

# **Twenty first century visions: Systems practice for managing complexity**

**International conference 15-  
17th July 2003, St Anne's  
College, Oxford**

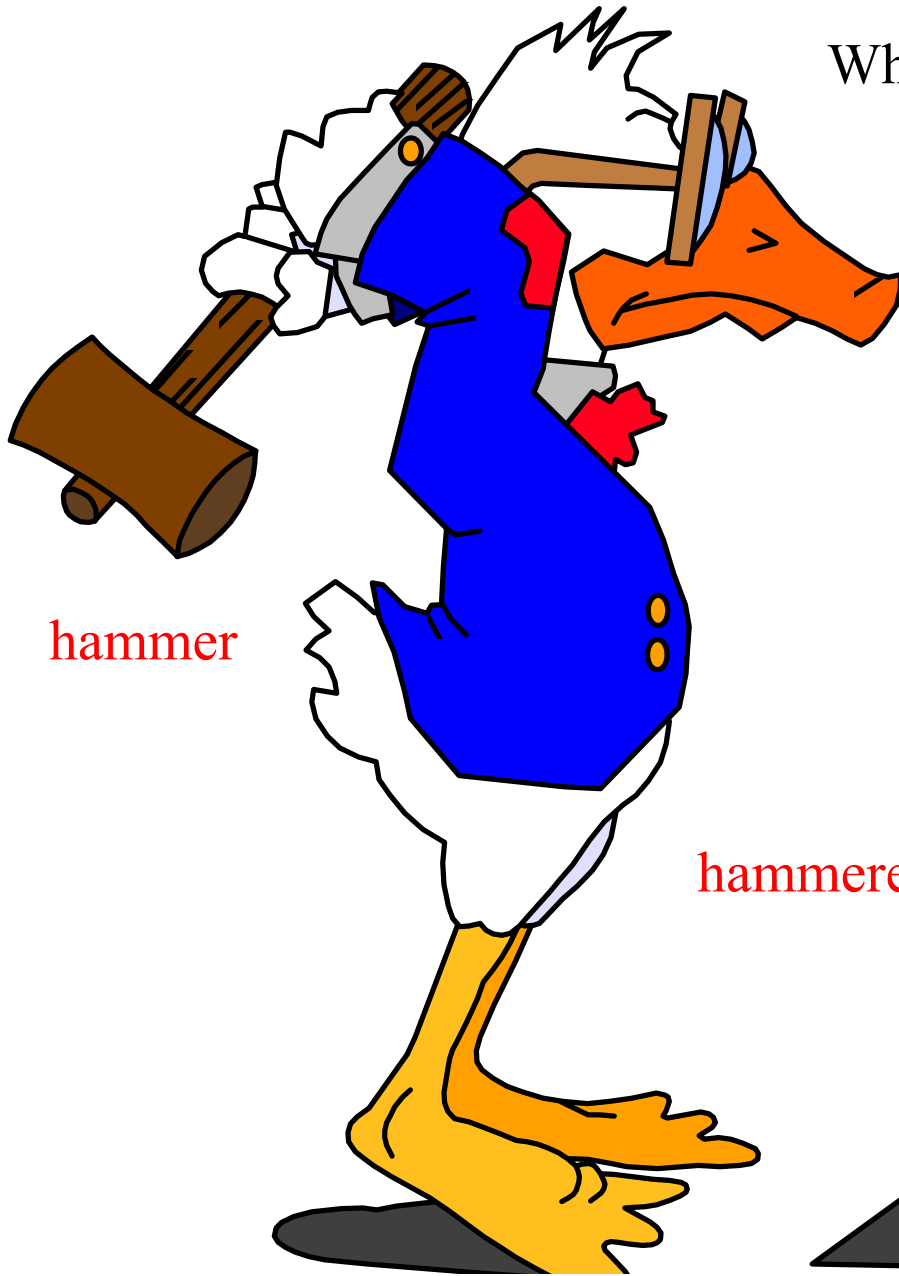
Day 1  
‘Introducing different Systems  
traditions’

*‘Systems tool kit’*

# ‘Buzz groups’

- Form a group of four with the person beside you and those immediately behind you
- Please introduce yourselves to each other;
  - perhaps discuss why you took up the offer of attending today

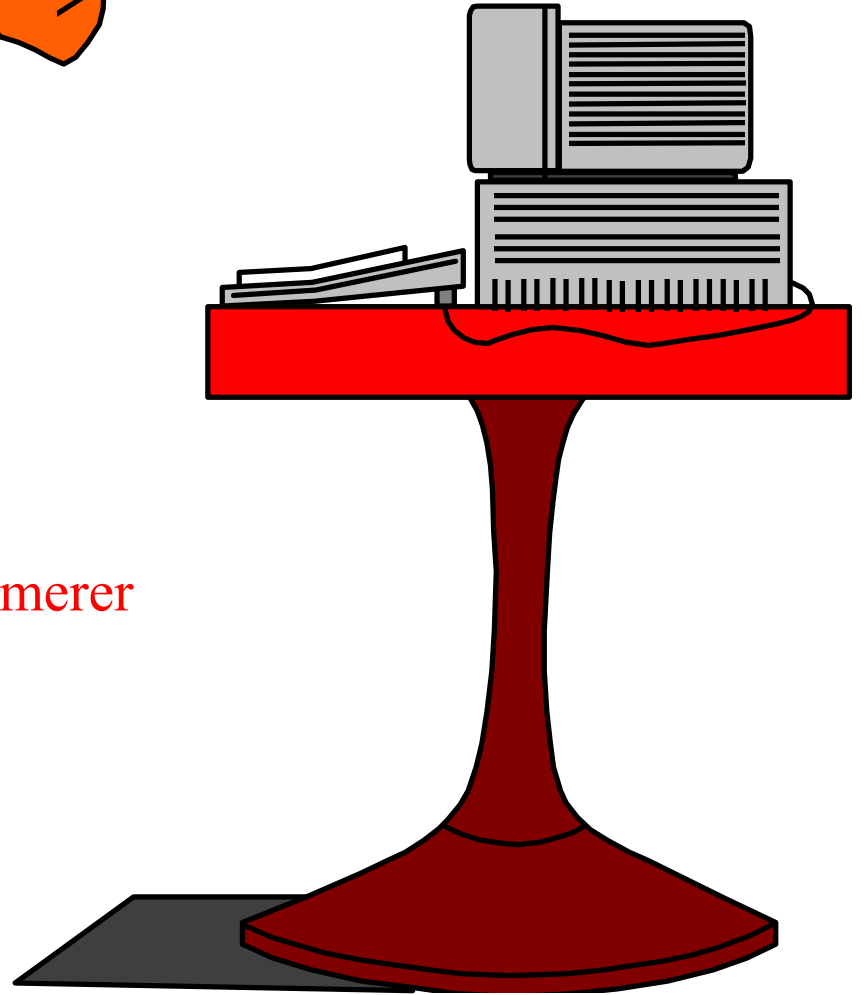
What's in a tool kit?



hammer

hammerer

hammered



# ‘Introducing different Systems traditions’

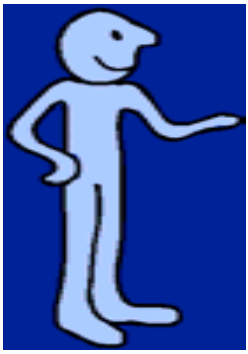
- Our aspiration for today’s event is for you to make connections, based on your own experiences, with the different traditions of understanding that together contribute to the field called systems thinking and practice
- Today is an introduction to the language and concepts of systems thinking as taken up in different ‘lineages’ of systems practice

# Traditions

- our models of understanding, grow out of traditions
- a tradition is a network of prejudices that provides possible answers and strategies for action.
- another way of defining tradition is as a network of pre-understandings
  - (because the word prejudices may be literally understood as a *pre-understanding*)
- traditions are not only ways to see and act but a way to conceal

# Traditions of understanding

- Traditions in a culture embed what has, over time, been judged to be useful practice.
- A risk is that a tradition can become a blind spot when it evolves into practice without critical reflection.
- The effects of blind spots can be observed at the level of
  - the individual, the group,
  - the organization, the nation or culture
  - the metaphors and discourses in which we are immersed (semantic pollution!)



Traditions: we  
are all part of a  
lineage.

What is  
conserved are  
different  
manners of  
living together



# Systems lineages

- Systems thinking and practice is not a unified field with a single set of theories and practices - it is diverse like all intellectual traditions and fields of professional practice
- Lineages:
  - General Systems Theory (GST)
  - Cybernetics
  - Practical holism
  - Interdisciplinary movements in the sciences

