Interdisciplinarity's Future: threatened because it is important?

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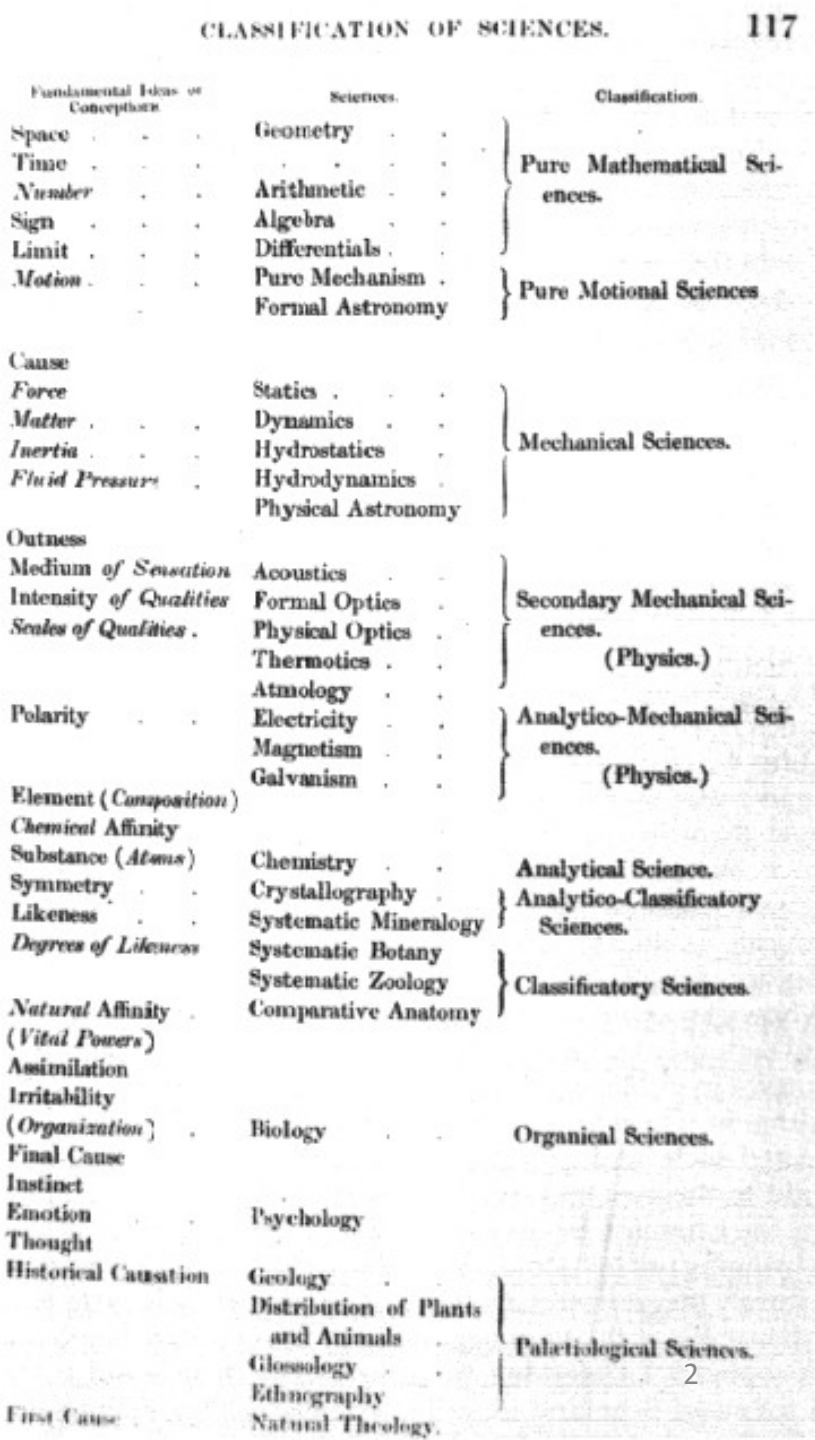
Increasing specialization in modern science



Fundamental Ideas or Conceptions	Sciences.	Classification.
Space	Geometry	Pure Mathematical Sciences.
Time		
Number	Arithmetic	
Sign	Algebra	
Limit	Differentials	
Motion	Pure Mechanism	Pure Motional Sciences
	Formal Astronomy	
Cause		
Force	Statics	Mechanical Sciences.
Matter	Dynamics	
Inertia	Hydrostatics	
Fluid Pressure	Hydrodynamics	
	Physical Astronomy	
Outness		
Medium *of Sensation*	Acoustics	Secondary Mechanical Sciences. (Physics.)
Intensity *of Qualities*	Formal Optics	
Scales of Qualities	Physical Optics	
	Thermotics	
	Atmology	
Polarity	Electricity	Analytico-Mechanical Sciences. (Physics.)
	Magnetism	
	Galvanism	
Element (*Composition*)		
Chemical Affinity		
Substance (*Atoms*)	Chemistry	Analytical Science.
Symmetry	Crystallography	Analytico-Classificatory Sciences.
Likeness	Systematic Mineralogy	
Degrees of Likeness	Systematic Botany	Classificatory Sciences.
	Systematic Zoology	
Natural Affinity	Comparative Anatomy	
(*Vital Powers*)		
Assimilation		
Irritability		
(*Organization*)	Biology	Organical Sciences.
Final Cause		
Instinct		
Emotion	Psychology	
Thought		
Historical Causation	Geology	Palætiological Sciences.
	Distribution of Plants and Animals	
	Glossology	
	Ethnography	
First Cause	Natural Theology.	

