



# Anticipation and Semiotics

## One Cannot Not Interact

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# Semiotics is about the meaning of interaction

To know is to account for change as an expression of interaction

All knowledge is expressed through representations

- encapsulate the experience of interactions
- express awareness of consequences of change

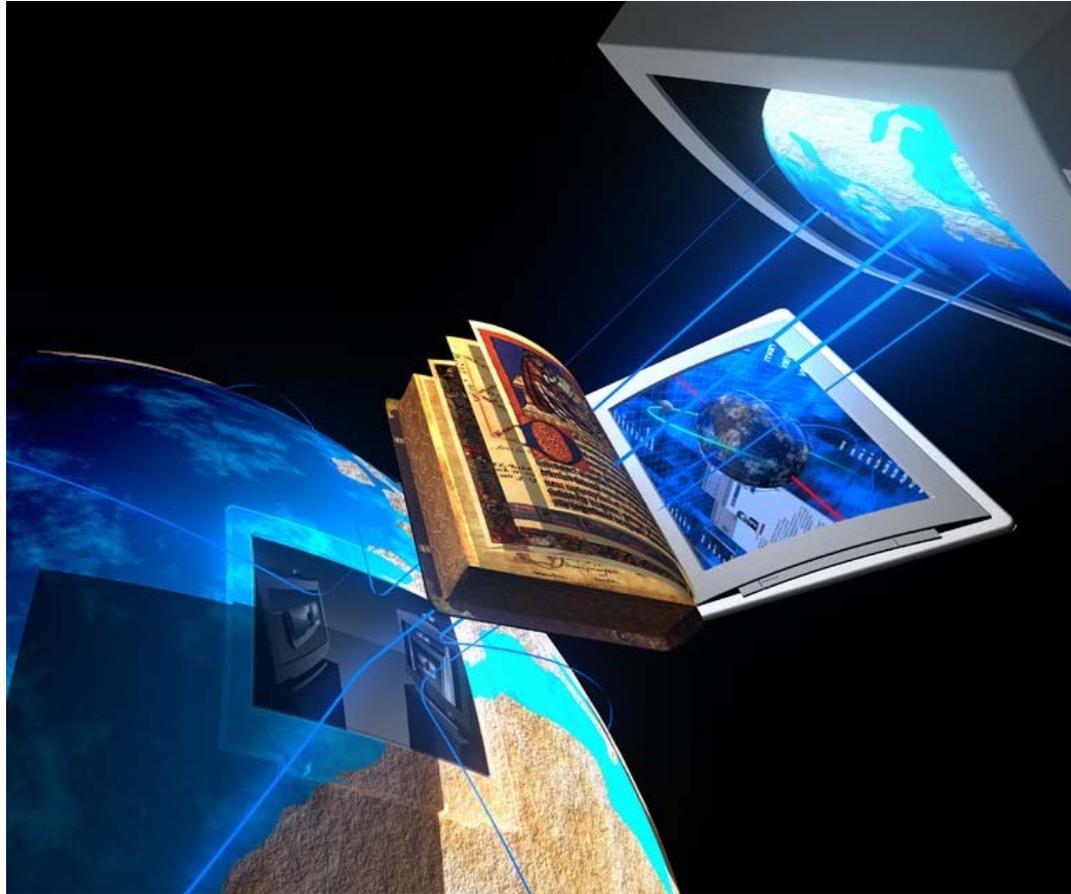
Interaction representations capture the dynamic condition of the living

Anticipatory expression is definitory of the living. It corresponds to awareness of change

A new foundation for semiotics will

- capture the meaning of interaction
- integrate the sign in a dynamic perspective
- inform semiotic-based activities (medicine, in particular)

## A new human condition



The integrated nature of human activity in the  
age of networking

## *zoon semiotikon — 21 century*



Charles S. Peirce: 'A virtual X (where X is a common noun) is something, not an X, which has the deficiency (virtus) of an X.'

# Homo Ludens



97% of all American teens  
53% of adults (age 18+)

21% plays every day

- computers
- game consoles
- cell phones

# Play to Win



Watching is the new playing—over 20 hours a week, 150 million

Twitch: videogame streaming *League of Legends*, *Call of Duty* and *StarCraft II*



# South Korea—the epicenter of eSports

South Korea's E-Sports Obsession



More than 40,000 fans filled an outdoor soccer stadium in Seoul on Sunday to watch the world championship for League of Legends, one of the world's most popular electronic games.

Jean Chung for The New York Times



South Korea's E-Sports Obsession



Top video game players in South Korea are household names. Fans gather under the banners of Samsung White and Star Horn Royal Club for the championship finals.

Jean Chung for The New York Times



Fans watch the finals of 2014 League of Legends World Championship.

