delta t$), that the common understanding of T^*, P^*, Q^*, R^*, S^* in Fig 2.4. permits the derivation of Fig 2.3. from β and γ . Under these circumstances it is legitimate to derive static (but cyclic) inscriptions (Fig 3.2., Fig 3.3., Fig 3.4) and to justify the operation of pruning (as in Fig 3.5). The picture thus exhibits the necessary interaction between the fundamental distinctions of individuals (A, B), of temporal succession ($t, t + \Delta t$) and the process Ex of a stable concept "of" some individual. This essential but often obfuscated interdependence seems to account for the "difficulty" (as well as the potential power) of conversation theory. Notice, for example, that if (as an easy way out of difficulty) we had asserted "A and B have agreed to understand T^* " then Fig 2.3. could be derived, by a simple derivation, from Fig 1.2 and Fig 2.2. but such a statement would render the picture of descriptive value only.

What's a Theory?

- Complementarity
- Duality
- Conservation

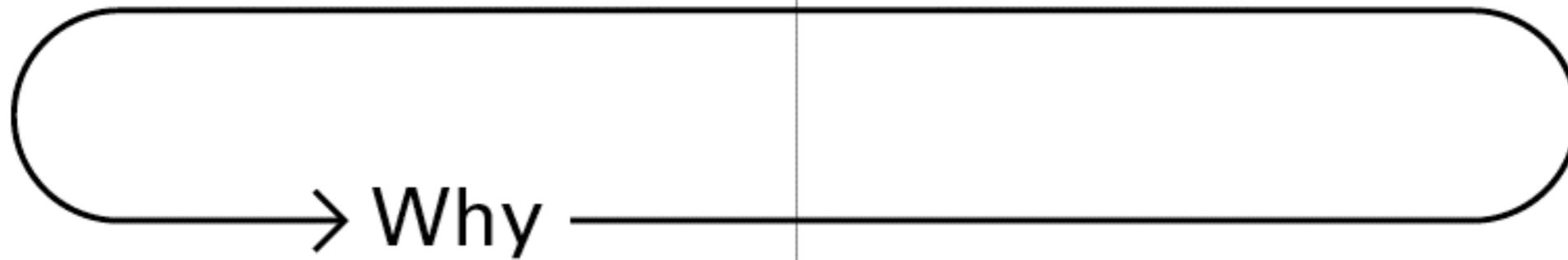
What's a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality
- Conservation

Participant A

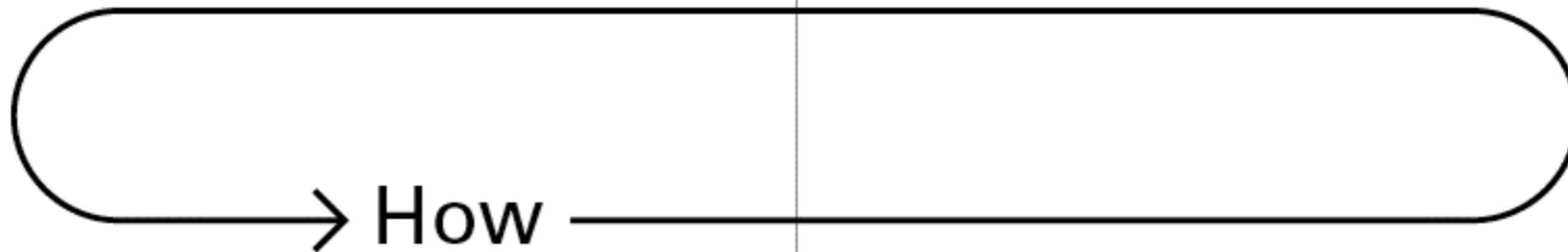
Participant B

Description (L¹)



goals

Prescription (L⁰)



means

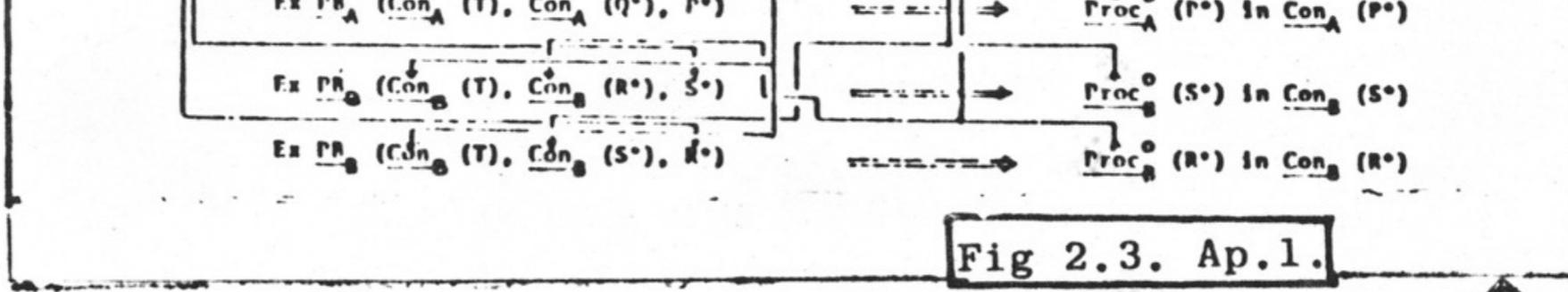


Fig 2.3. Ap.1.

