Ranganathan Lectures 2023

Classification
in the wider philosophical perspective
of informational ontology

University of Mysore
online, 4 Jan 2024

Claudio Gnoli

Abstract

- Authors like Dewey, Otlet, Bliss, Ranganathan, Vickery, Kyle, Foskett, Austin and Dahlberg have developed a rich corpus of classification theory and practice, covering important techniques like facet analysis and ordering by integrative levels. The advent of digital information was an opportunity to organize it by such techniques, but unfortunately this heritage has often been forgot in the illusion that automation made it unnecessary. Nowadays classification is subsumed in the field of knowledge organization, which covers the conceptual ordering of contents in libraries, archives, museums, digital collections and knowledge in general. We propose a broad view of knowledge organization as an intellectual guide to learning and scholarship grounded in philosophical ontology, the study of the kinds and categories of being. Established classification principles can play a role in the production of general schemes of phenomena. The recent informational paradigm suggests that there are relationships of formal dependence between the major levels of reality: forms, matter, life, mind and culture, as each of them is a new way of modelling other phenomena. In particular, the macro-level of culture is often reduced to the label of "social" but it actually covers several sub-levels, including services, institutions, customs, creative arts and scholarship, which have their own characteristics. Documents, library and information science and knowledge organization systems considered as real phenomena belong to the level of scholarship. Therefore they should be studied not just as mental or social phenomena, but especially for their distinctive characters such as scientific communication channels, openness to criticism and cumulative knowledge recording.

Classification

In Ranganathan's thought, classification is a core tool for information management

- Not just to locate a book, but to relate it with other books (APUPA pattern),

- to surrogate a catalogue,

- to evaluate circulation,

- to select acquisitions...
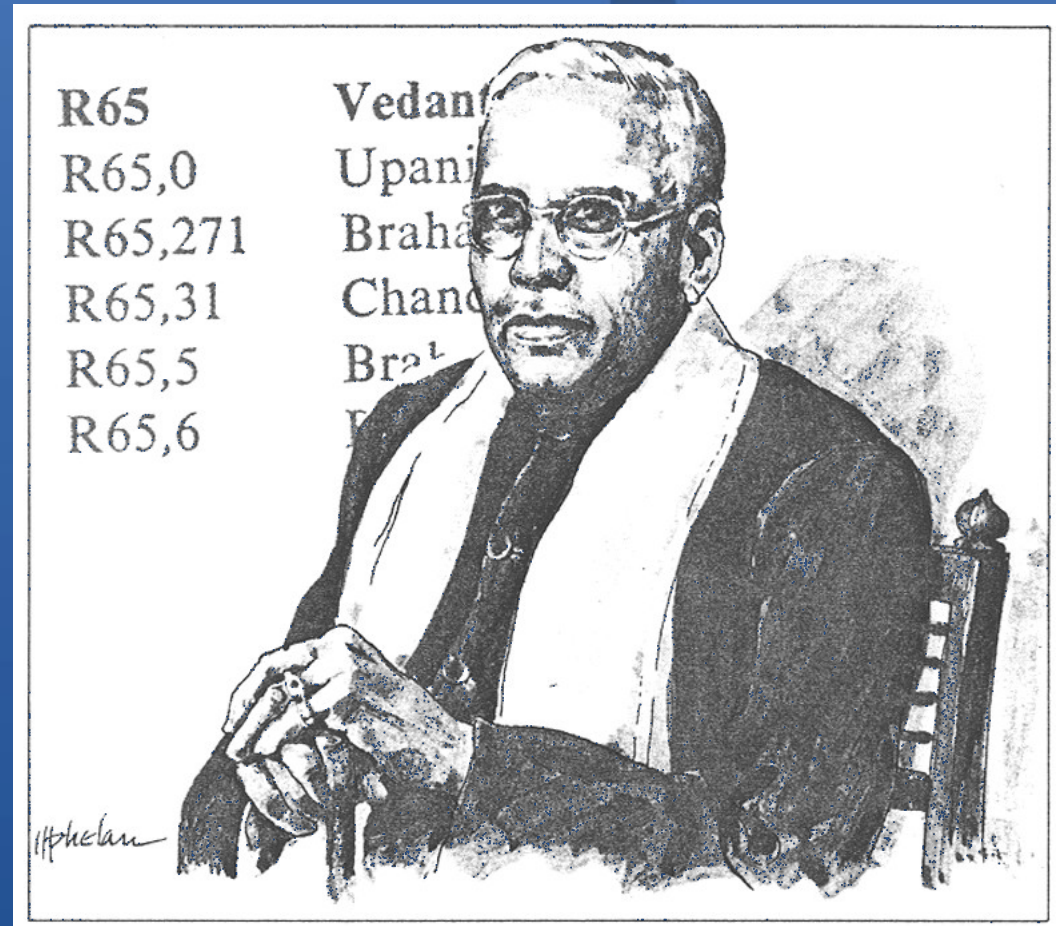
Classification