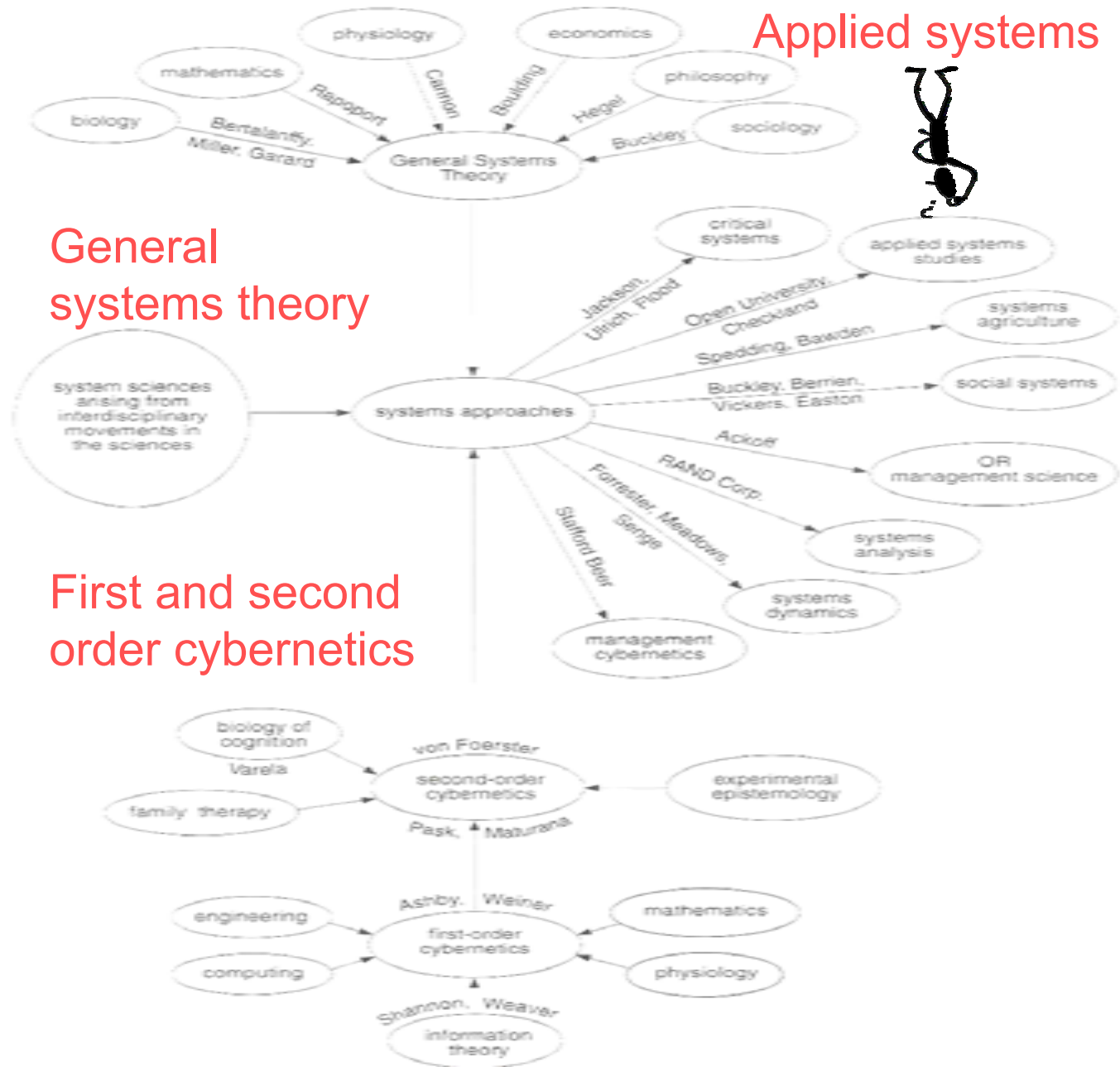
Applied systems



An influence model of different systems traditions which have shaped recent systems practice

General systems theory

First and second order cybernetics



# Systems concepts

**Table 1 Definitions of some generalized system concepts used in this course**

<b>Concept</b>	<b>Definition</b>
Boundary	The borders of the system, determined by the observer(s), which define where control action can be taken: a particular area of responsibility to achieve system purposes
Closed system	A system which is closed to inputs from its environment, e.g. a transistor radio is closed to energy. In practice such systems rarely exist, but many systems are treated as if they were closed
Communication	(i) First-order communication is based on simple feedback (as in a thermostat) but should not be confused with human communication, which has a biological basis  (ii) Second-order communication is understood from a theory of cognition which encompasses language, emotion, perception and behaviour. Amongst human beings this gives rise to new properties in the communicating partners who each have different experiential histories
Connectivity	Logical dependence between components or elements (including sub-systems) within a system

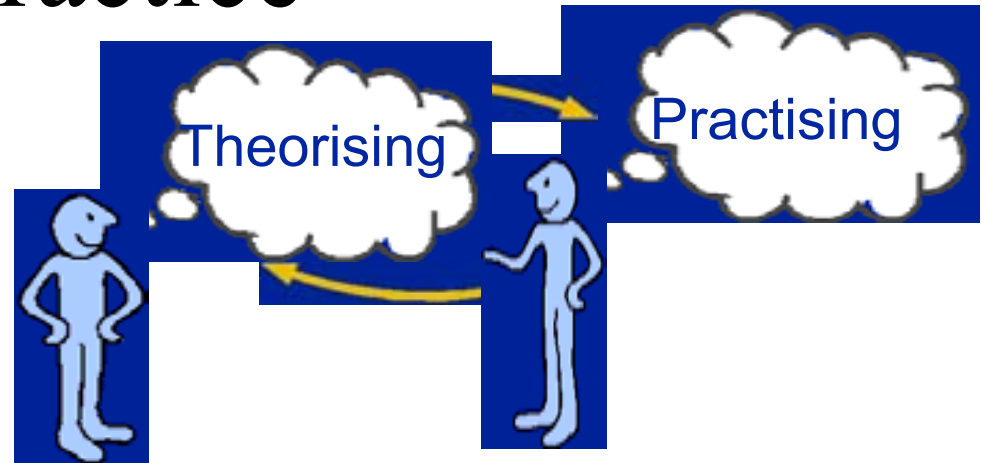
# Introducing different Systems traditions

- Workshop options include:
  - • An introduction to Soft Systems methodology
  - • The Open University approach to Systems
  - • The Natural Step – a systems approach to managing sustainability
  - • Tools for Information Systems Development
  - • Viable systems
  - • Critical Systems Approaches

# For systems practice - how do you understand the theory/practice relationship?

- There is nothing as practical as a good theory (Kurt Lewin);
- Human agency has been lost by centuries of oppressive theorising (Klaus Krippendorf)
- Maynard Keynes remarked that when he talked to business men who claimed to be practical people uncontaminated by theory, they always turned out to be the prisoners of some defunct theorist of 30 years ago.

# Systems thinking/systems practice

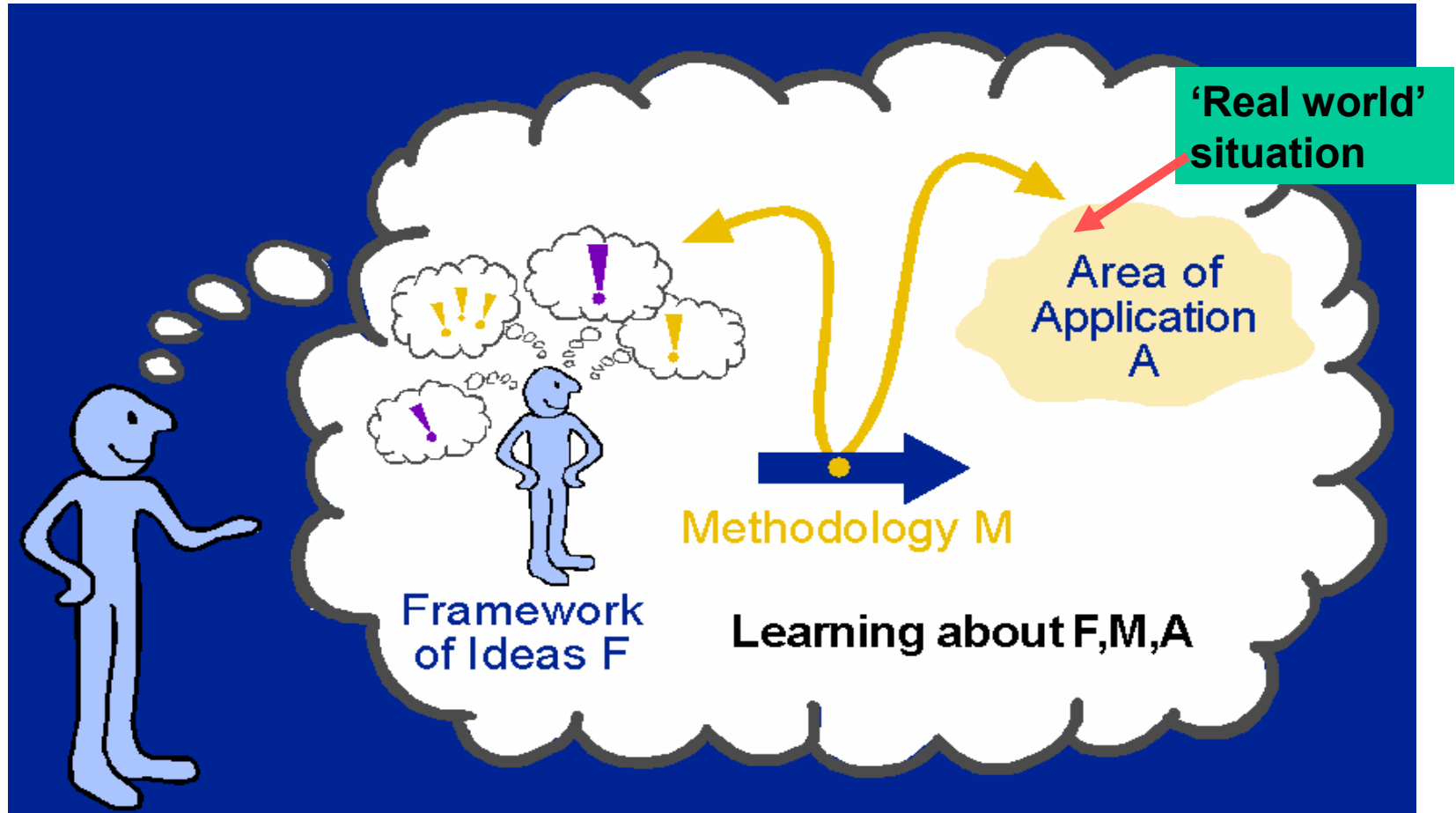


- *'theory and practice'*
  - the move from nouns to verbs - to practising

# ‘Buzz groups’

- Using the metaphor of the hammer shown earlier, discuss your purpose in attending today
  - do you want a new hammer?
  - are you interested in hammering more effectively?
  - or is there something that you want hammered?