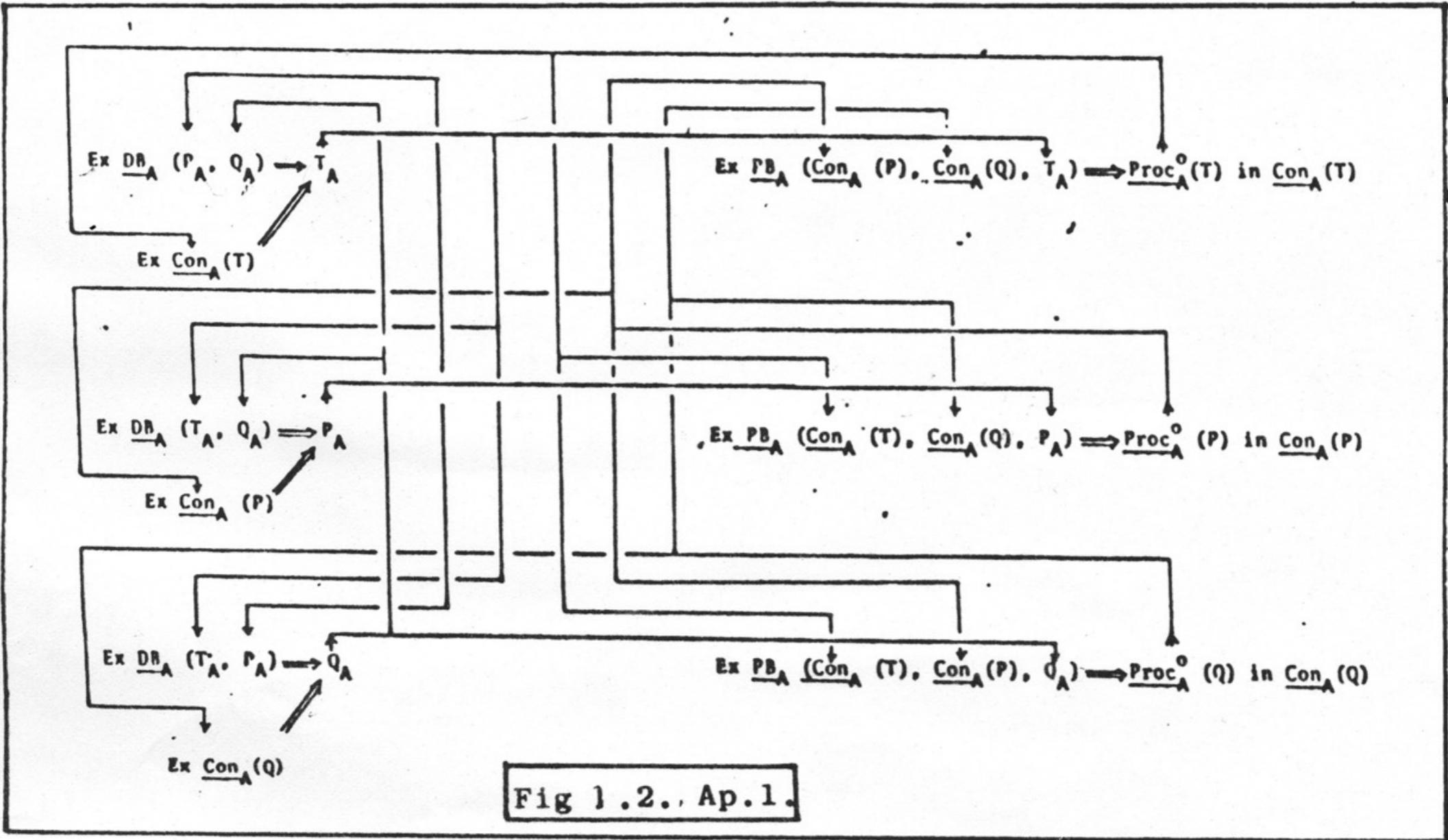


Fig 1.2. Ap.1.