He studied library classification in London
and placed his ideas in a long tradition including:

- Melvil Dewey (DDC)

- Paul Otlet (UDC)

- Henry E. Bliss (BC)

- …

Subject 1. Development of Radar in the French Navy		
Scheme	Class Number	Number of digits
BC	BOW–RNf3	8
CC	D9N8, 44 (MV5.53)	15
UDC	621.396.9:359 (44)	17

with which he made comparisons of his Colon Classification
as for coextensiveness, notation length etc.

Classification

...and was followed (especially in facet analysis) by members of the Classification Research Group, including:

- Brian C. Vickery
- Barbara Kyle
- Douglas Foskett
- Derek Austin
- Jack Mills

Classification

The tradition continued with
I. Dahlberg and other researchers,
although less known in our age
of word-matching techniques

Ontical structures and universal classification

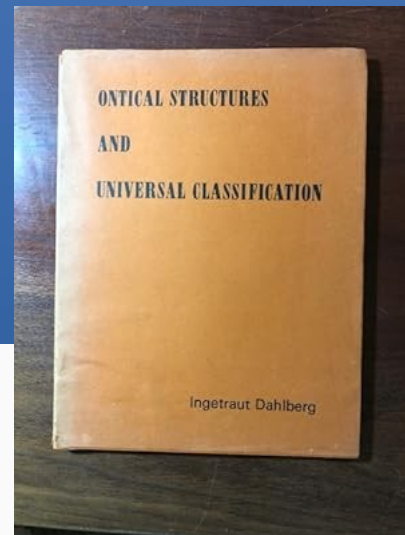**Autori:** Ingetraut Dahlberg, Sarada Ranganathan Endowment for Library Science

📘 **Libro a stampa**, inglese, 1978
Edizione: Ed. 1
Editore: Sarada Ranganathan Endowment for Library Science, Bangalore, 1978

Serie:	Sarada Ranganathan Endowment for Library Science series, 11, 11, 1977
Descrizione fisica:	xii, 64 pages : illustrations ; 26 cm.

A rich heritage

- Hierarchical trees
- Levels of organization
- Facet analysis
- Phase relationships
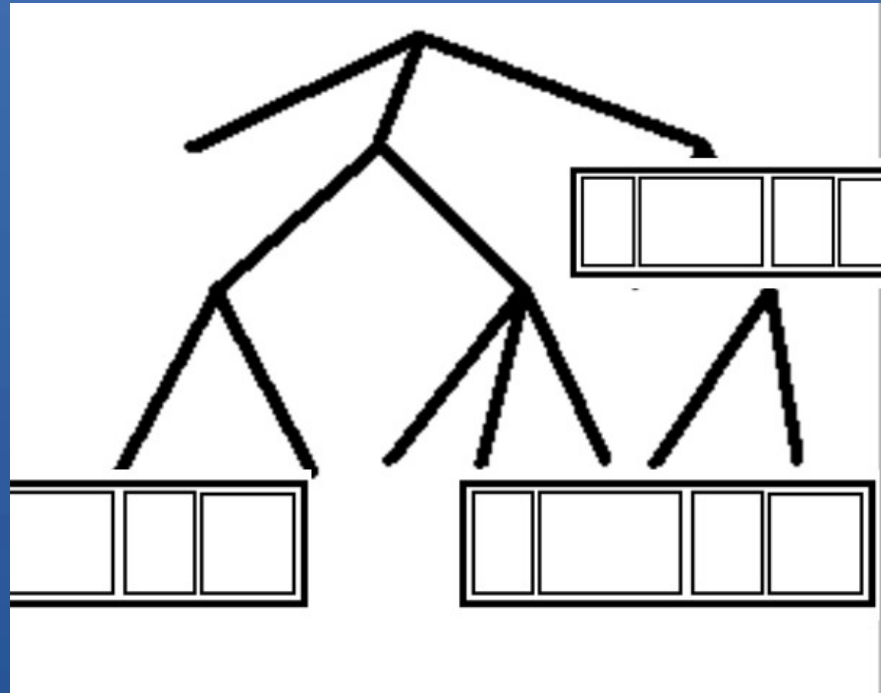
Hierarchical trees