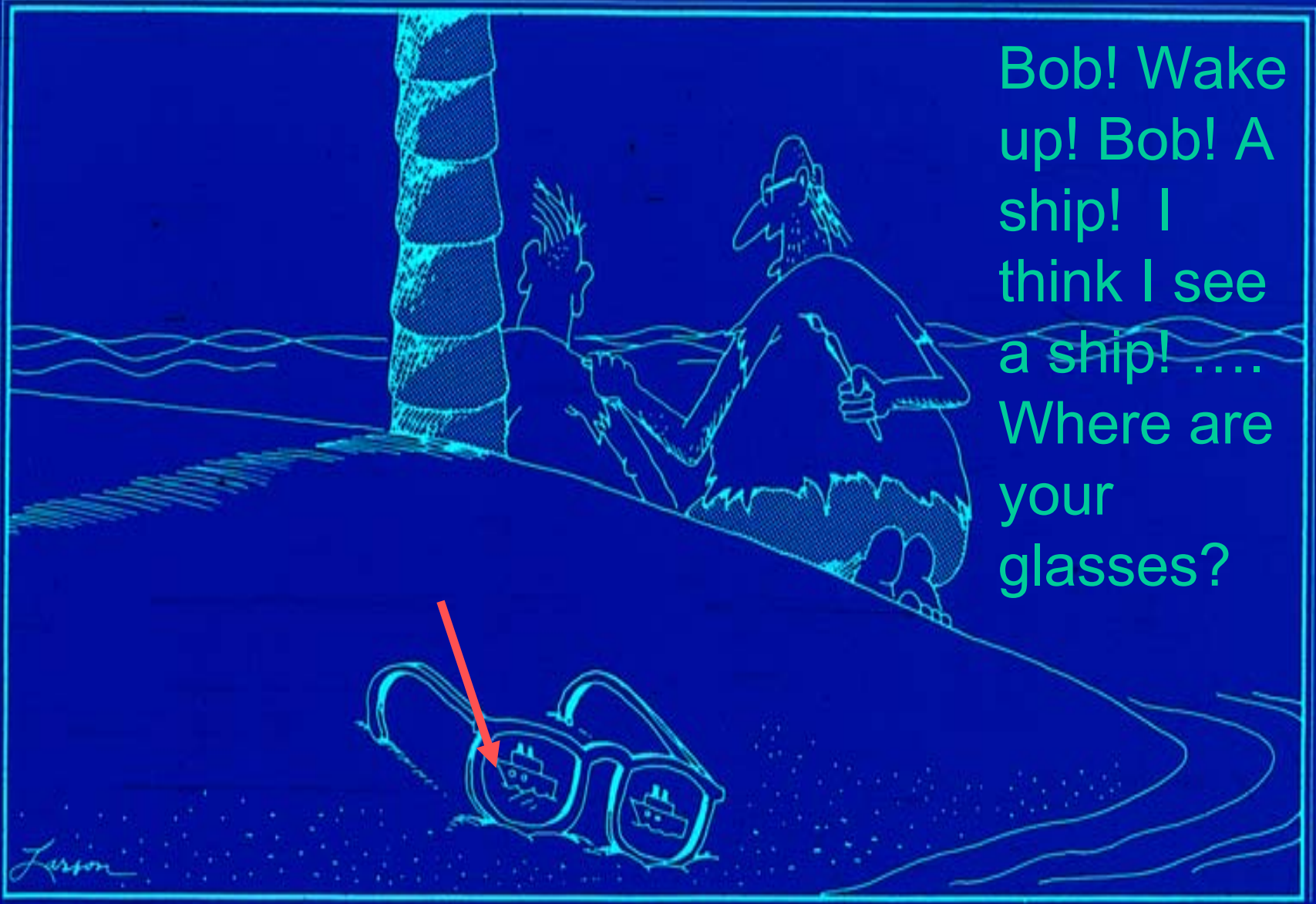
# The elements of practicing (managing and researching )



# Some systems concepts that contribute to a systemic (theoretical) ‘framework of ideas’

- **Perspective**
- System, systemic, systematic, system-of-interest;
- purpose - purposeful; purposive
- Boundary, boundary judgements;
- Emergence
- Hierarchy, layered structure, network
- Feedback - +ve and -ve feedback
- Control
- Communication





Bob! Wake up! Bob! A ship! I think I see a ship! .... Where are your glasses?

Larson

"Bob! Wake up! Bob! A ship! I think I see a ship! ... Where are your glasses?"

# Perspectives

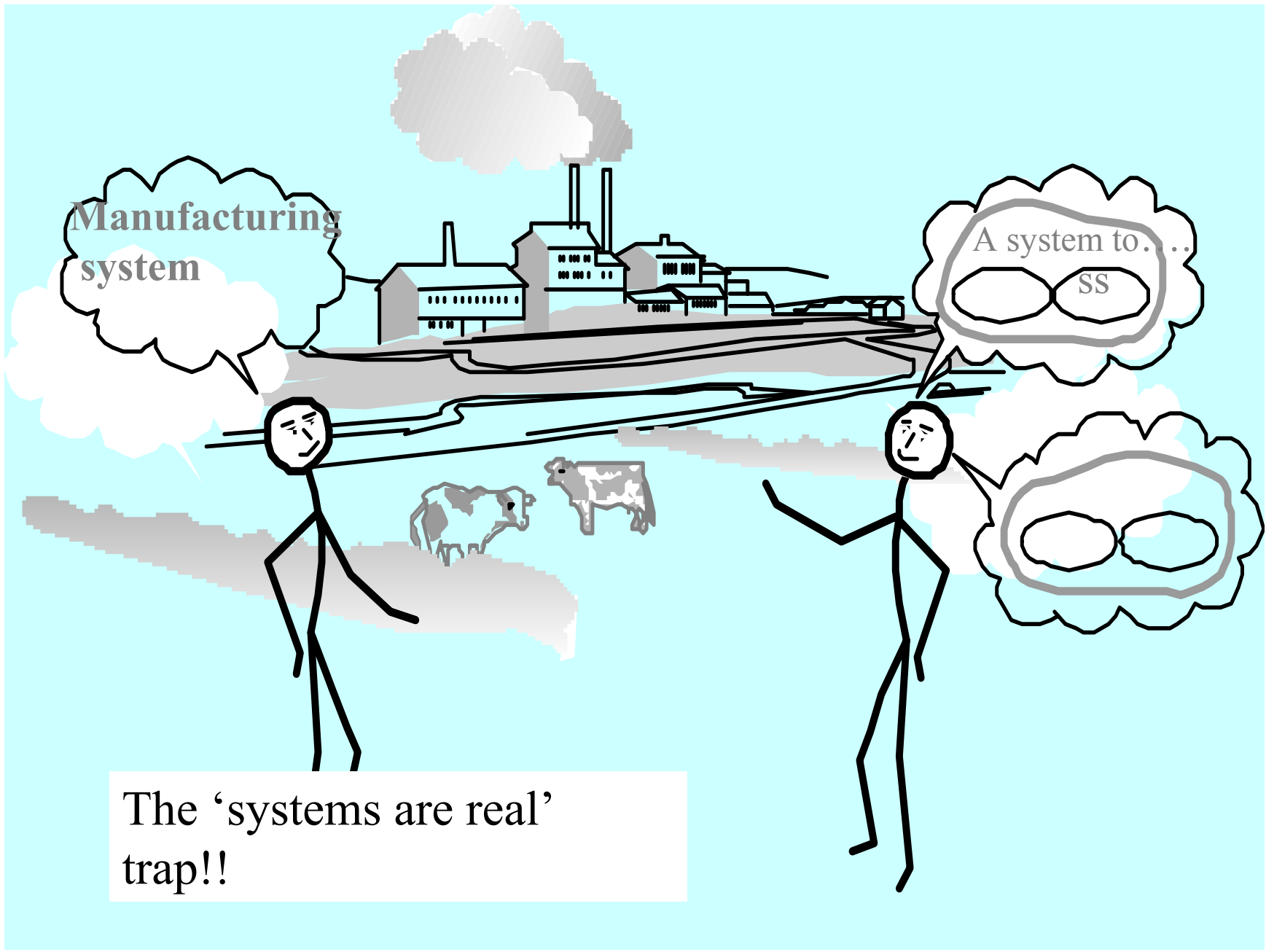
- A way of experiencing which is shaped by our personal and social histories where experiencing is a cognitive act
- Who experienced an old woman and who experienced a young woman?
- The metaphor of the “ship on the glasses”

# Some initial claims:

- Experience is something that we distinguish as happening to us - the act of making a distinction
- Everything said/done is said/done by someone
- My world is different to your world and this must always be so.... all we share is our ability to communicate about our worlds