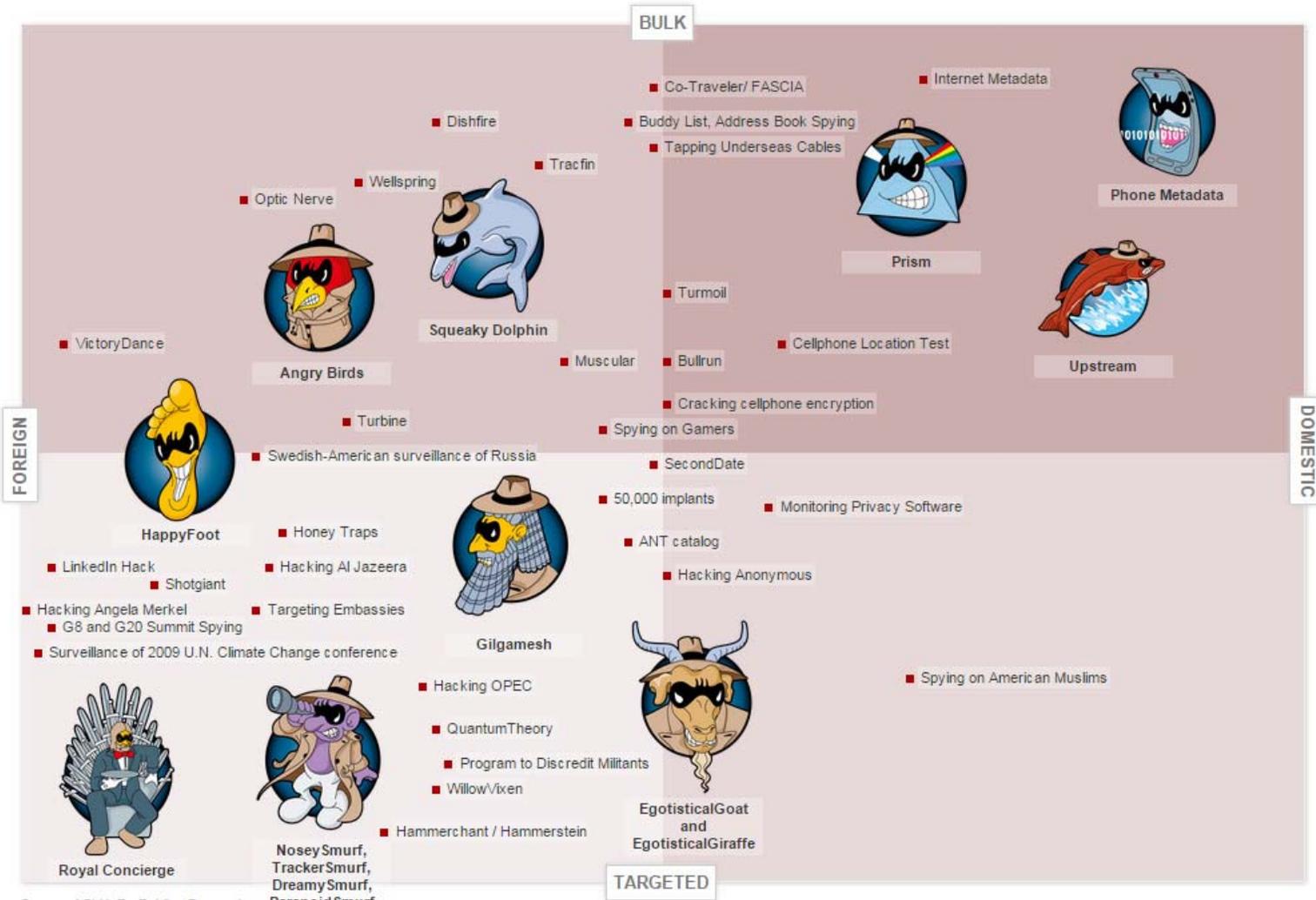
Jean Chung for The New York Times



A South Korean man uses a smartphone to play a mobile game on the subway in Seoul. The country has led in professional video game competitions, creating organized leagues and training well-financed professional teams.