- Class/subclass, or BT/NT

  – genus/species, e.g. bicycle/tandem

  – whole/part,   e.g. bicycle/pedal   (also a facet)

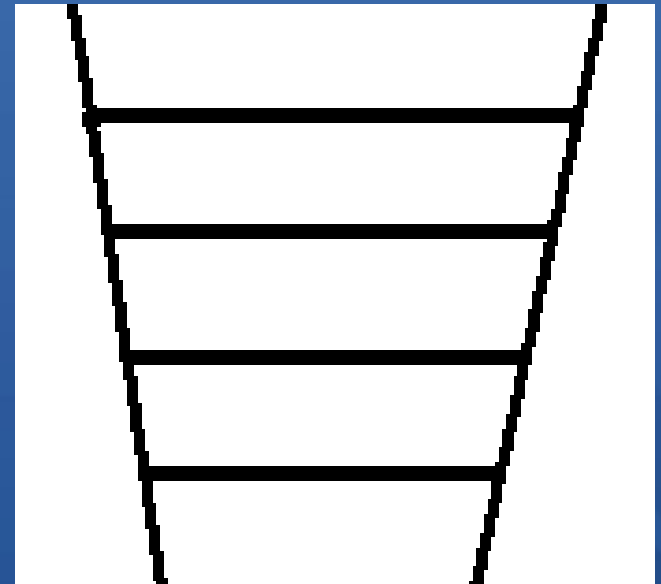 – type/instance   e.g. bicycle/your bicycle (also a deictic)
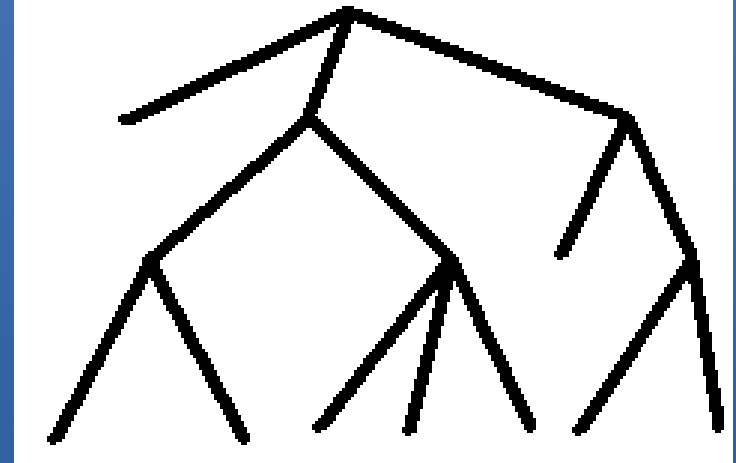
Levels of organization

From philosophy of science
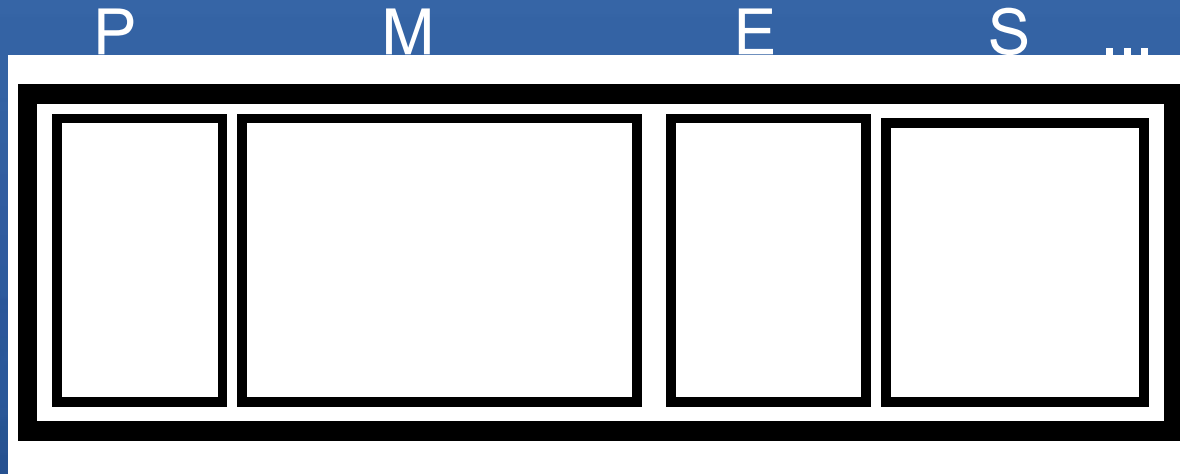(C.L. Morgan, Needham, Feibleman, Hartmann...)