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Manufacturing system

A system to...  
SS

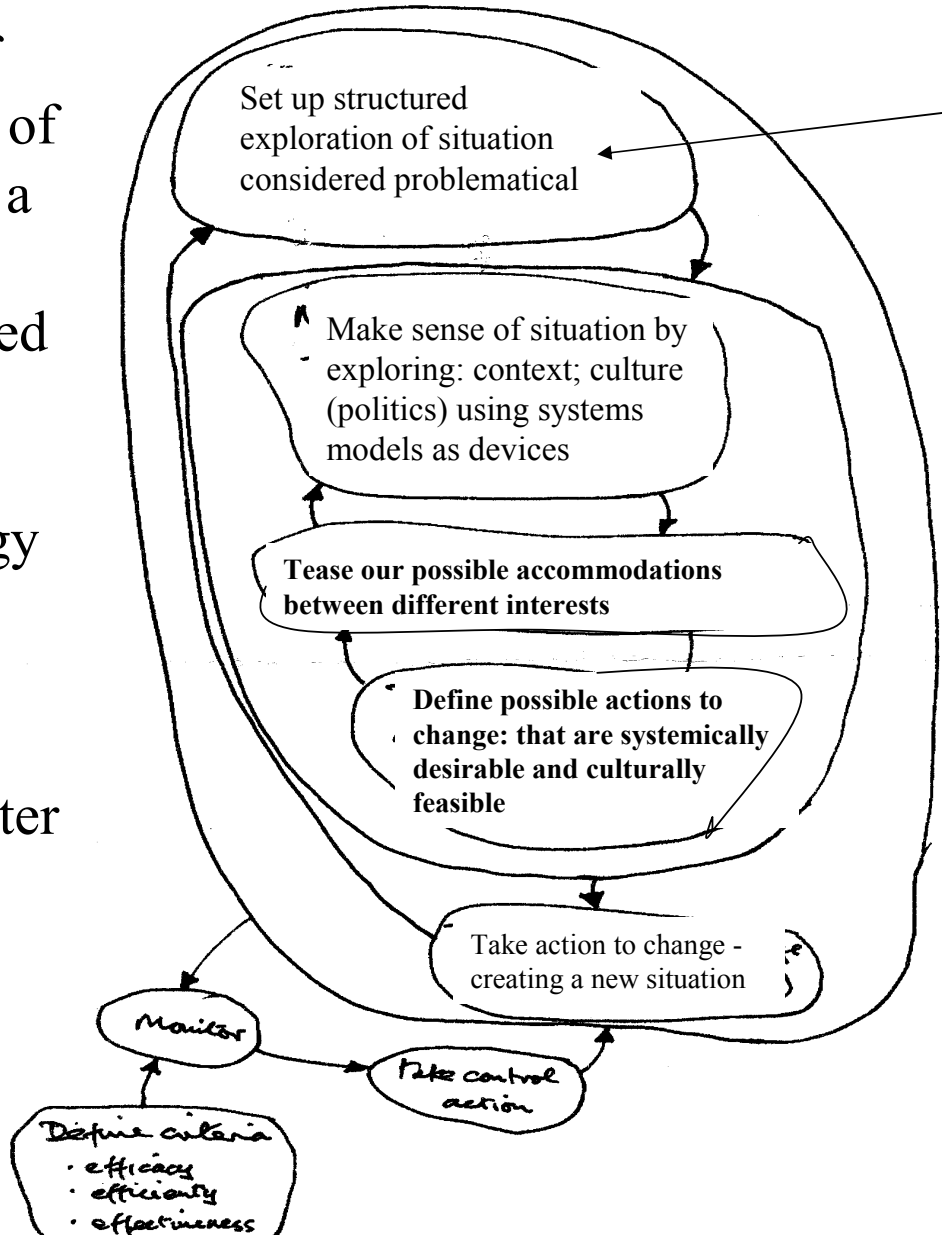
The 'systems are real' trap!!

# The ‘systems are real’ trap!!

- This issue has bedevilled the different lineages of systems practice!!
- What is at stake?
  - The education system; the transport system - the trap of the everyday use of the word ‘system’
  - If you take the position that ‘systems’ are ‘real’ then this leads to practices such as describing, discovering, simulating them - often accompanied by the belief that the map that is generated is the same as the territory
  - An alternative form of practice that sees ‘systems’ as being formulated by those with some interest in a situation experienced as problematic or holding some opportunity

A model of the process of conducting a **systemic** inquiry based on the soft systems methodology (SSM).

Source: Peter Checkland



Activity modelling based on verbs

# Systemic and systematic

- Capra (1996) claims systems thinking is 'contextual' thinking; and since explaining things in terms of their context means explaining them in terms of their environment, we can also say that all systems thinking is environmental thinking.
- Systemic thinking may be contrasted with systematic thinking which is linear, step-by-step thinking

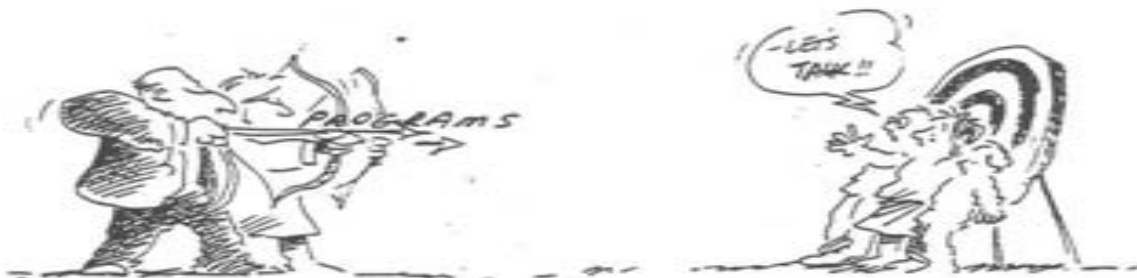
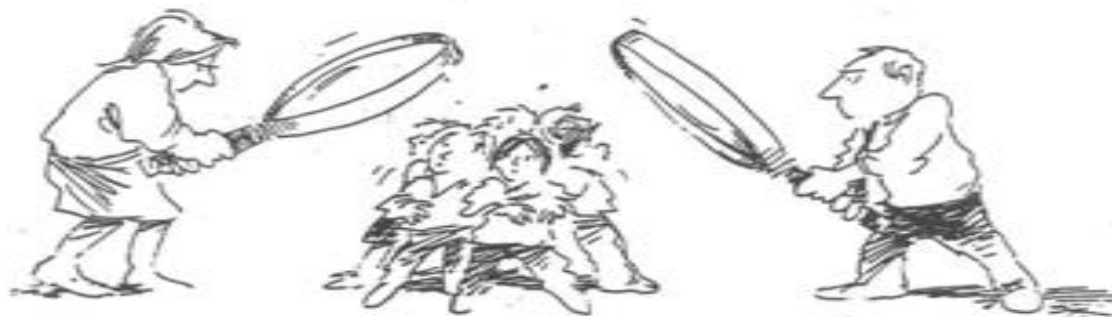
# Systemic ----- Systematic

- Properties of the whole differ (they are said to emerge) from their parts; e.g. the wetness of water cannot be understood in terms of hydrogen and oxygen
- The whole can be understood by considering just the parts through linear cause–effect mechanisms

# Systemic ----- Systematic

- Boundaries of 'systems' are determined by the perspectives of those who participate in formulating them. The result is a 'system of interest'
- 'Systems' exist as concrete entities; there is a correspondence between the description and the described phenomenon

INSTITUTIONS - HAVE TENDED TO  
TAKE THIS APPROACH -----



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# Attributing purpose

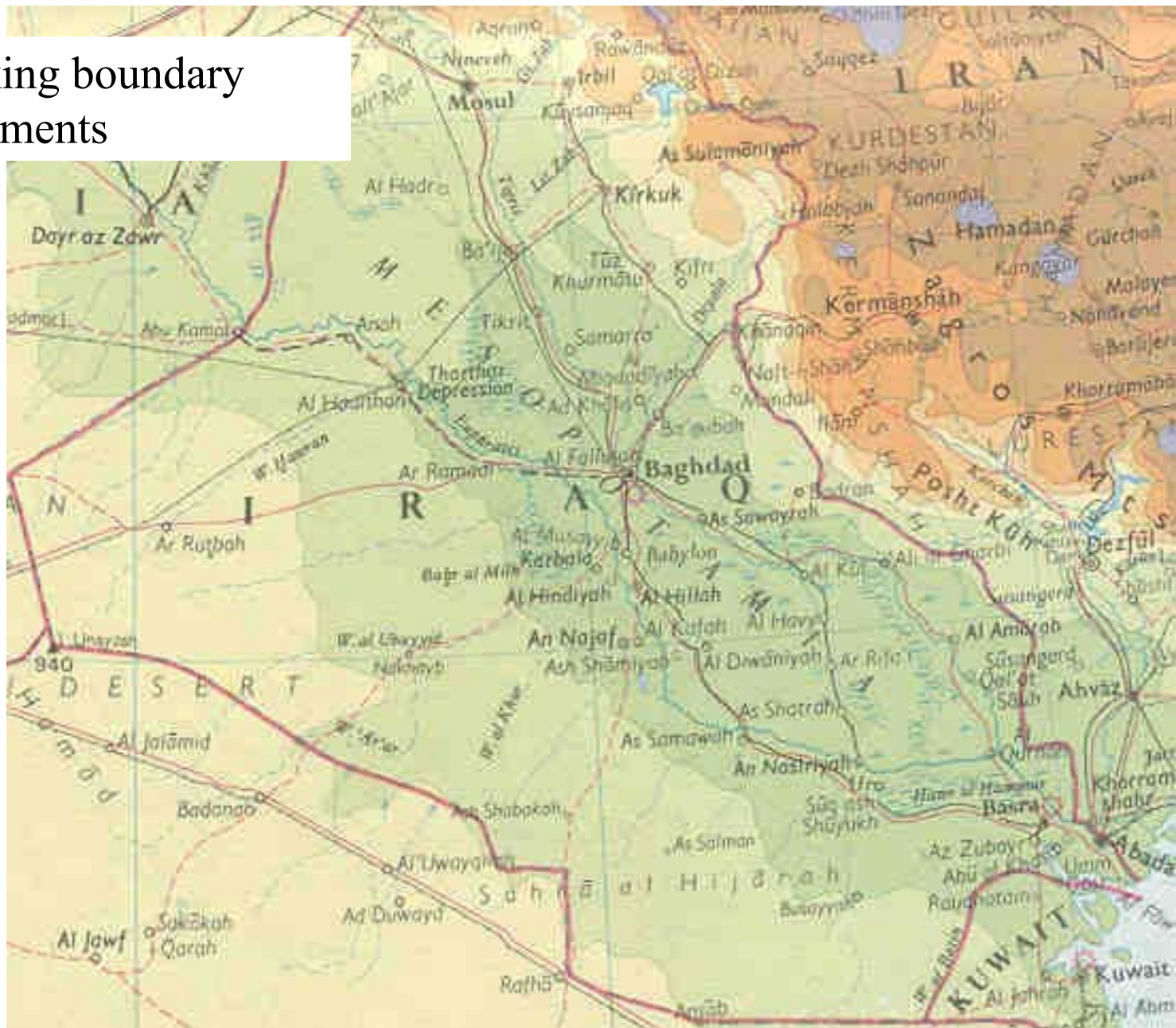


‘They are making a living’ - when another attributes purpose it is called purposive