Why inter-disciplinarity?

Karl Popper: *"We are not students of some subject matter, but students of problems. And problems may cut right across the boundaries of any subject matter or discipline."*

*(*Conjectures and Refutations, Karl Popper, 1963, p. 67)

Increasing complexity of problems - and of our insights and models

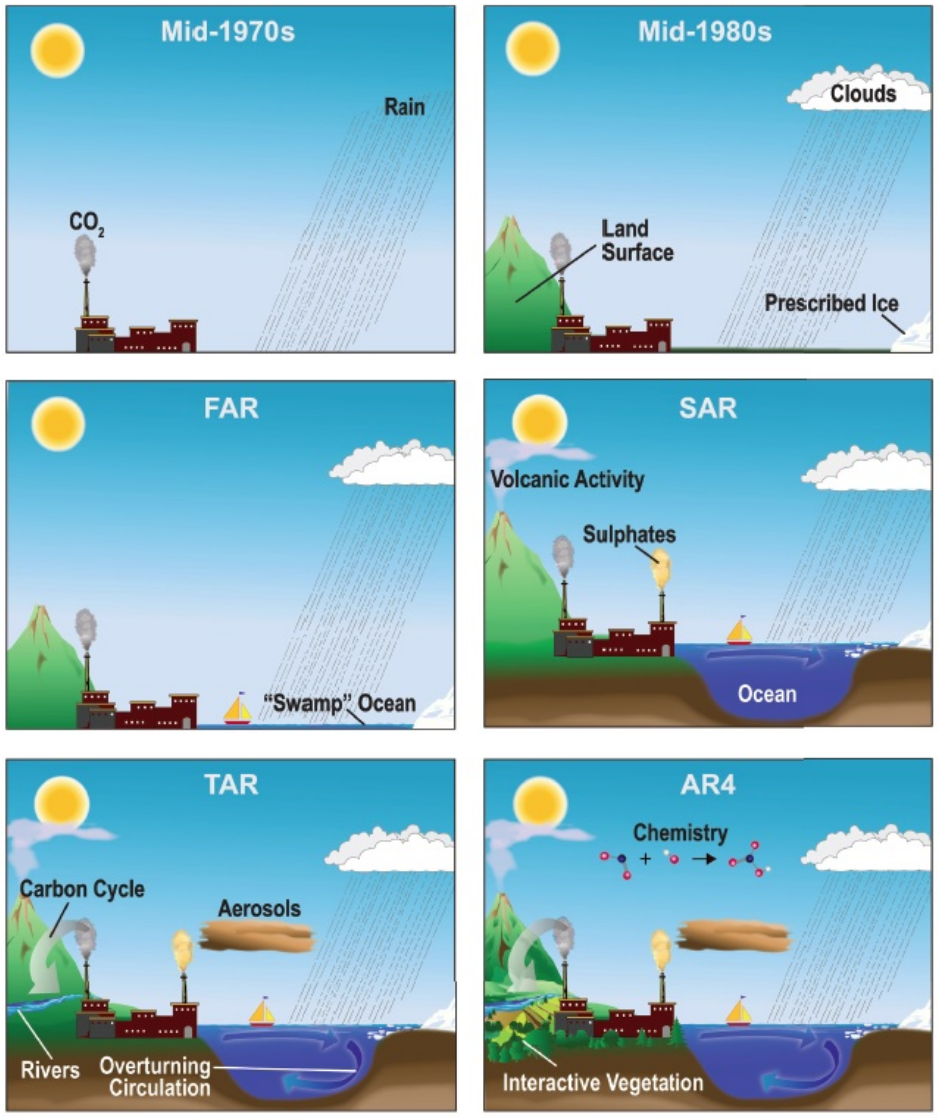


Figure 1.2. *The complexity of climate models has increased over the last few decades. The additional physics incorporated in the models are shown pictorially by the different features of the modelled world.*

Drivers towards IDR research:

- The Inherent Complexity of Nature and Society
- The Drive to Explore Basic Research Problems at the Interfaces of Disciplines
- The Need to Solve Societal Problems
- The Stimulus of Generative Technologies

(Nat. Acad. Sciences report: Facilitating interdisciplinary research, 2004)

Interdisciplinarity's emergence

- 1920's ('26?): Social Science Research Council
- WW II and after: technological and social scientific demands for interdisciplinarity
- 1972: OECD report 'Interdisciplinarity: Problems of Teaching and Research in Universities
- 1979: Association for Integrative [Interdisciplinary] Studies
- 2011: International Network for Interdisciplinarity & Transdisciplinarity

An influential definition

[Interdisciplinary studies is] a **process** of answering a question, solving a problem, or addressing a topic that is **too broad or complex** to be dealt with adequately by a single discipline or profession . . . and draws on disciplinary **perspectives and integrates** their insights through construction of a more comprehensive perspective."