Introduced in LIS by the CRG
(Vickery, Kyle, Foskett)

Cf. Kleineberg 2017
isko.org/cyclo/integrative_levels

Facets

Theorized in LIS by Ranganathan
(previously "special/common auxiliaries" in UDC)

P   M   E   S ...

Phase relationships

Used in UDC, theorized by Ranganathan:

- *37:1*   "education [in] philosophy"

- *1:37*   "philosophy [of] education"

- *V0aW* "political science in relation with history"

- *S0bL* "psychology for medicine"

They imply classification by disciplines...
Facets and phases seem to belong to a single set of relationships (Gnoli in press)

The digital revolution

- Computers made people believe that classification is not needed anymore

- as word-matching can locate a concept anywhere

- so ordering would be irrelevant...

"Helpful sequence"

...But are we sure?

Classification is
"helpful sequence"
(Ranganathan 1967)

Browsing is still needed

Topics need a linear order
in handbooks, herbals,
museums (Minelli 2023)

Classification still needed

for:

- managing homonyms and synonyms

- identifying concepts in different languages

- showing hierarchies, levels and facets

- controlling meaningful ordering, including inversion principle:
  'T
 .S'T
  :E.S'T
  ;M:E.S'T
  ,P;M:E.S'T

Knowledge organization

Term by Bliss, institutionalized by Dahlberg & c. in 1989
by founding the International Society of Knowledge Organization

Covers the conceptual organization of contents,
esp. in (paper/digital) libraries, archives, museums (LAM)

In a broader sense, also in knowledge generally:
handbooks, encyclopedias (e.g. Wikipedia categories),
lexical semantics, language acquisition,
education, organizations (uni departments, government…),
scientific taxonomies, systematic philosophy
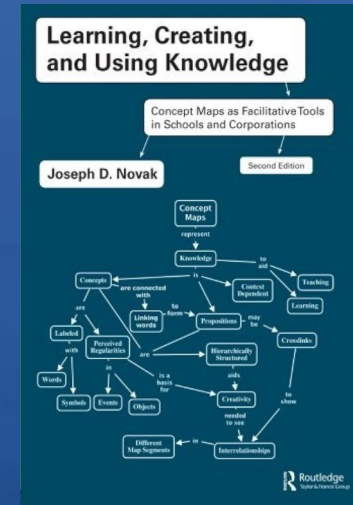
KO in a broad sense

"this is not merely an intellectual interest
but has **social and economic** value ...
It is not merely a **bibliothecal** problem, nor on a higher plane
is it a problem solely **scientific or philosophic**.
It concerns all these and also the **educational**
interests and those of social organization"

H.E. Bliss, 1929
*The organization of knowledge
and the system of the sciences*

KO systems

- Keywords, tags

- Subject heading lists

- Thesauri

- Taxonomies

- Classification schemes

- Ontologies

- ...

Ontology

A term introduced in computer science
to organize databases

but coming from philosophy, where it means
the study of what there is (*onto-* = "being")
as part of (or synonym of) *metaphysics*

usually dealing with such high-level "categories" as

- real / possible / necessary

- thing / property / process

- whole / part, etc.

My main thesis

The heritage of bibliographic classifications
can provide relevant contributions
to philosophical ontology
and to KO in the broad sense

by applying principles of
ordering, hierarchies, levels, facets
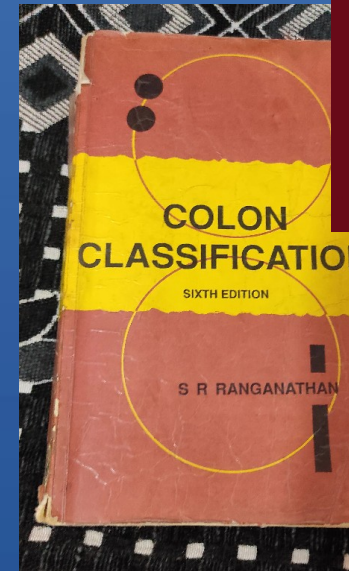
Ex.: Natural kinds

A classical ontological problem:
are the classes of sciences *natural kinds* ?