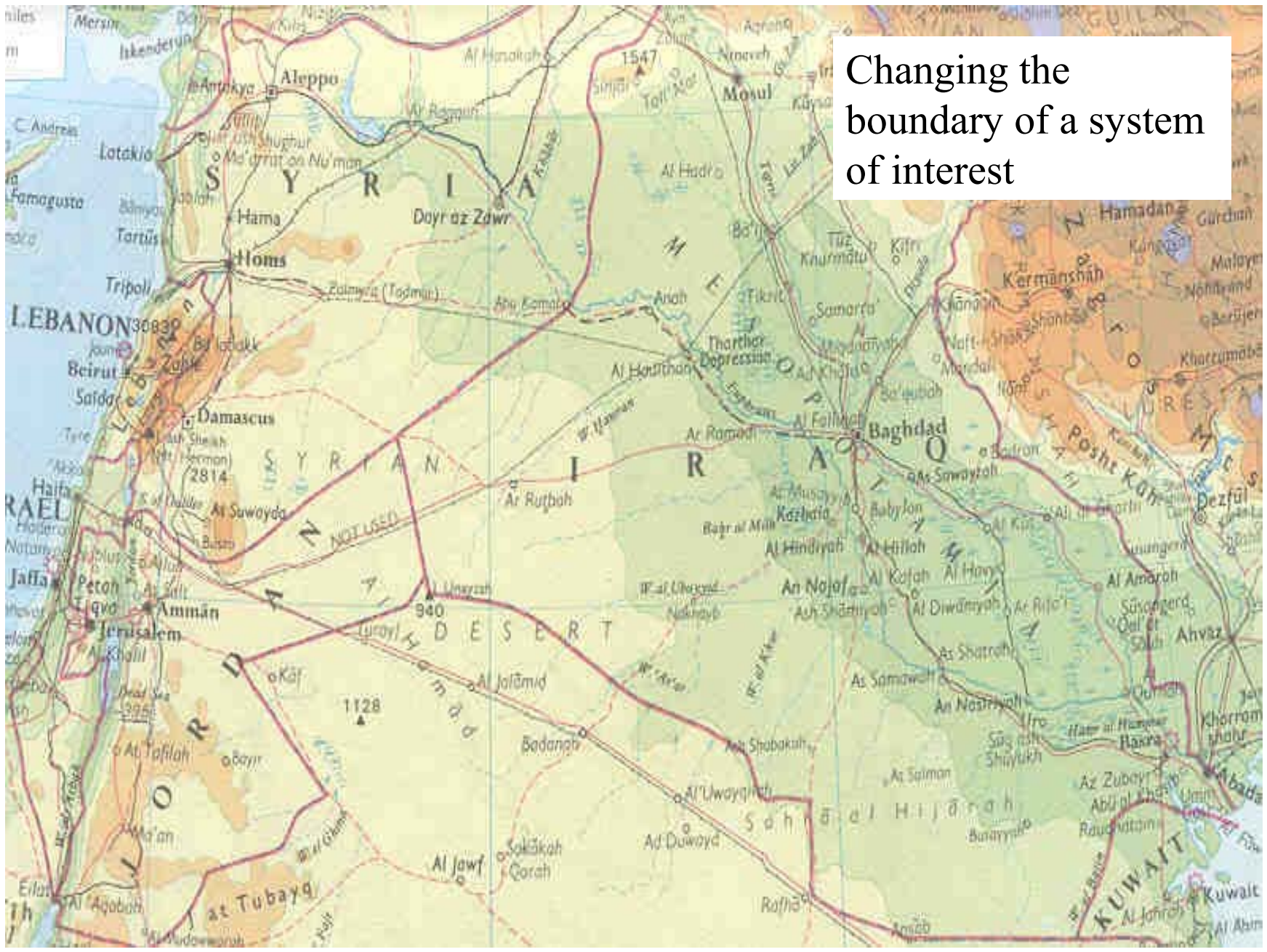
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# Making boundary judgments



Changing the boundary of a system of interest

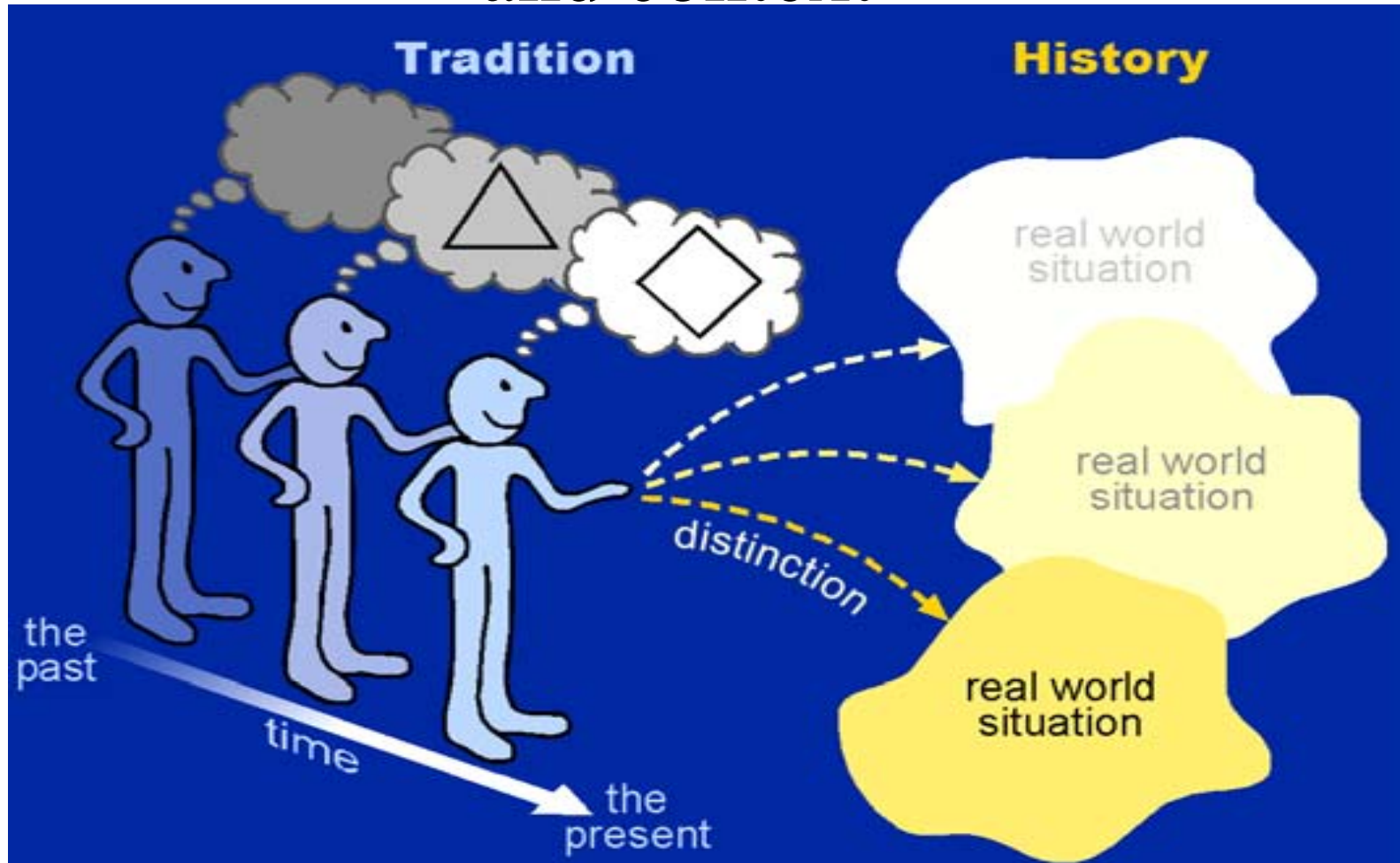


The Berlin to Bagdad railway



In 1889 the German Kaiser visited Constantinople and declared he had taken all Moslems under his protection