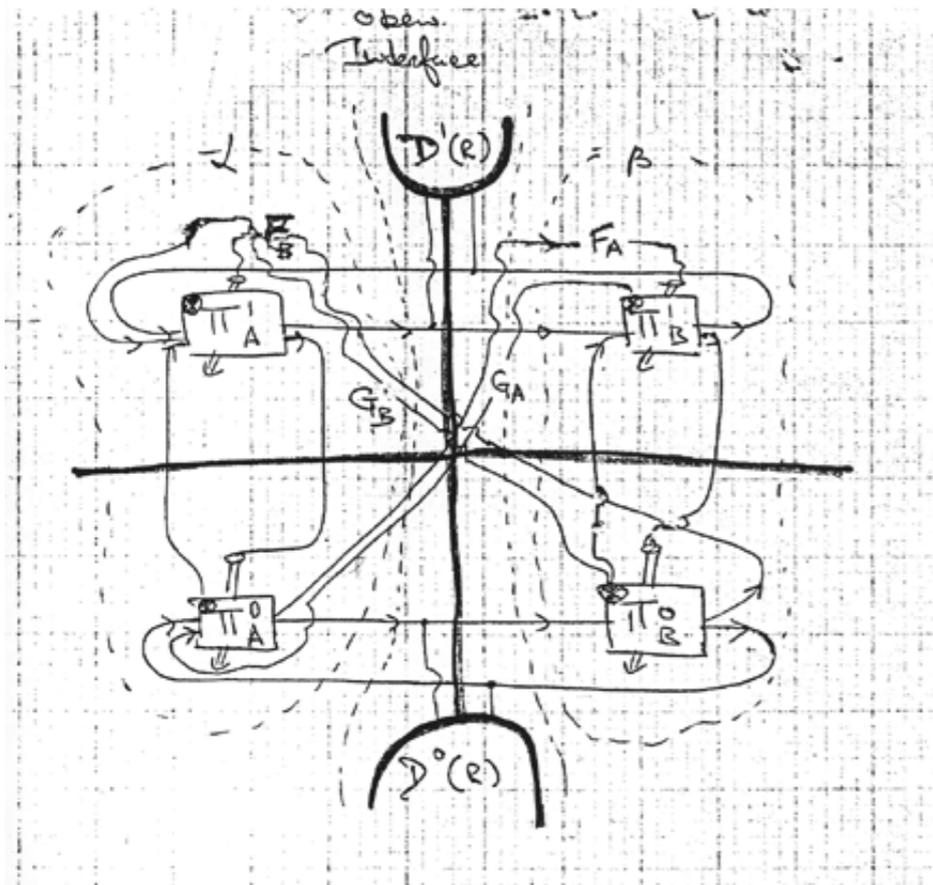
48
"2nd ord
Expans

What's a Theory of Conversation?

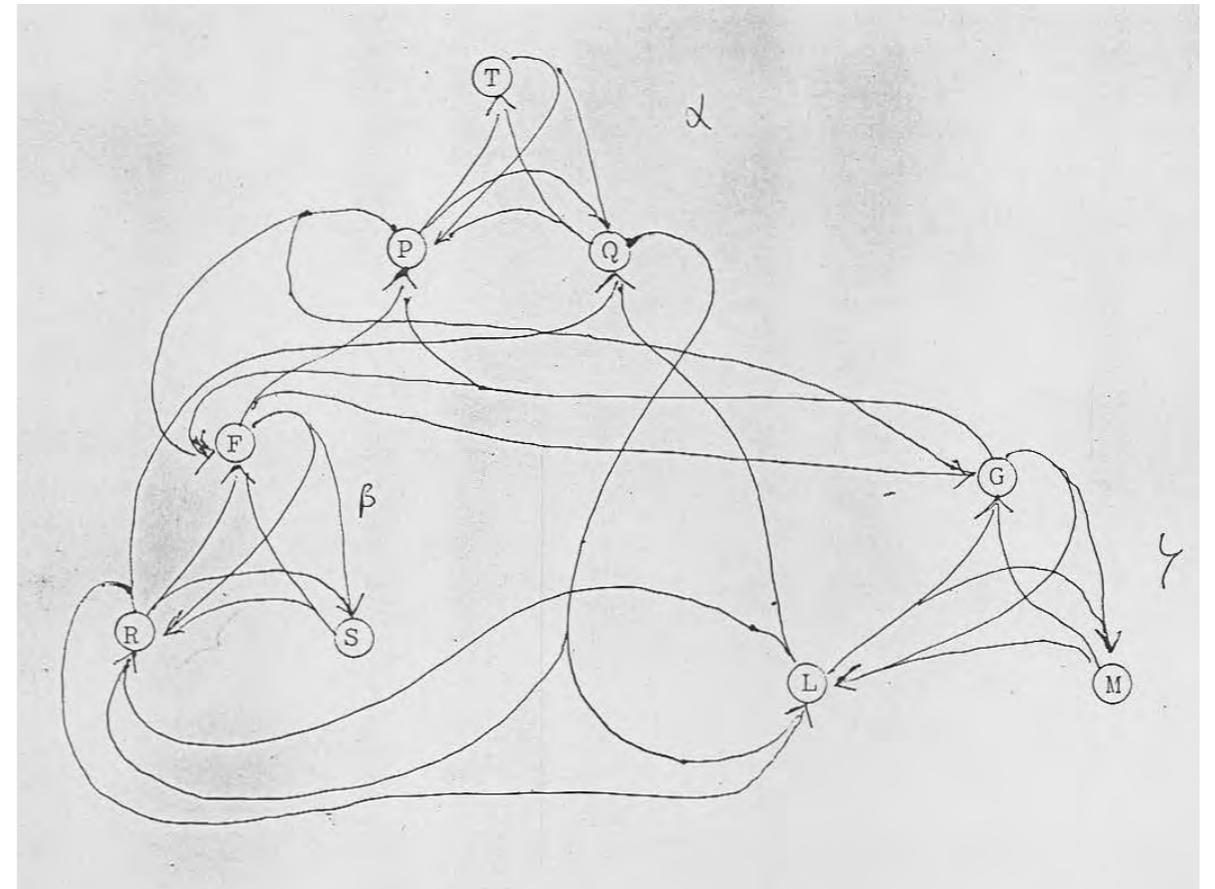
- Complementarity—Descriptive & Prescriptive
- Duality
- Conservation

What's a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality—Interactions & Consequences
- Conservation



VS.