E.g. should plants be classified
by botanical families ("monocots", "dicots"...)
or by agricultural function ("weeds", "crops"…) ?

Wikimedia, CC0

Promiscuous realism (Dupré): both are natural kinds
P.D. Magnus: they are natural in different domains

Place of unique definition

Concepts should be represented at the level at which they are defined (J. Farradane, CRG Bulletin)

→ Plants to be represented by notation from the level of organisms, notation can be reused at higher levels, like agriculture (freely faceted classification)

Informational ontology

Ontological approach based on *informational systems* at various levels

Foundations of Science
https://doi.org/10.1007/s10699-022-09883-9

An Informational Approach to Emergence

Claudio Gnoli[1]

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© The Author(s) 2022

Abstract
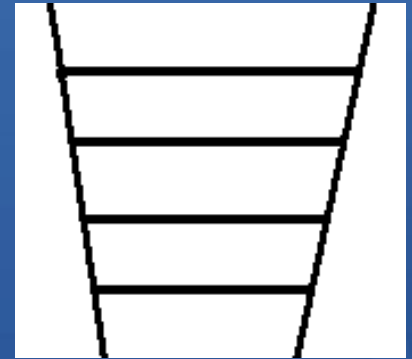Emergence can be described as a relationship between entities at different levels of organization, that looks especially puzzling at the transitions between the major levels of matter, life, cognition and culture. Indeed, each major level is dependent on the lower one not just for its constituents, but in some more formal way. A passage by François Jacob suggests that all such evolutionary transitions are associated with the appearance of some form of memory–genetic, neural or linguistic respectively. This implies that they have an informational nature. Based on this idea, we propose a general model of informational systems understood as combinations of modules taken from a limited inventory. Some informational systems are "semantic" models, that is reproduce features of their environment. Among these, some are also "informed", that is have a pattern derived from a memory subsystem. The levels and components of informed systems can be listed to provide a general framework for knowledge organization, of relevance in both philosophical ontology and applied information services.

Main classes = levels

- Culture
- Mind
- Life
- Matter
- Forms
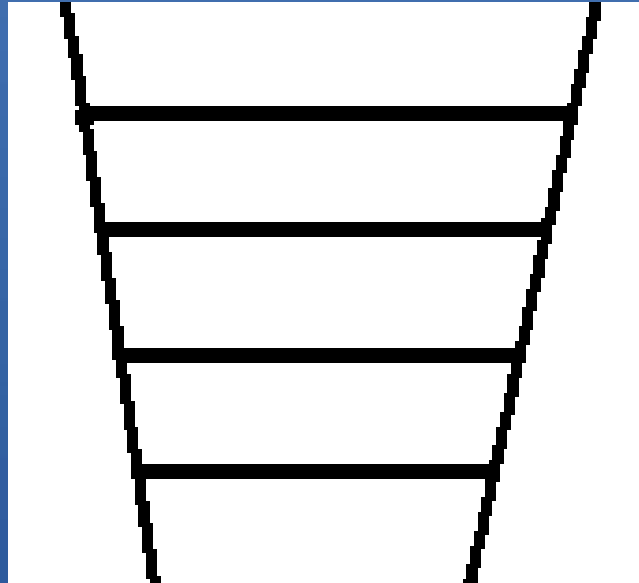
integration, organization

Subclasses = minor levels

- Culture

- Mind
  - Perception, Emotions, Moods, Temperament...

- Life
  - Cells, Organisms, Populations...

- Matter
  - Particles, Atoms, Molecules, Continuum bodies...