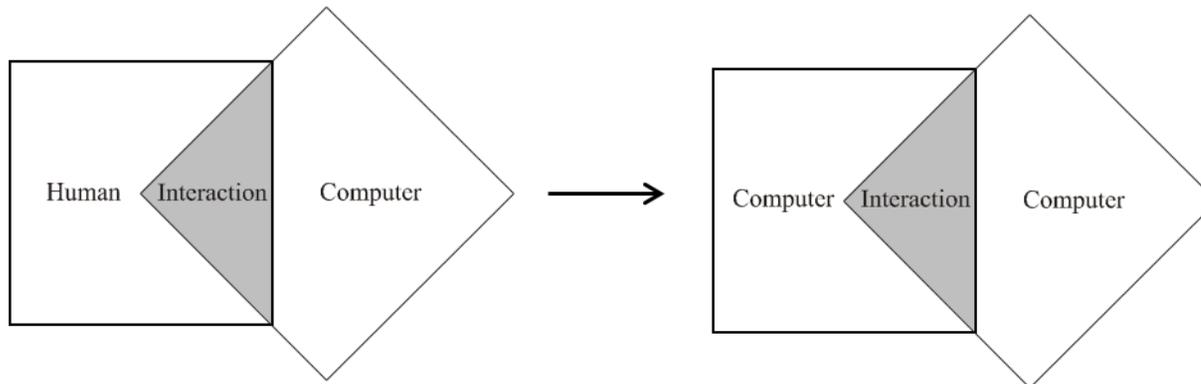
Jean Chung for The New York Times

# NSA / National Semiotics Agency?



Source: ACLU, ProPublica Research

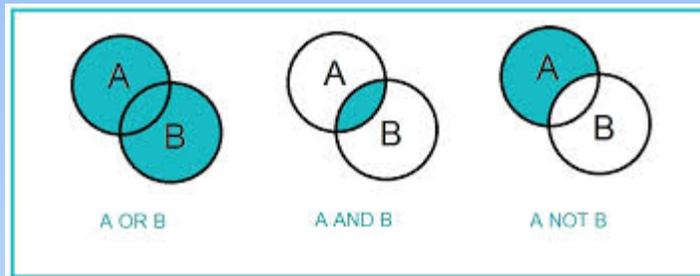
# The interactive virtual global economy



Automating the human away

# Changing condition of sciences

Contest at the 5<sup>th</sup> World Congress on Universal Logic, June 2015



## Universal Logic - The Future of Logic - The Contest

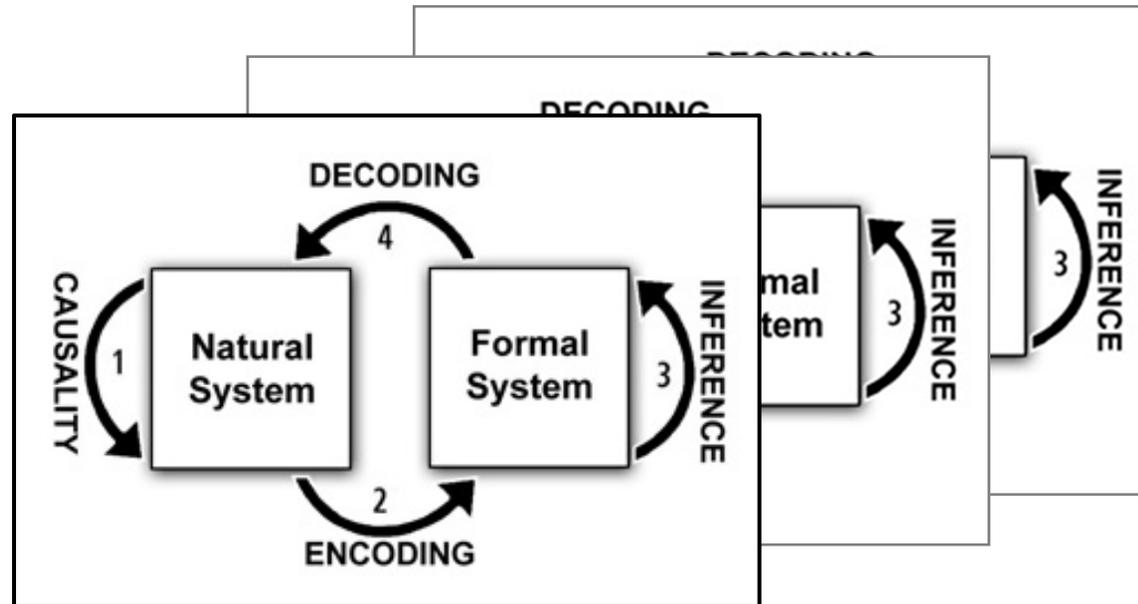
- Will or can logic provide better understanding to the sciences (physics, biology), economics, music, information?
- How will the internal life of logic, its objectives and tools evolve?
- How will the interactions between logic and philosophy, logic and mathematics, logic and computation develop?

## The future of semiotics: Will it disappear?

- We are, because everything changes
- We are what we do – the pragmatic context
- Change is the outcome of interaction
- Interaction in the physical reality is different from interaction in the living
- To know is to understand dynamics
- Awareness of change

# Models and representations

Rosen's concept of the modelling relation:



No distinction between the physical and the living

# Representation: conduit to knowledge

World



The changing world to which  
the observer belongs

Observer

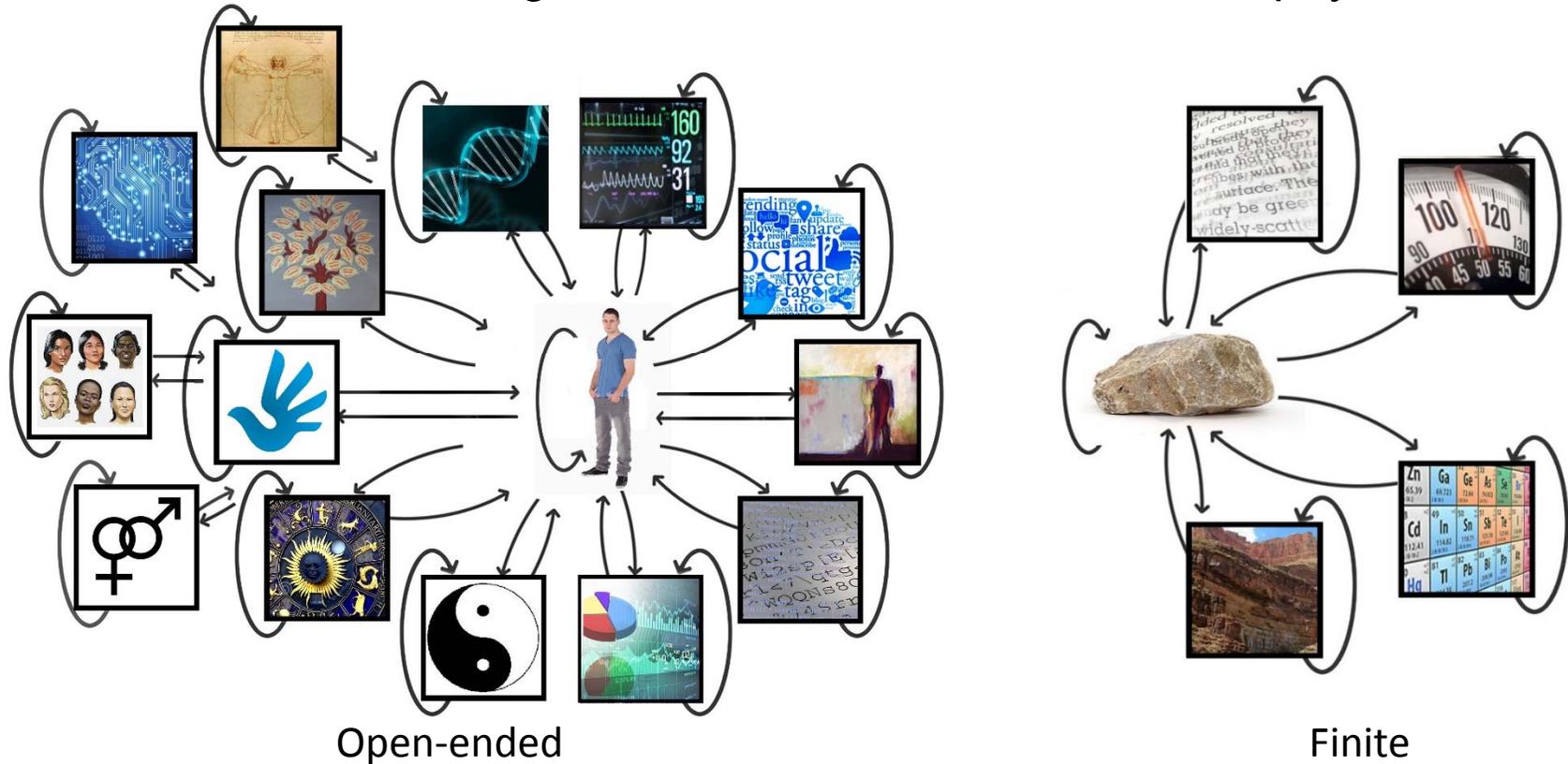


The changing observer as part  
of the changing world

# A distinction that does not go away

The living

The physical



- Representation of the living is different from representation of the physical
- Representation of the living is always incomplete

# Semiotics and complexity

*Any effectively generated theory capable of expressing elementary arithmetic cannot be both consistent and complete. In particular, for any consistent, effectively generated formal theory that proves certain basic arithmetic truths, there is an arithmetical statement that is true, but not provable in the theory.*

- Kurt Gödel (1931): Theorem VI in “On Formally Undecidable Propositions in *Principia Mathematica* and Related Systems, I”