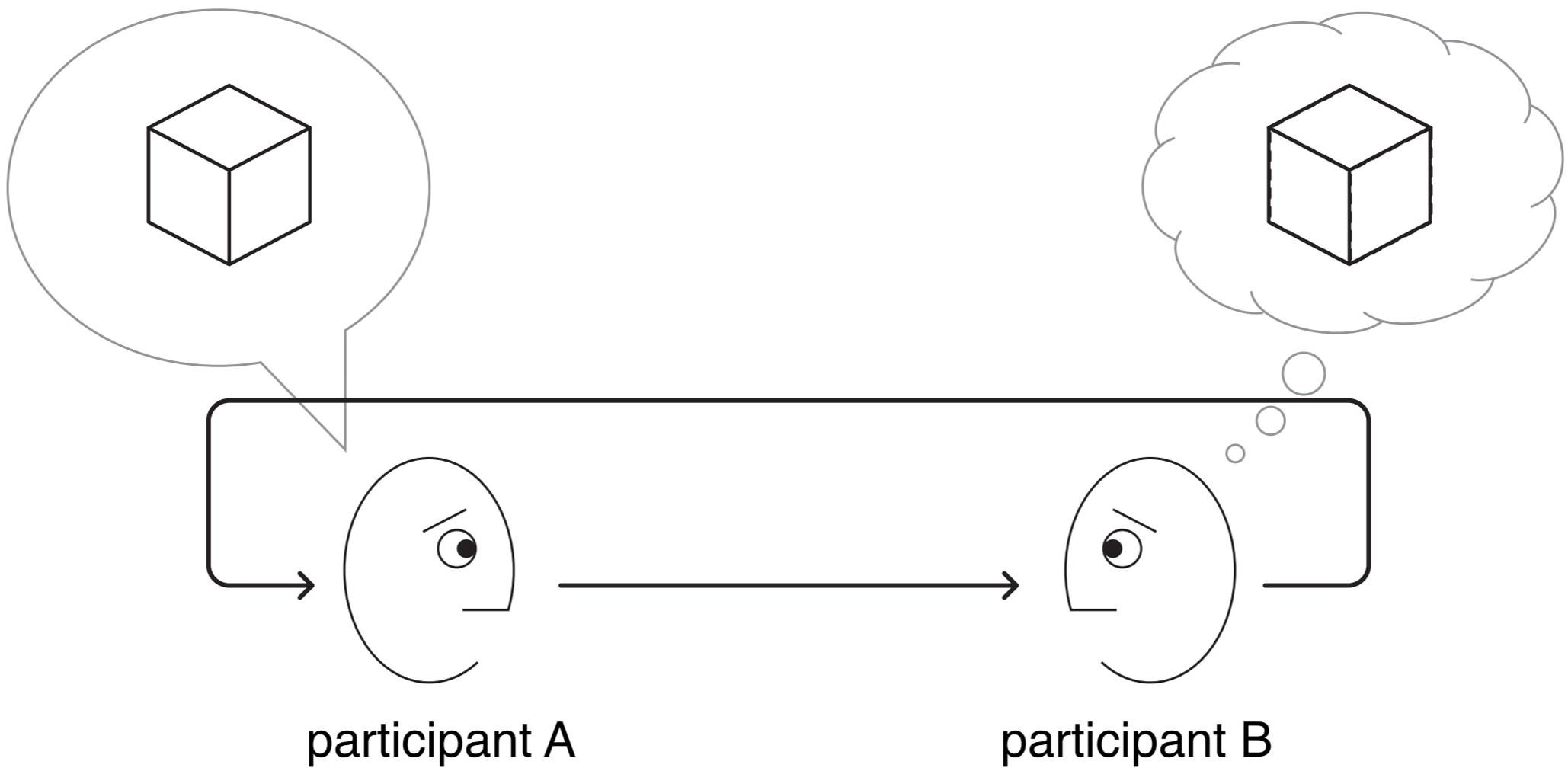


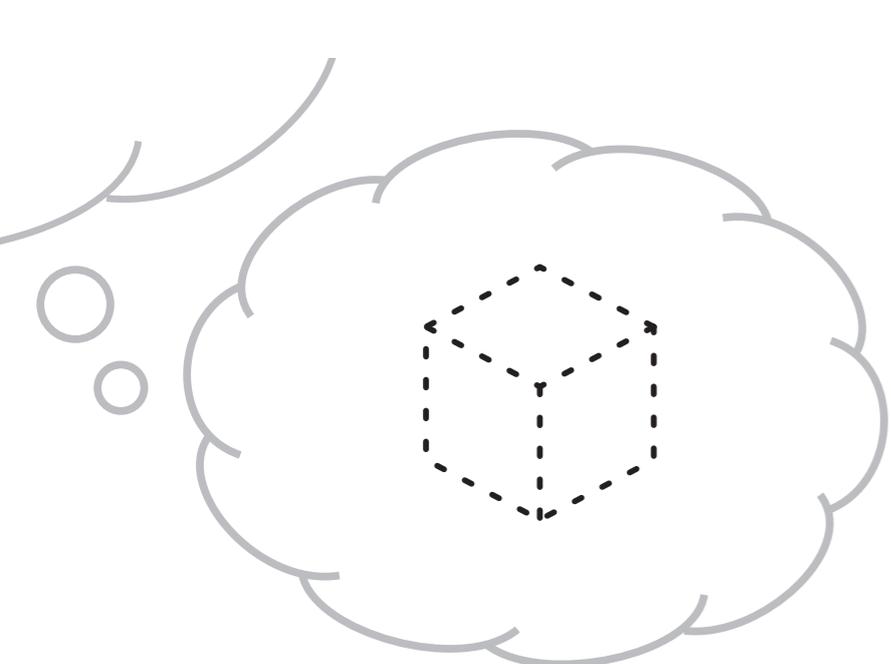
What's a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality—Interactions & Consequences
- Conservation

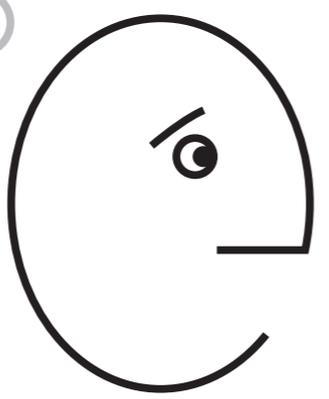
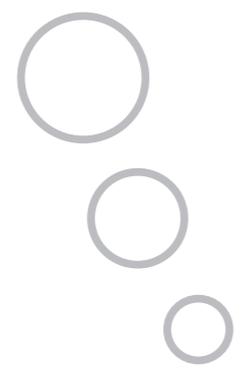
What's a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality—Interactions & Consequences
- Conservation—Shared Awareness