- Forms

Attributes = special facets

	parts	properties	processes	agents ...
Culture				
Mind				
Life				
Matter				
Forms				

Systems

Each class can be considered as a **system**
formed by several **elements**
connected in a **structure**
in some **environment**
(Bertalanffy, Boulding, Bunge)

These can be expressed as facets:
"rice, stem, growth, in Madras, in dry season"

Faceted compounds are like molecules (Broughton)
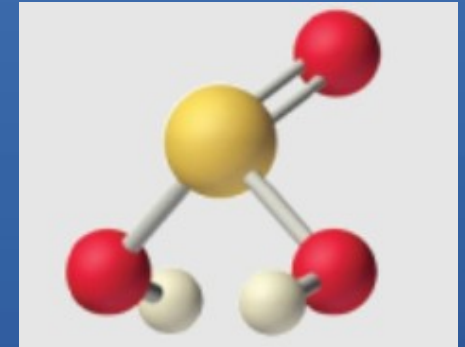
Modular systems

Have many parts of the same kind (modules)

belonging to a limited repertoire

that can be combined by some syntax

Examples:

- – chemical substances

- – genomes

- – brains

- – languages
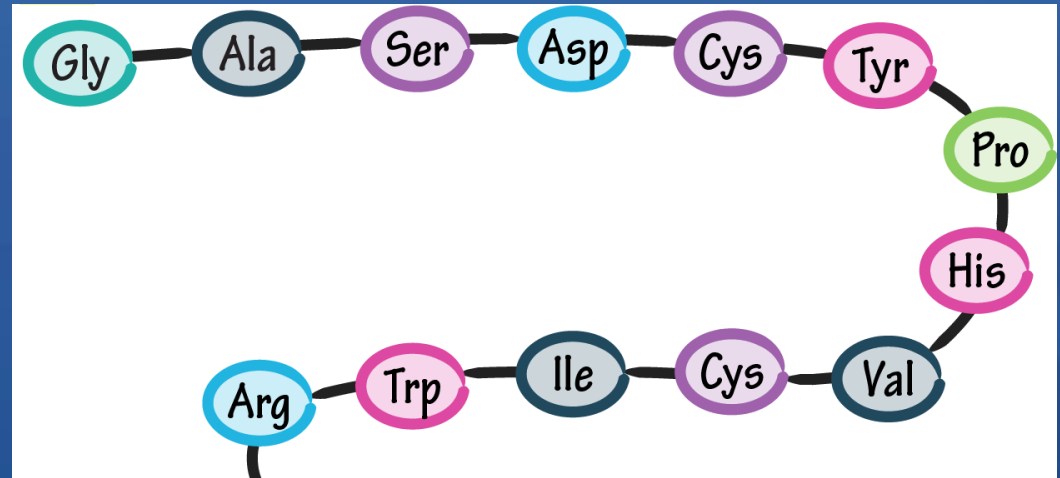
Modular systems

They convey "information" in a very general sense

So our ontology can be described
in terms of information:
it can be an **informational ontology**
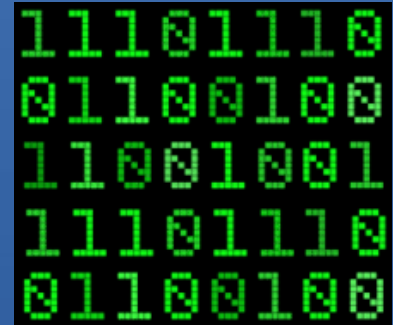
Everything is a configuration of some informational system
(cf. J.A. Wheeler, L. Floridi)

Models

Configurations of a modular system

that are isomorphic to other phenomena

as an effect of dependence (causal) relationships, e.g.

- erosion landforms
- footprints, impact craters
- percepts
- sentences

public domain

Models

- Syntactical, isomorphic:

  the pen is on the table
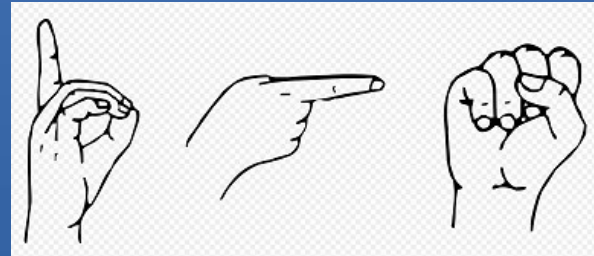
  Wikimedia, CC BY LiliCharlie

- Syntactical, non-isomorphic:

  colourless green ideas sleep furiously   (Chomsky)

Memories

A single modular system, e.g. a footprint, dissolves sooner or later

H. Seitz, Research Gate

Some systems replicate in many copies so that some can survive longer, e.g. letters given to several travellers in Middle Ages