G-complexity is the characteristic of the living

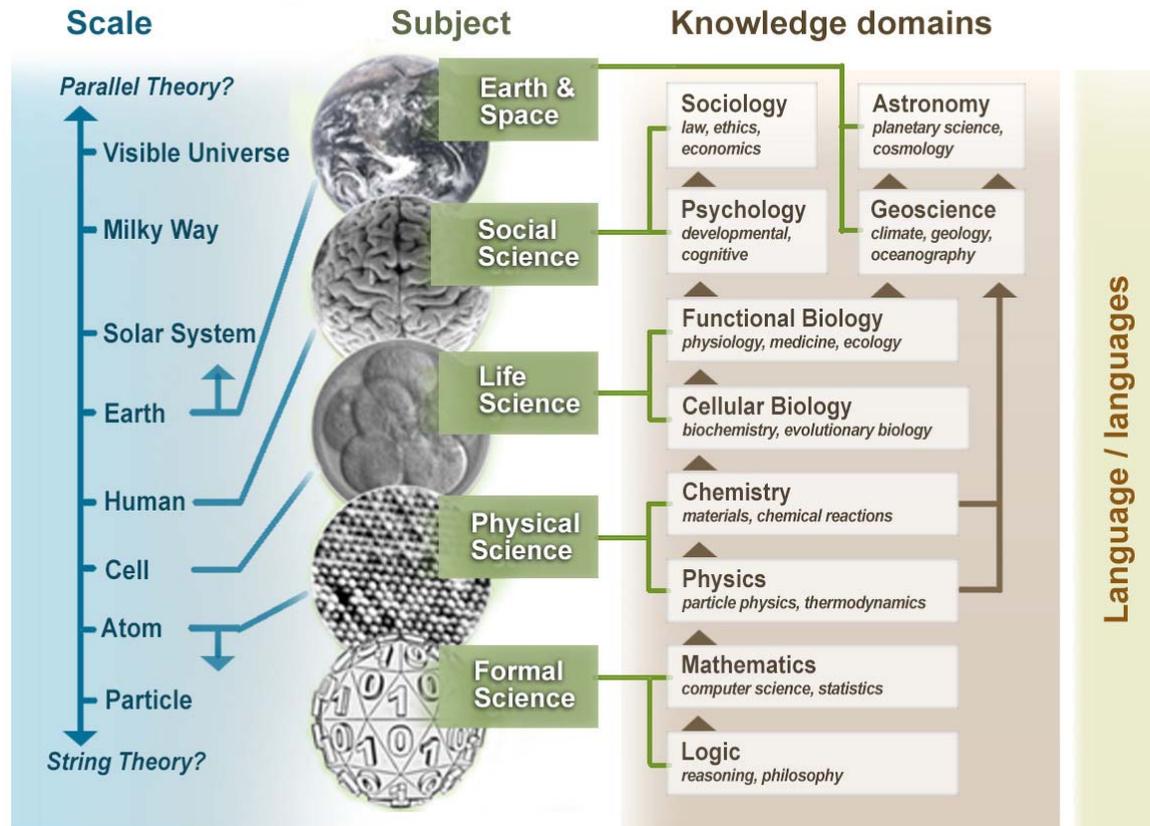
The physical is decidable

Undecidable science is the outcome of undecidable cognitive processes

## The semiotics of knowledge domains

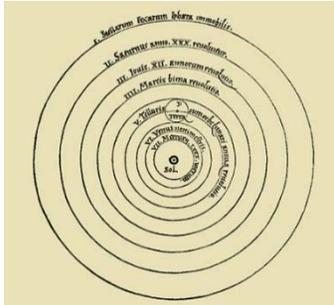
- From reality to many representations of reality
- Expression and sharing of knowledge in language/languages
- When does a new language become necessary?

# Knowledge and semiotics

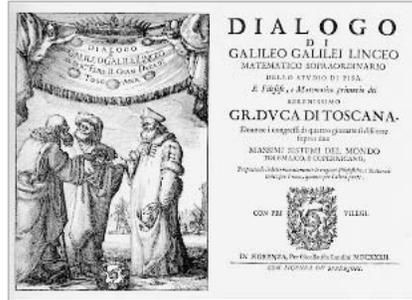


- Each knowledge domain has its own semiotics
- Expression and sharing of knowledge in language/languages

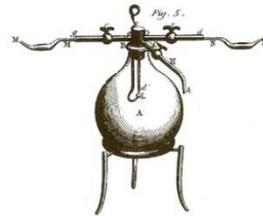
# Semiotics of the visual



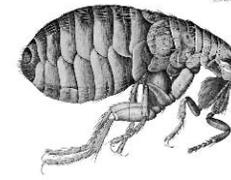
**On the Revolutions of Heavenly Spheres**  
Nicolaus Copernicus, 1543



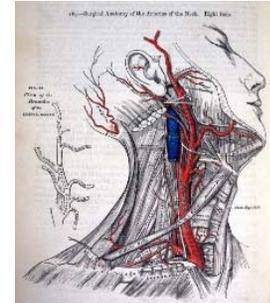
**Dialogue Concerning the Two Chief World Systems**  
Galileo Galilei, 1632



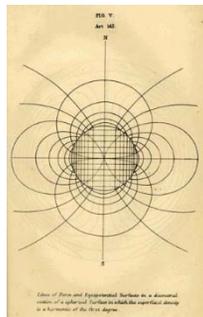
**Elements of Chemistry**  
Antoine Lavoisier, 1789



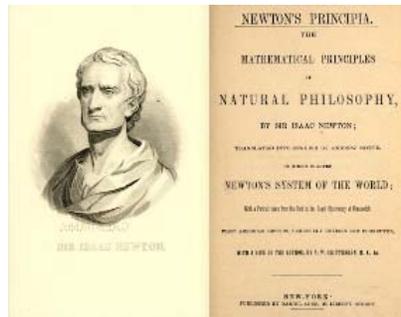
**Micrographia**  
Robert Hooke, 1665



**Gray's Anatomy**  
Henry Gray, 1858



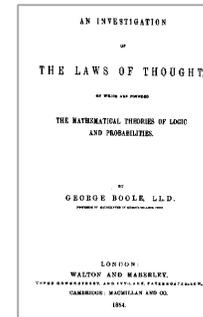
**A Treatise on Electricity and Magnetism**  
James Clerk Maxwell, 1873