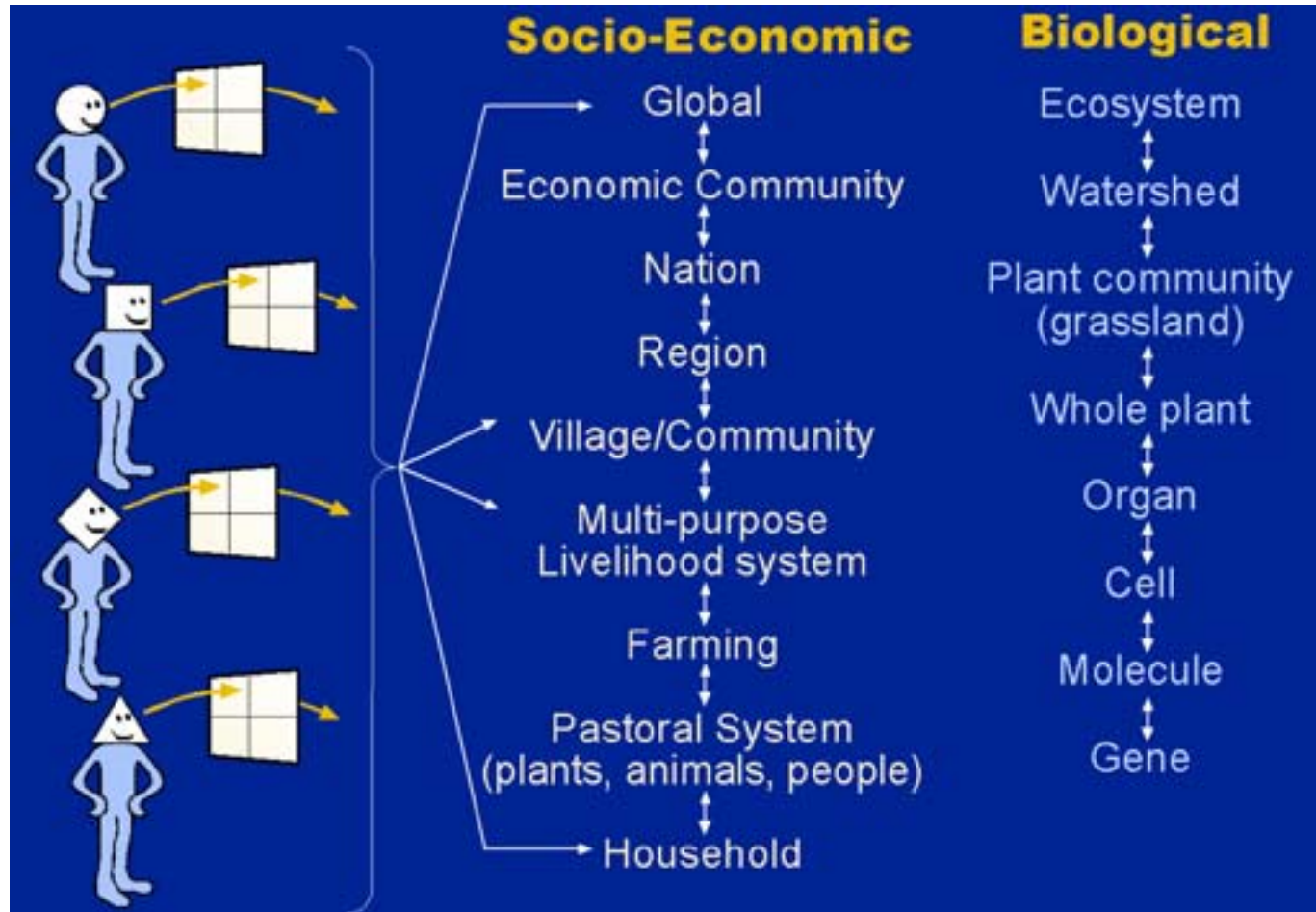
# Systems practice involves understanding the history of the practitioner (tradition) and context



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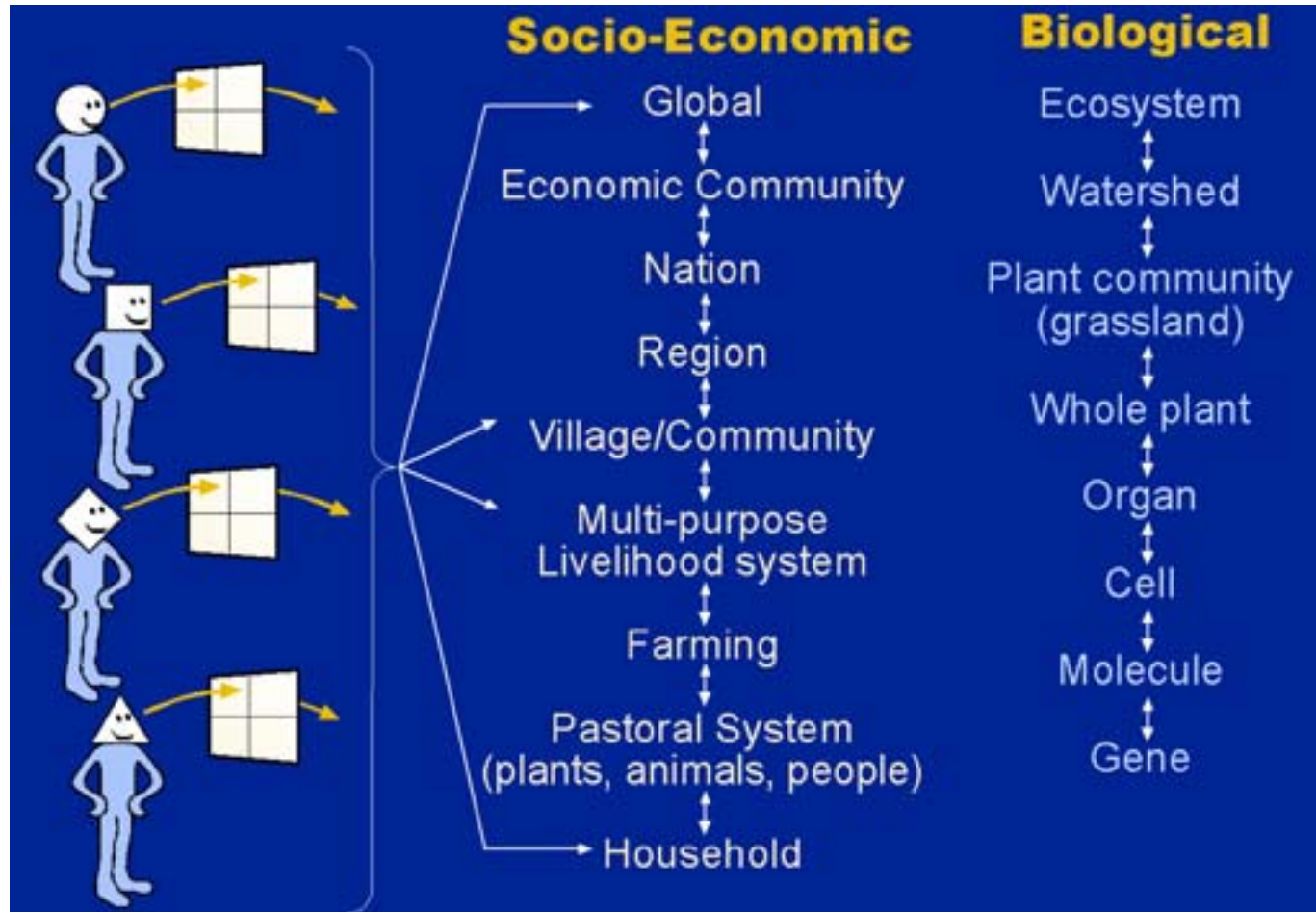
# Levels of organisation



# Levels of organisation: hierarchy, layered structure

- E.g. the debate on GMOs
  - within the category GMOs I distinguish two different systems - '*a system of within-species gene manipulation*' e.g. traditional plant breeding
  - '*a system to introduce novel, alien genes into an organism*' - transgenics

# Levels of organisation



# Some systems concepts that contribute to a systemic (theoretical) ‘framework of ideas’

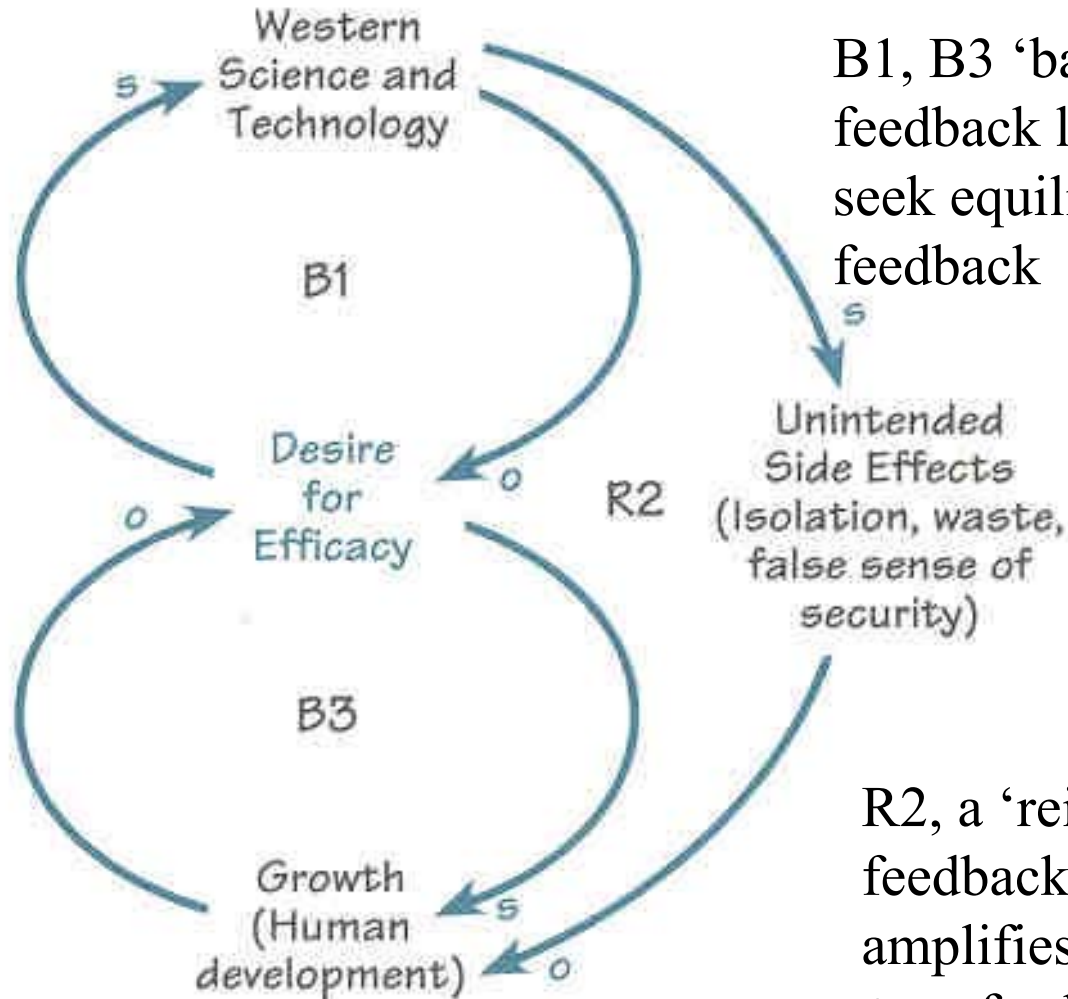
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# Systemic ----- Systematic

- Systems are characterized by feedback which may be negative (compensatory or balancing) or positive (exaggerating or reinforcing)
- Analysis is linear
  - e.g. a causes b

# RELIANCE ON SCIENCE AND TECHNOLOGY

S, a change in one variable causes a change in another variable in the same direction



B1, B3 'balancing' feedback loops that seek equilibrium = - ve feedback

R2, a 'reinforcing' feedback loop that amplifies change = + ve feedback

Source: P. Senge (2002)

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- **Communication**

Nick Davies looks at the government's attempt to deal with the most prolific of offenders - the drug users who commit an estimated 7.5 million crimes a year.