A **memory** is a modular system working as a mold from which many copies can be produced, e.g. genomes reproduce many copies of an organism species

Jacob's law

The main levels (life, mind, culture)

originate from the appearance of some memory:

matter ⇒ genomes

       ∨

    life ⇒ neurons

           ∨

        mind ⇒ languages

               ∨

            culture
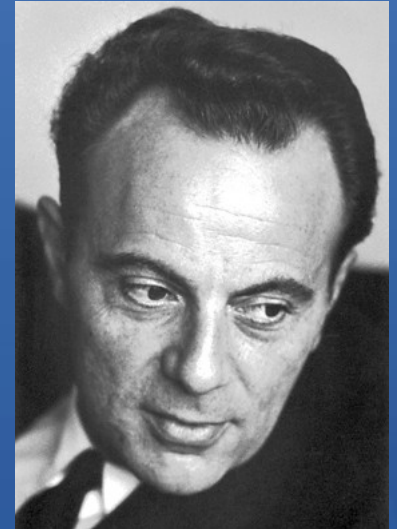
François Jacob
1965 Nobel prize
for medicine

Informed system

A system produced in many copies
from some memory
in a replication cycle:

memory → outcome → memory → ...
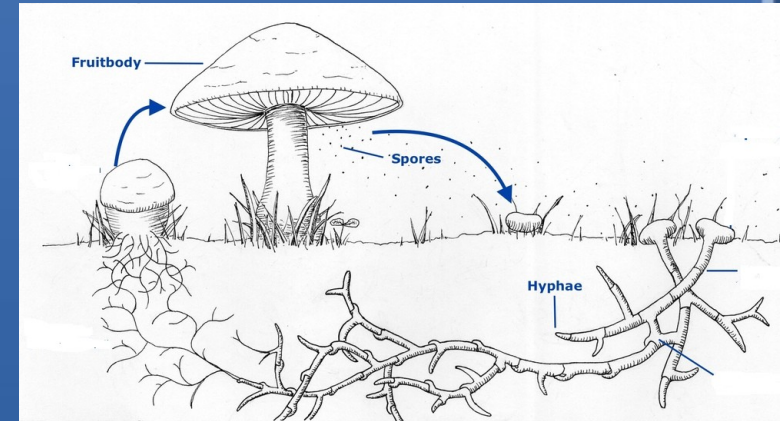
sciencelearn.org.nz

Because of natural selection by environment
on informed systems, these evolve in time
and new classes of phenomena appear

Major levels

- Culture

- Mind

- Life

- Matter

- Forms
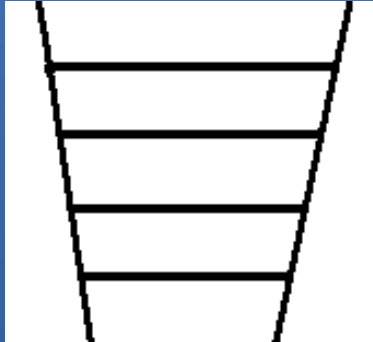
  They stand in a relation of "overbuilding" (Hartmann)
  which is a case of formal+compositional dependence,
  as their memories can model other phenomena in new ways

Culture

The highest major level as far as we know

Its memory are languages in a broad sense, including gesture systems, speech, writing

Languages work like instructions
to build cultural structures, such as:

– Dishes, clothes, buildings…   (artifacts)

– Communities, institutions   ("sociofacts")

– Customs, artworks, scholarship ("mentefacts")
                                    including KO

studiozaneboni.com

Cultural = social?

Culture is often labeled as the "social" stratum

This implies that it needs to be studied by social sciences

KO literature often focuses on sociological aspects,
e.g. according to the **domain analysis** school (Hjørland, Ørom, Mai…)
KO depends on how discourse communities use categories

This is true as mentefacts depend on sociofacts,
e.g. conferences and awards are social events,

but mentefacts also have their own emergent features!

Counter-example

Grigorij J. Perelman (1966-)

demonstrated Poincare's conjecture,
an important mathematical mentefact

Wikimedia GFDL 1.2

but refused the 2006 Field Medal
and lives simply, out of academic life

Society and scholarship are not the same...

Ontology of culture

- Culture
  - Artifacts
  - Sociofacts
  - Mentefacts
    - Customs
    - Creative arts
    - Scholarship
      - ..., LIS, KO, ...

universitycompare.com

So, what are the emergent features of scholarship / sciences?