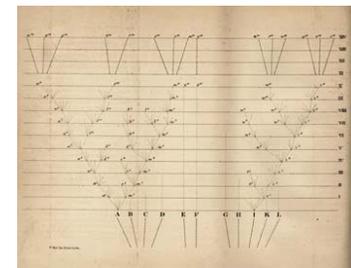
**Philosophiæ Naturalis Principia Mathematica**  
Isaac Newton, 1687



**Principles of Chemistry**  
Dmitri Mendeleev, 1868–1870



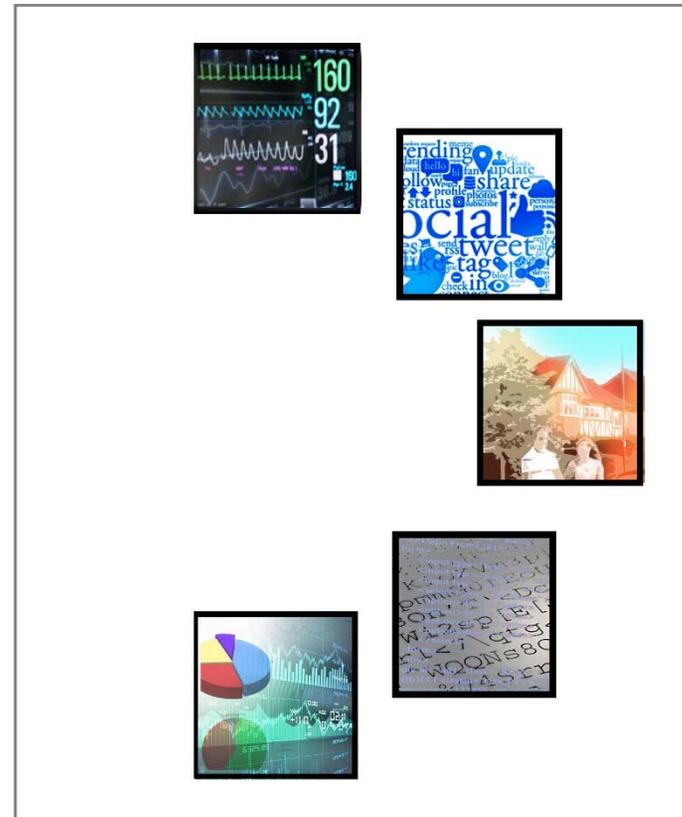
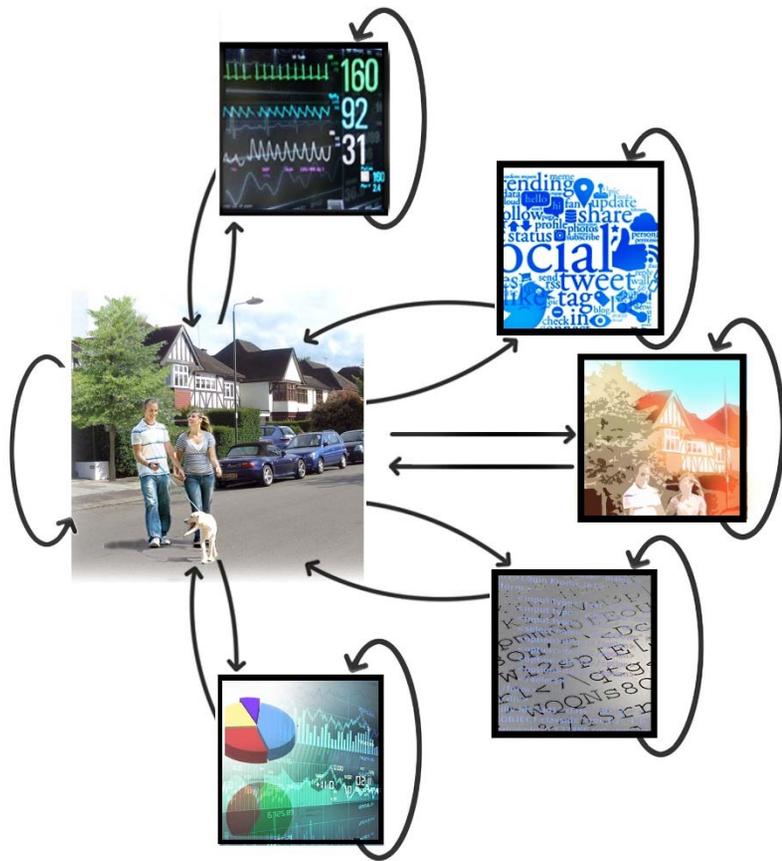
**The Laws of Thought**  
George Boole, 1854