- Richard Elliott couldn't stand it any more. For nearly two years, he had been acting as the government's drugs envoy in Bristol, running the city's drugs action team, handling millions of pounds a year, linking together police, health and social workers and voluntary agencies into one big drive against drugs, but earlier this year he realised he couldn't stand it any more, so he quit.
- This is the story of a fiasco at the heart of the criminal justice system. This is not for want of money; the national treatment budget has risen from £234m in 2000/01 to £440m this year (2003/4). It is not for want of effort by those on the ground. And it is certainly not for want of political will.

# The UK's culture of 'control'

- Elliott knew his work was being swallowed by a monster. By virtue of their *endless monitoring*, Whitehall knew that the same thing was happening across the country. But the outside world knew next to nothing about it. Like a sci-fi alien, the bureaucracy mutated and reproduced itself in the shape of an effective organisation. Simply, in among all the numbers that it collects so obsessively, it has chosen to *measure its performance* with a number which is fundamentally misleading. This is a result not so much of conspiracy as of sheer Whitehall bloody-mindedness.

# The UK's culture of 'control'

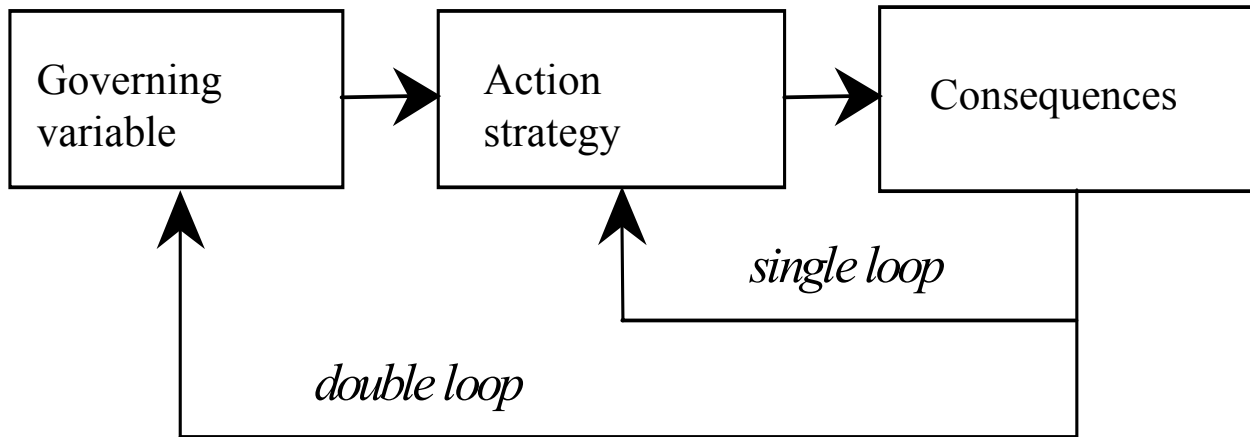
- The reality is that, after five years of effort and with a budget now topping £400m a year, despite relentlessly hard work from some 5,000 dedicated people on the ground, there is an alarming shortage of effective treatment and no sign of a reduction in demand for drugs.
- Richard Elliott describes an organisation which is being managed to death, where *centralised direction* has mutated into systematic suffocation.

# The UK's culture of 'control'

- Elliott's explanation is simple: "They [Whitehall] don't know very much about drugs, but they do know about management and monitoring and data collection. So that's what they do."

# The problem is twofold.

- First, the whole treatment project is built on a foundation which is distorted by the ideology of prohibition, with the result that the most effective forms of treatment remain strictly rationed.
- The second part of the problem is the running theme which colours every aspect of contemporary criminal justice in Britain - that the project is being grossly mismanaged from the centre. *The government is so determined to control every aspect of the delivery of policy that the control itself becomes the object of the project, disrupting and obstructing, delaying and destroying.*



**Figure 2. A model of double loop learning, based on Anderson (1997).**

Single and double loop forms of ‘control’