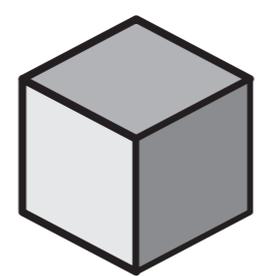




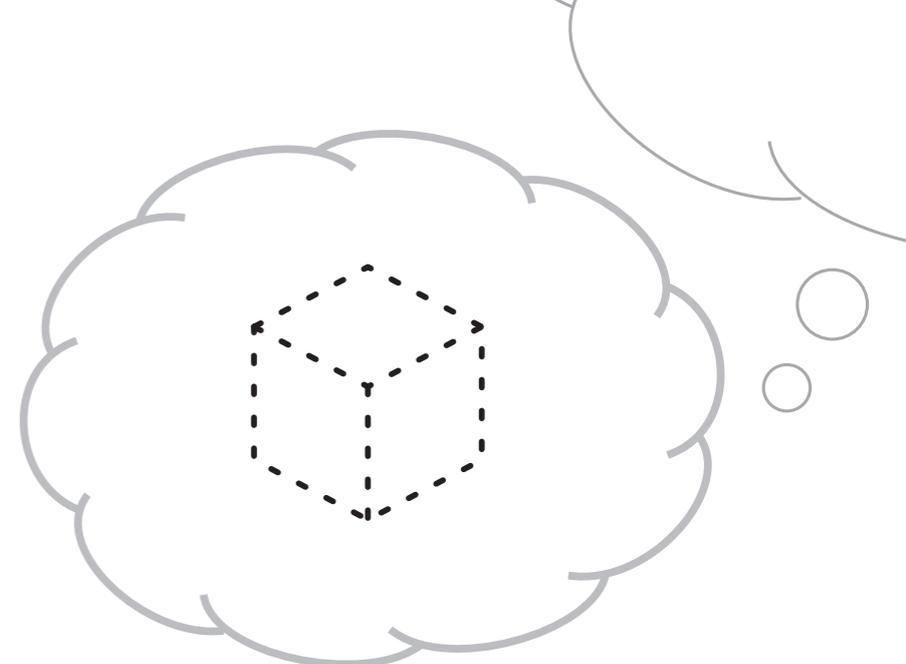
of the subject



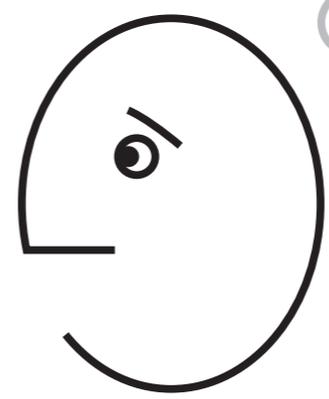
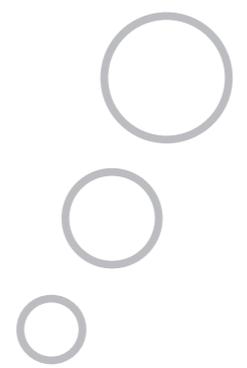
me



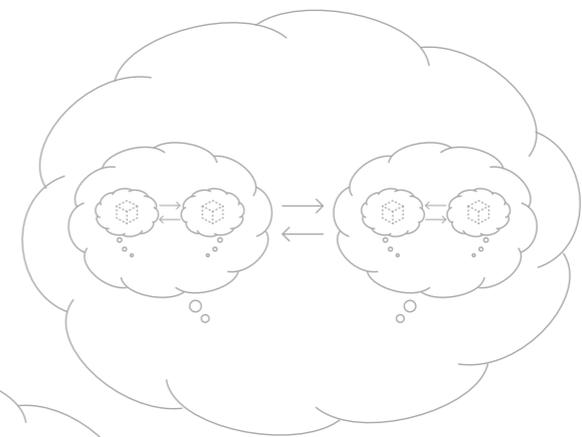
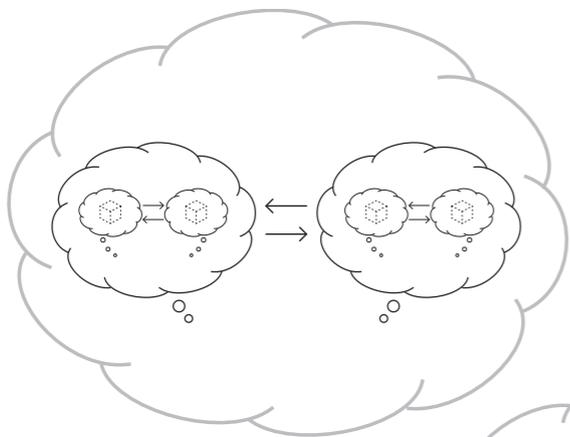
subject