**On the Origin of Species**  
Charles Darwin, 1859

New knowledge domains (nano, cosmos, DNA, etc.) rely on visual representations

# Semiotics: the generality of the sign



Semiotics as metadomain of knowledge

The missing dynamics of the sign

## Semeion transcended

σημεῖον, σημείου, τό (σημαίνω, or σῆμα), תוא, sign, mark, token

Nothing is a sign unless interpreted as a sign

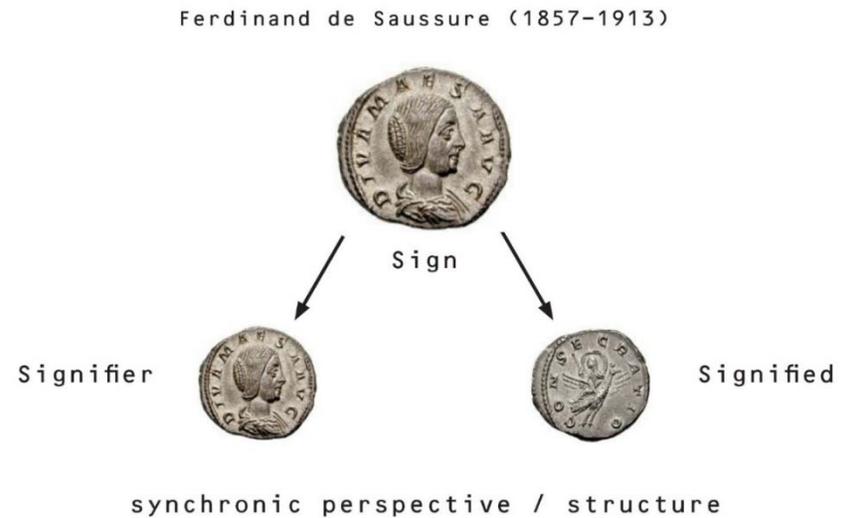
Why interpret anything as a sign?

Dynamics and semiotics: the accelerated rhythm of change

# From structuralism to sémiologie

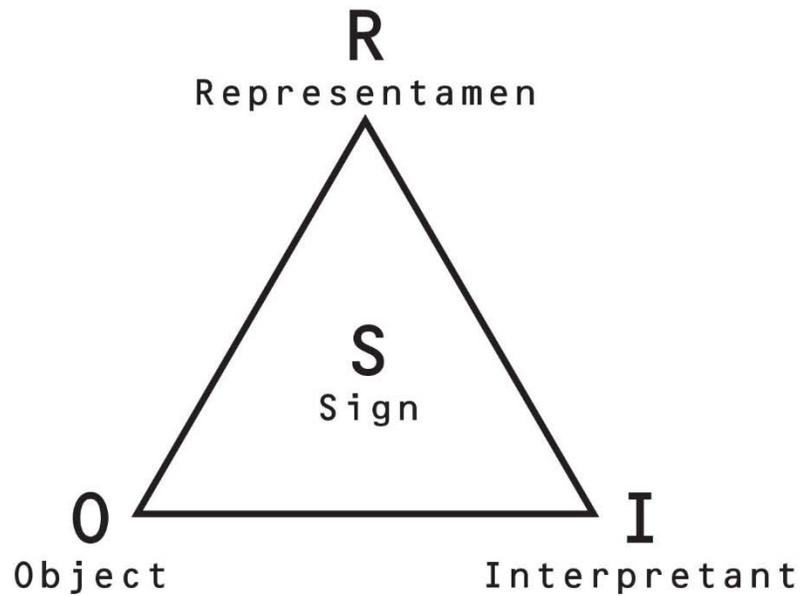
**SIGNIFIÉ**  
**(Concept)**  
**SIGNIFIANT**  
**(Image acoustique)**

The structure of the sign

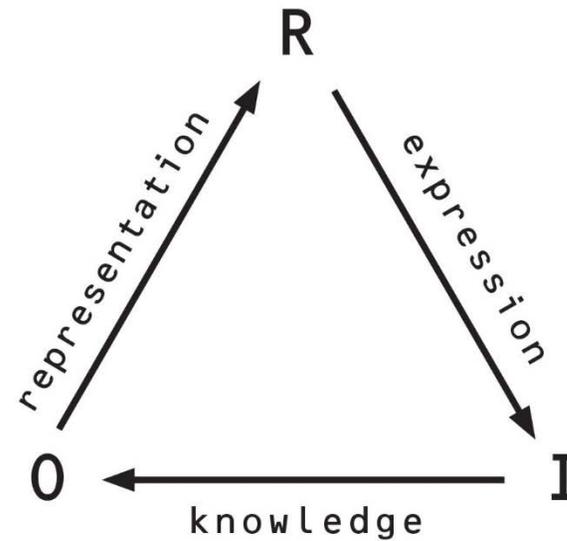


- *The role of signs as part of social life*
- *Linguistics is only one branch of this general science*
- *The laws which semiology will discover will be laws applicable in linguistics, and linguistics will thus be assigned to a clearly defined place in the field of human knowledge.*