(J. Klein & B. Newell: Advancing Interdisciplinary Studies,1997.)

Interdisciplinarity comes in different forms:

1. Borrowing of concepts, methods
2. Problem oriented collaboration
3. Bordering interdisciplinarity; increasing unification
4. Emergence of a new inter-discipline

(naar J. Thompson Klein, ‘Interdisciplinarity’, 19
64-66)

E.g.: Interdisciplinary Studies of Cognition

Complex system

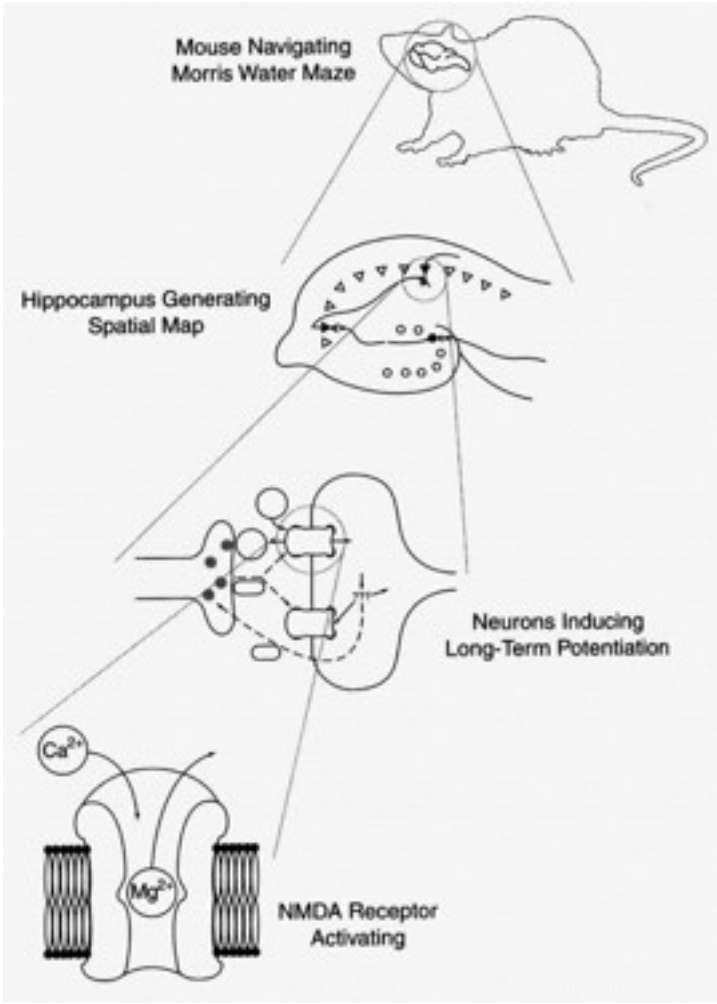
Different components

Dynamical interactions:

- internal
- with environment

Developmental trajectories

Many constraints / conditions



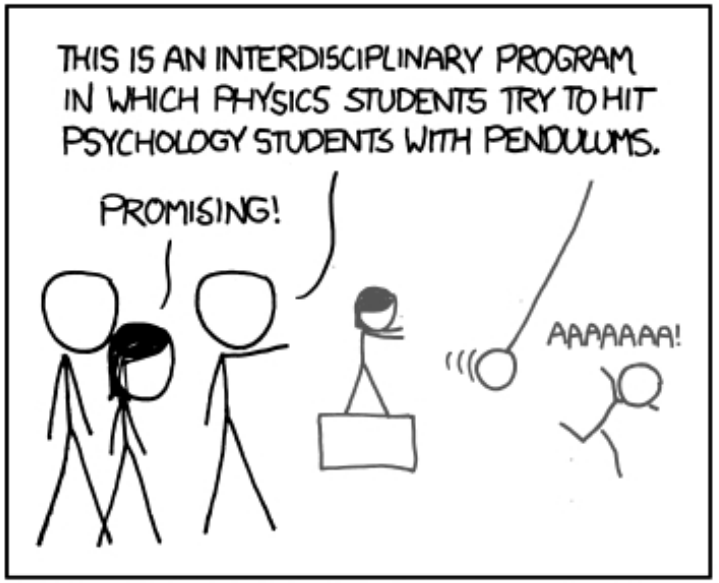
Interdisciplinarity requires disciplinary specialization

- Specialized research methods
- Explanatory models
- Disciplinary Theories that provide ‘common ground’

- Refrain from shallow or superficial interdisciplinarity

Drivers against interdisciplinarity

- disciplinary structure of the university
- disciplinary structure of academic education
- organization and funding of research
- peer review process



What do we need more?

- disciplinary super-specialization?
- problem-oriented interdisciplinarity?
- or both in parallel...?

Future of interdisciplinarity? Varying upon Kant's Adagium:

Disciplinarity without Interdisciplinarity is Blind

&

Interdisciplinarity without Disciplinarity is Empty

Thanks!

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