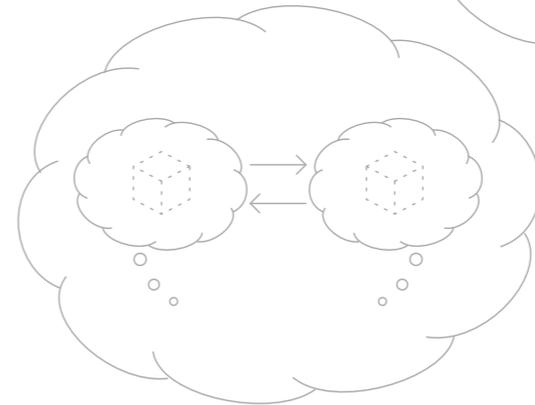
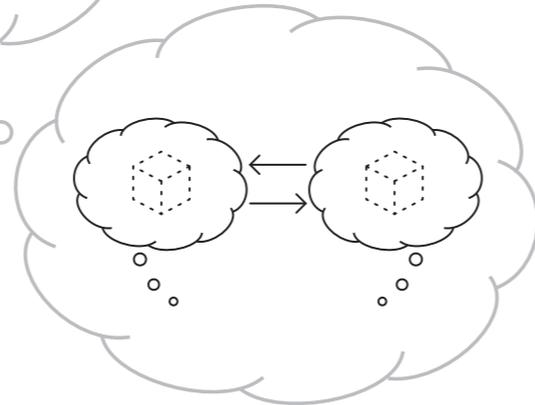
your model of



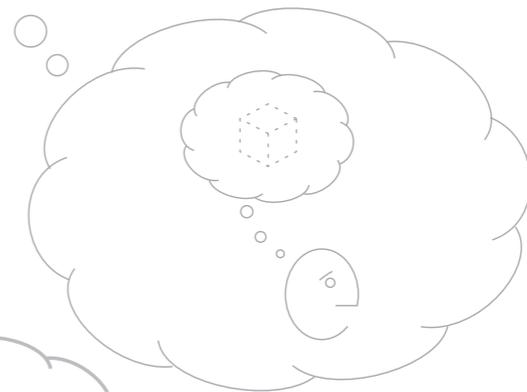
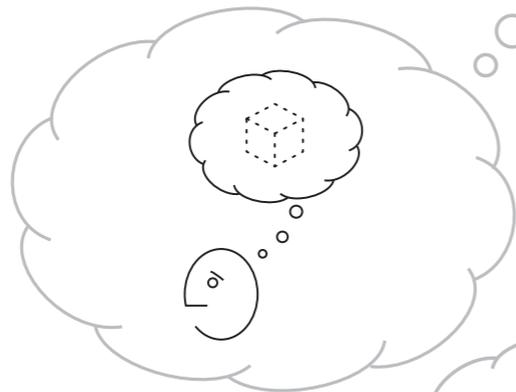
you



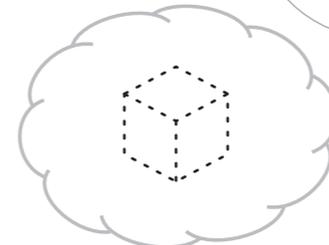
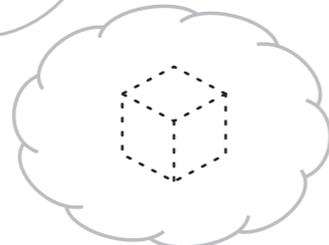
Do we seem to agree, that we agree?



my model of the correspondence
of your model of the subject
to my model of the subject
(Do we seem to agree?)



my model of your model
of the subject



my model of the subject

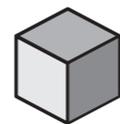
your model of the subject



me



you



subject

What's a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality—Interactions & Consequences
- Conservation—Shared Awareness

What's a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality—Interactions & Consequences
- Conservation—**Consciousness**

What comprises a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality—Interactions & Consequences
- Conservation—Consciousness

What comprises a Theory of Conversation?

- Complementarity—Descriptive & Prescriptive
- Duality—Interactions & Consequences
- Conservation—Consciousness

“Once begun, conversations never end.”

“Once begun, conversations never end.”

Any Questions?