# What happens in human communication & teams?

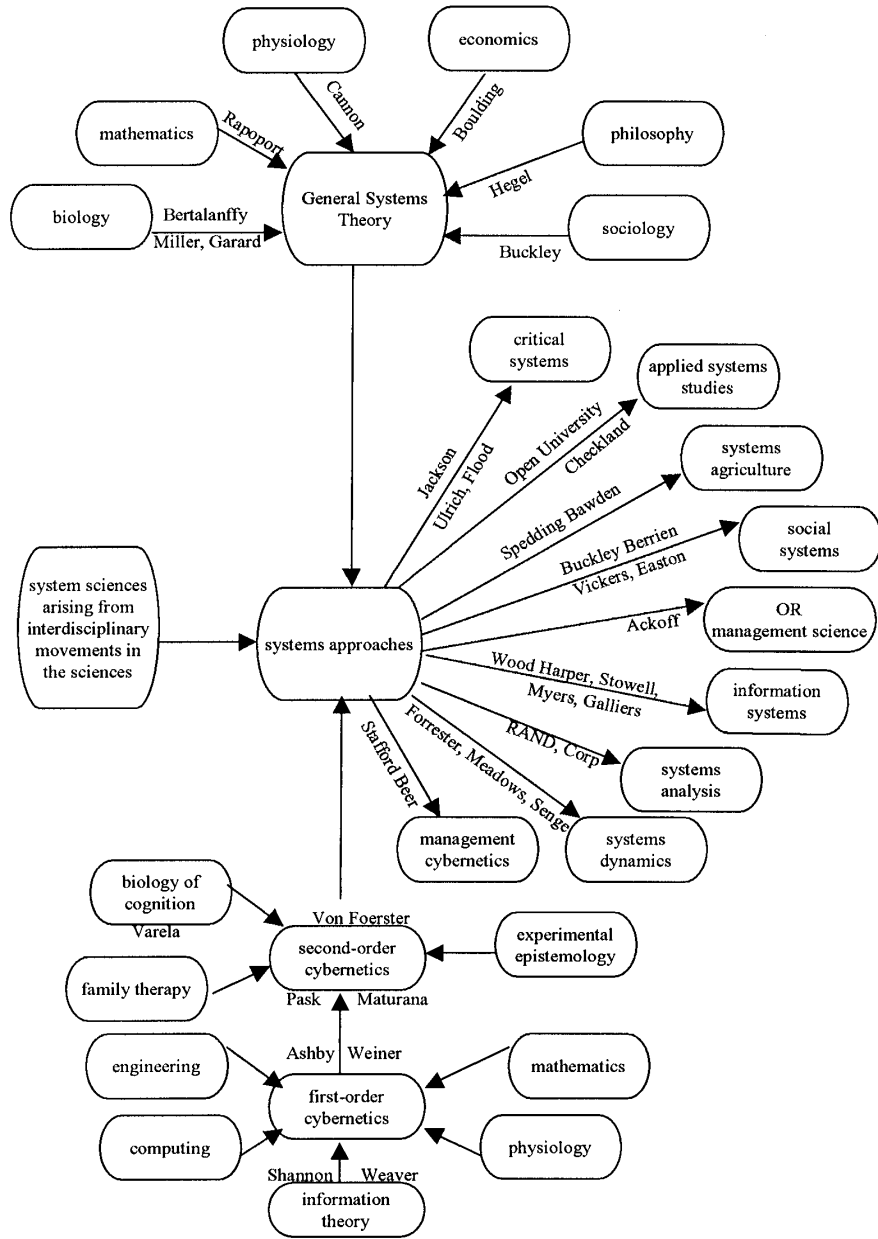


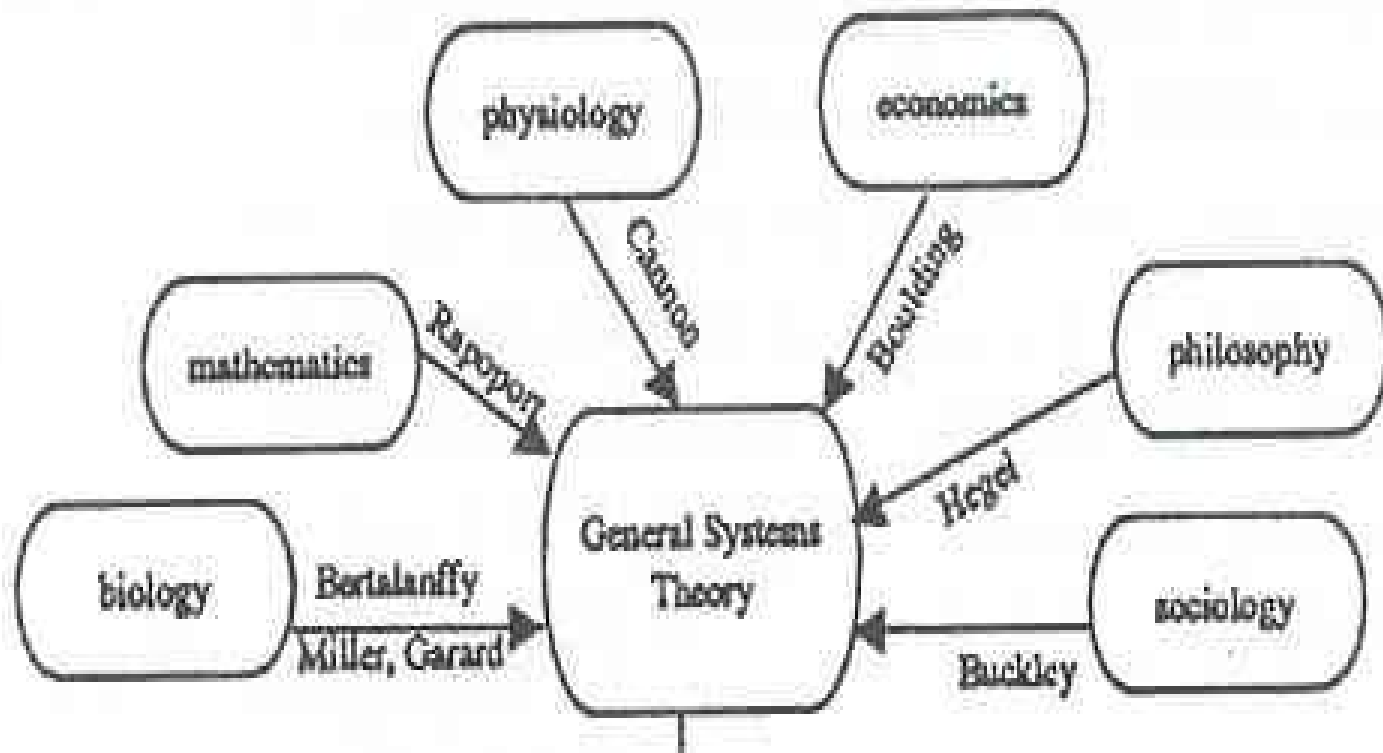
A OR B?



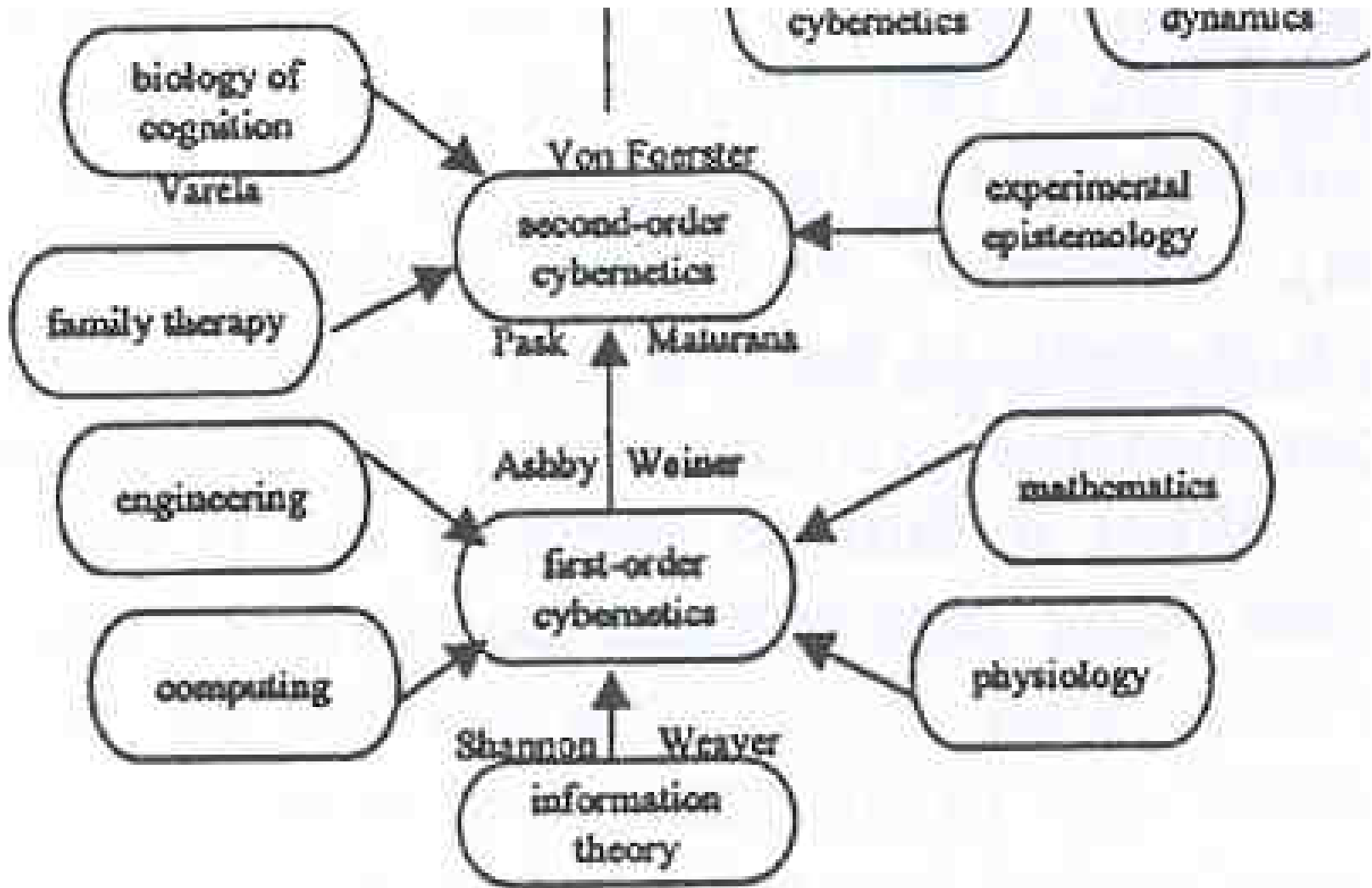
# *‘information now flows around’*

- The *container* metaphor
- The *conduit* metaphor
- The *control* metaphor
- The *transmission* metaphor
- The *war* metaphor
- The *dance-ritual* metaphor
- Be aware of the entailments of each!

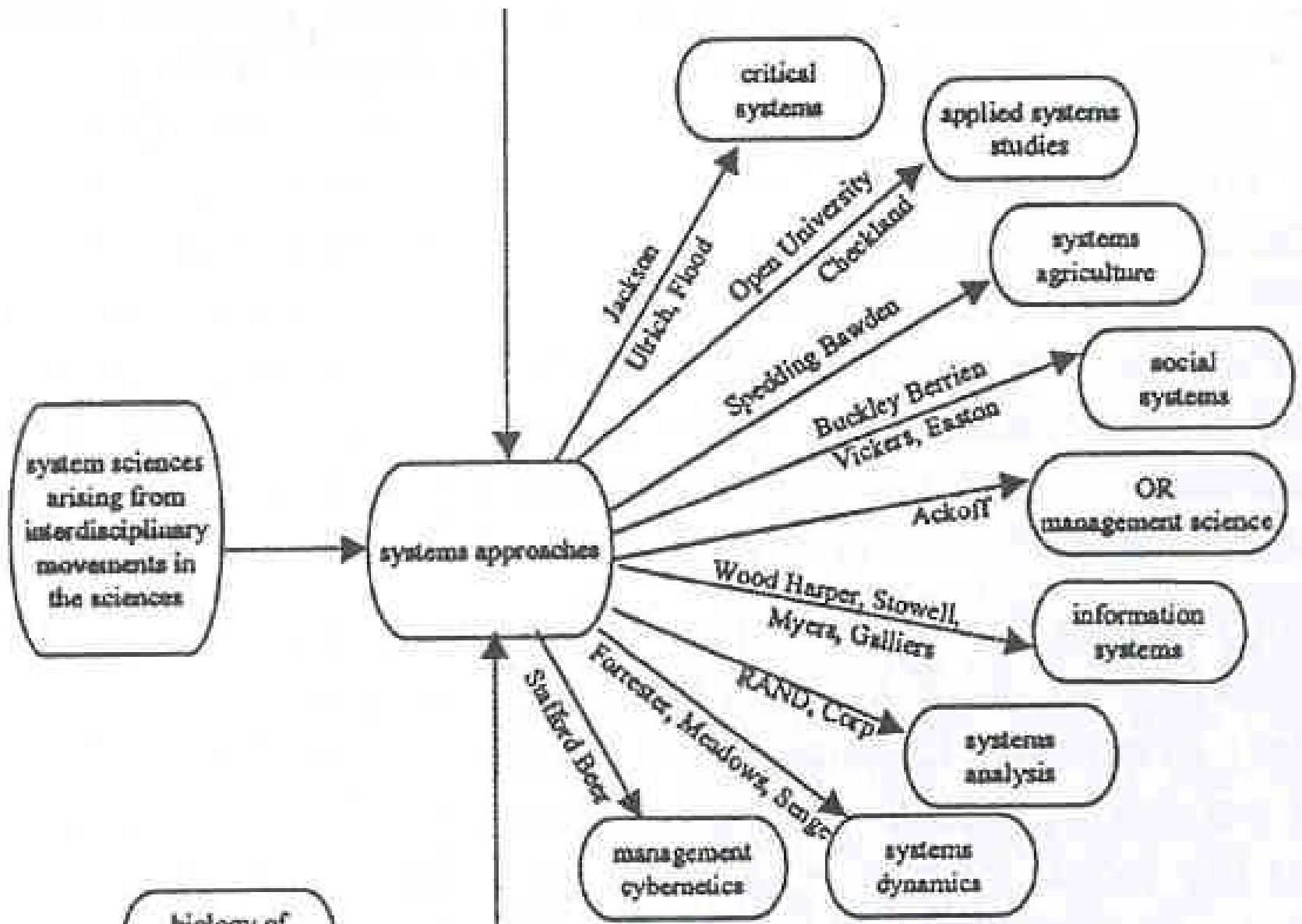




Organismic biologists - concerned about reductionism



Cybernetics - from the Greek meaning steersman or helmsman



history of

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