Features of scholarship

- **Active research initiative:**
  experiments, tests, surveys, …

- **Formal communication channels**:
  classes, lectures, journals, citations, …

- **Explicit theories**, based on concepts connected in a taxonomy
  (Hanson, Kuhn, Thagard, Hjørland), "objective knowledge"

- **Openness to criticism** (Popper)

- **Cumulative knowledge recording**:
  reviews, encyclopedias, archives, libraries, museums...
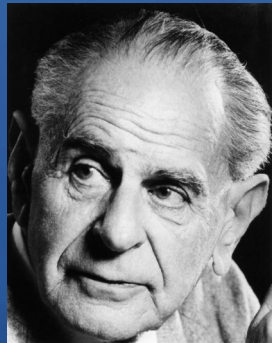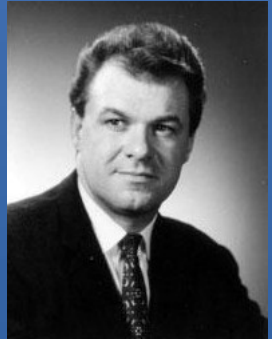
Features of scholarship

New theories are based on changes in taxonomy / ontology:

- geo-centrism vs. helio-centrism (Earth is a planet, Sun is a star)
- continent drift vs. plate tectonics

Science ≠ "metaphysics"
in that it can be falsified !

JOANNA KLARA TESKE

FALSIFICATION OF INTERPRETIVE HYPOTHESES
IN THE HUMANITIES

INTRODUCTION

The present paper concerns the use of falsification in the humanities.[1] In particular, it focuses on the question whether interpretive hypotheses can be falsified, and whether the scientific (or scholarly) status of the relevant disciplines (such as literary studies or history of philosophy) might thereby

Ambiguity!

Knowledge, information, thought, *idea* and similar terms are ambiguous:

- an animal knows its habitat (mental stratum)
- a worker knows how to do (cultural stratum, artifact layer)
- a person knows her family (cultural stratum, sociofact layer)
- a scholar knows a theory (cultural stratum, mentefact level)

Even *mentefact* does not refer to the mental stratum!

We need more specific terms for mentefacts...

Ontology of KO

Classification and knowledge organization
can be understood in two senses:

– epistemological, as a method to order what we know
and to produce ontologies of phenomena
covering all levels: matter, life, mind, culture

– ontological, as a phenomenon part of scholarship
belonging to the highest level of reality
together with LIS and all other sciences

Status of LIS & KO

In the light of the ontology of levels,
classification and KO needs to be studied
as for their specific features

Their social bases are relevant,
but are not their main focus:
information science is not just a social science

just like e.g. paper materials, binding, computers
are relevant for documents but not their main focus:
information science is not just a technology

- Culture
  - Artifacts
  - Sociofacts
  - Mentefacts
    - Customs
    - Creative arts
    - Scholarship

Focused phenomena

Among distinctive phenomena to be studied in LIS and KO are:

- intellectual *works* as documents
    - their titles, authors, time of production;
    - their internal structure: sections, TOCs, themes, subjects;
    - their publications, translations, adaptations, reviews…
- citation networks between documents
- influence trees in the history of ideas:
myths, traditions, trends, paradigms, knowledge systems

Which discipline?

- Cultural history

- Science studies

- Philosophy of science

- Library and information science (LIS)

- Knowledge organization (KO)

Maybe they all belong to an unnamed science of scholarship: "science of science/of knowledge" (Znaniecki; Ossowski-s), "logology" (Zamecki; *Wikipedia*)...

CG's relevant publications

- "Mentefacts as a missing level in theory of information science", *Journal of Documentation* 74 (2018) n. 6 p. 1226-

- "Levels of information and LIS as a science of mentefacts", COLIS proceedings, *Information Research* 24 (2019) n. 4 https://www.informationr.net/ir/24-4/colis/colis1903.html

- "An informational approach to emergence", *Foundations of science*, in press https://link.springer.com/article/10.1007/s10699-022-09883-9

- *Ontologia informazionale*, *PhilPapers*, in progress, https://philpapers.org/rec/GNOOIU

...thanks for your attention

Contact:

claudio.gnoli@unipv.it

Website:

gnoli.eu

R65   Vedan
R65,0   Upani
R65,271   Braha
R65,31   Chand
R65,5   Brat
R65,6