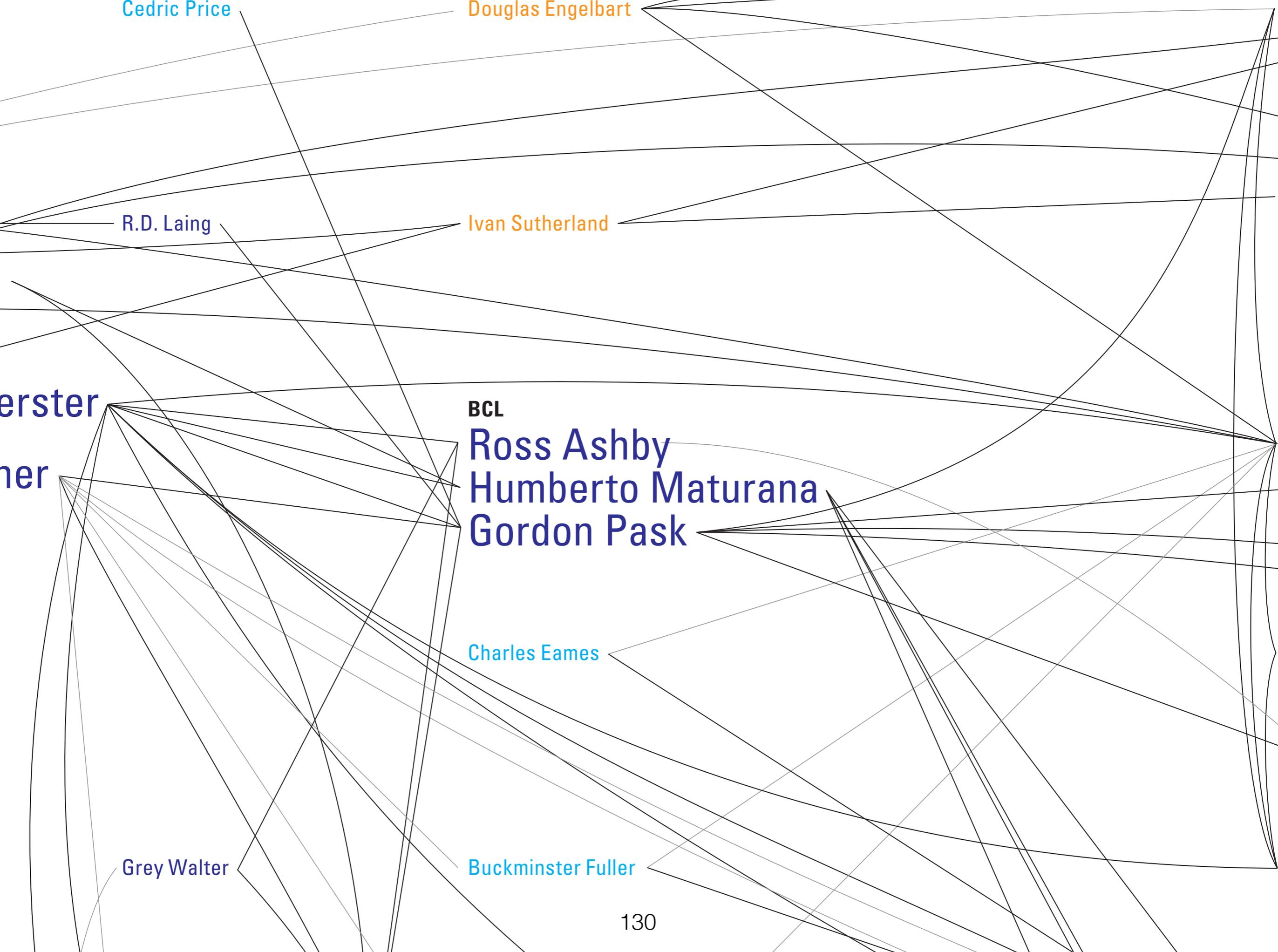
Conversation Theory
in an hour or so

ASC 2016 — Pangaro

What is Conversation? What is Theory?
What is Conversation Theory, anyhow?
How did it arise? Who participated? Where did it end up?
Is it interesting? How might it be useful?
Where has it been applied? Why should you care?
What does it offer the practice of education?
Of design? Of ethics?
Where is it headed? (Sorry, steering joke.)

Conversation Theory
instead of dinner

ASC 2016 — paulpangaro@pangaro.com



Cedric Price

Douglas Engelbart

R.D. Laing

Ivan Sutherland

erster

ner

BCL

Ross Ashby

Humberto Maturana

Gordon Pask

Charles Eames

Grey Walter

Buckminster Fuller

130

oh tics

computing,
esign

Macy Conferences

Gregory Bateson

J.C.R. Licklider

Warren McCulloch, Chair

Margaret Mead

Walter Pitts

Claude Shannon

Heinz von Foerster

John von Neumann

Norbert Wiener

Cedric Price

R.D. Laing

Grey Walter

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SRI, NLS

Douglas Engelbart

Ivan Sutherland

BCL

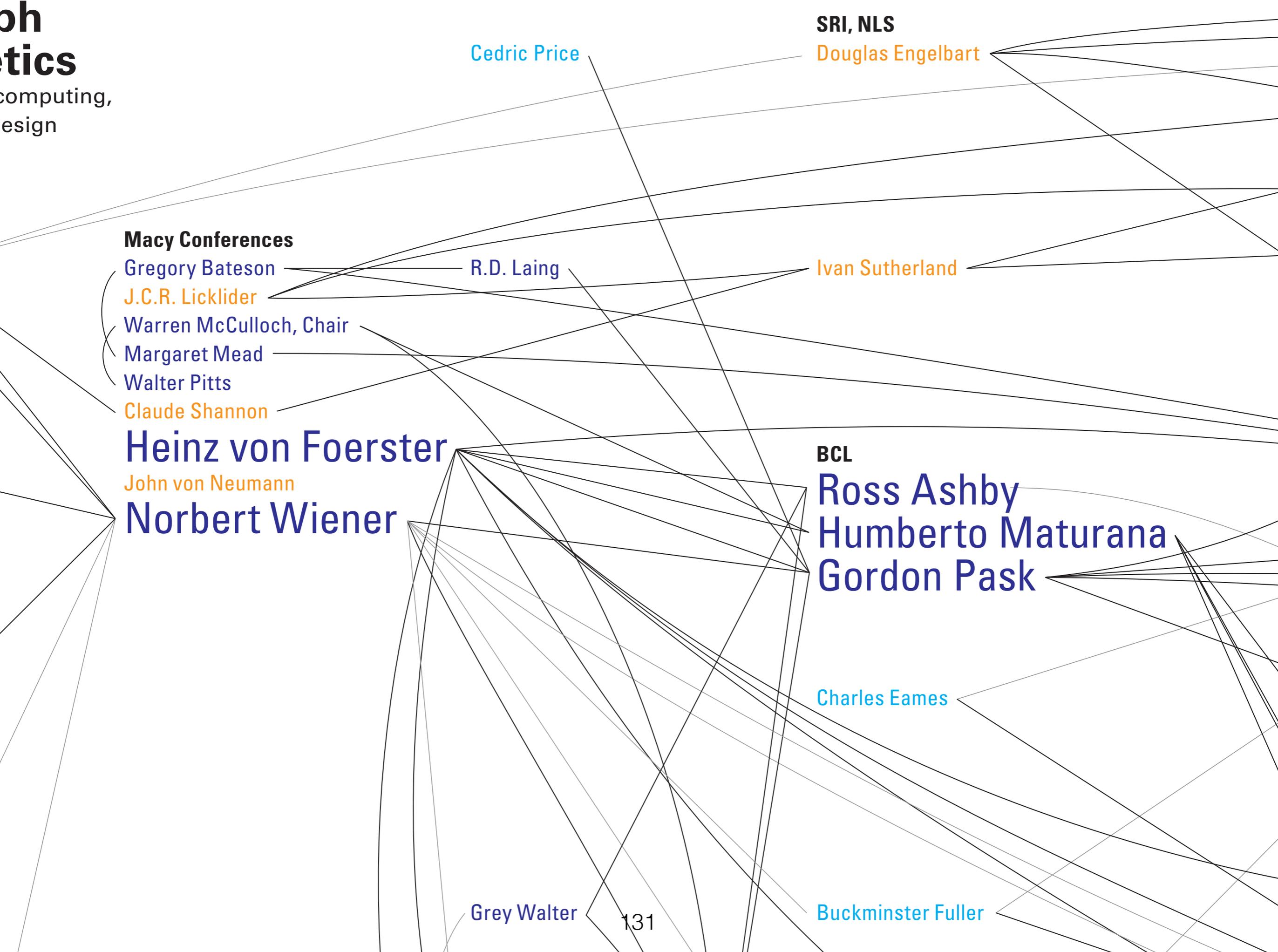
Ross Ashby

Humberto Maturana

Gordon Pask

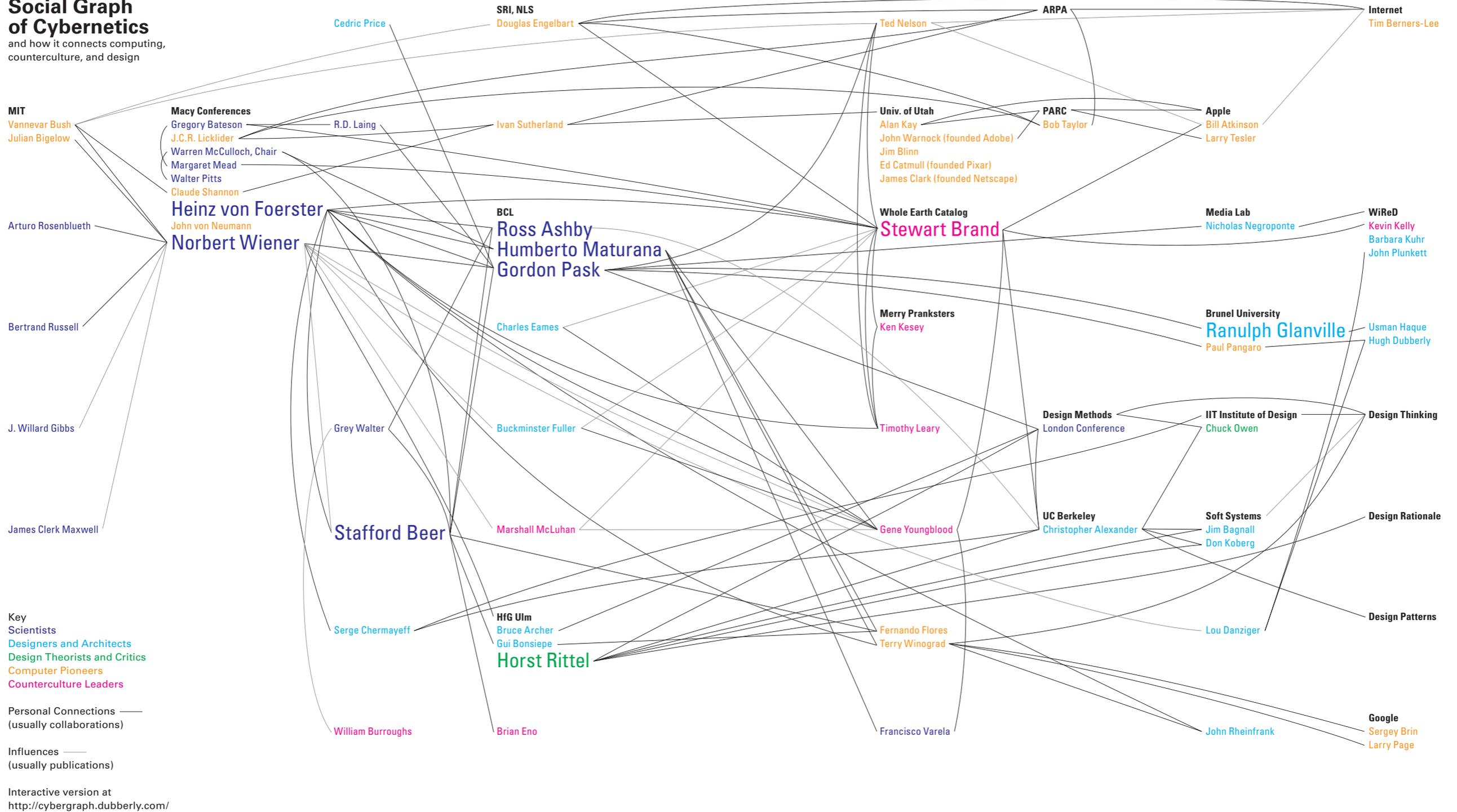
Charles Eames

Buckminster Fuller



Social Graph of Cybernetics

and how it connects computing, counterculture, and design



<http://www.dubberly.com/articles/cybernetics-and-counterculture.html>