## The sign. Ethics of terminology



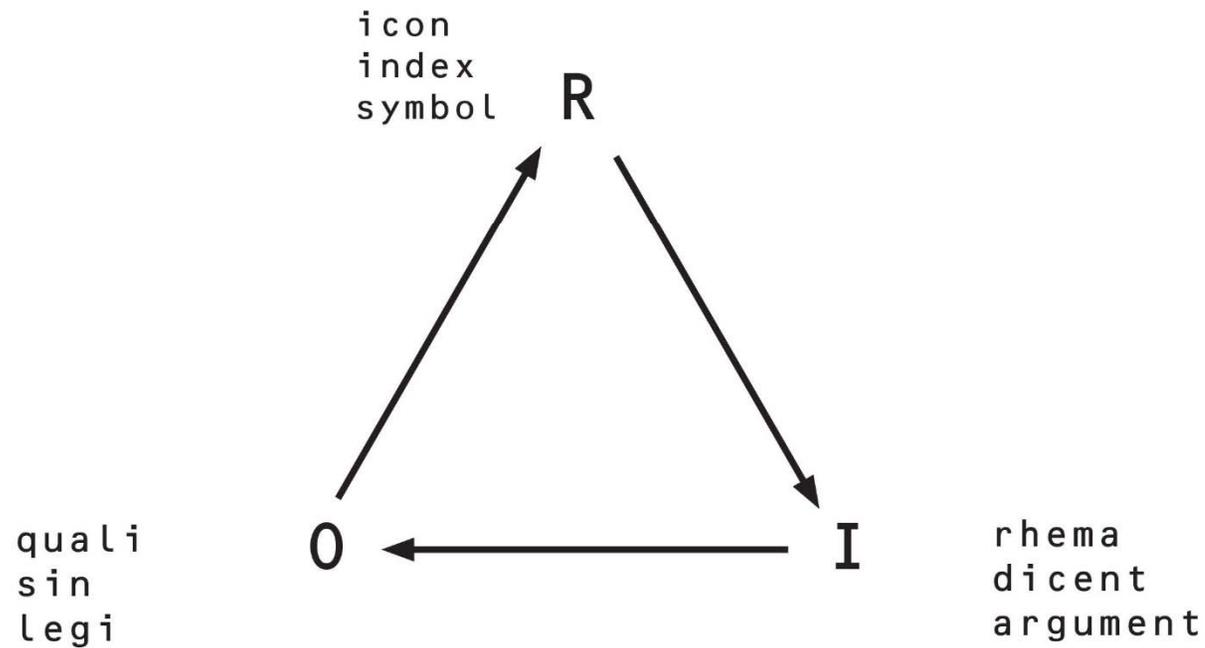
Sign:  
unity of represented object (O), means  
of representation (R), and process  
[infinite] of interpretation (I)



Sign functions:  
representation, communication,  
knowledge acquisition

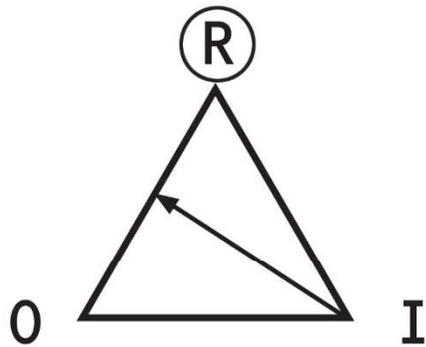
# The coherence of semiotics

Forms of representation:  
iconic - based on resemblance  
indexical - based on marks left  
symbolic - based on conventions



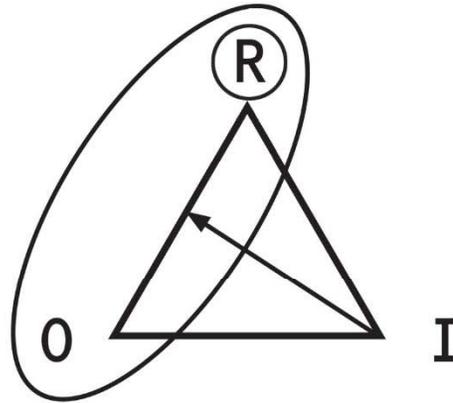
# Semiotic levels

Syntax



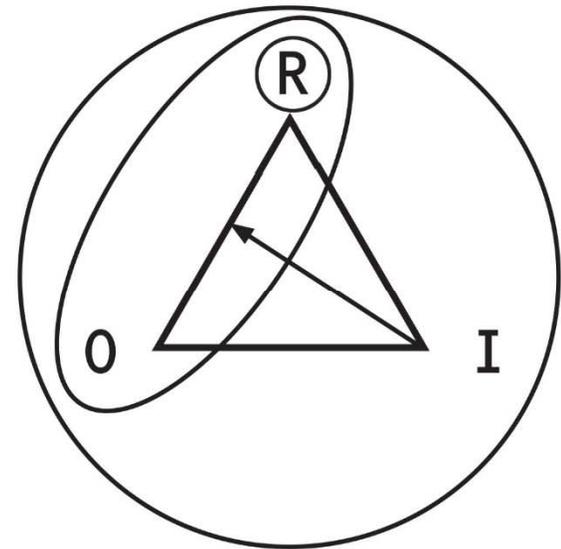
formal aspects of  
representation

Semantic



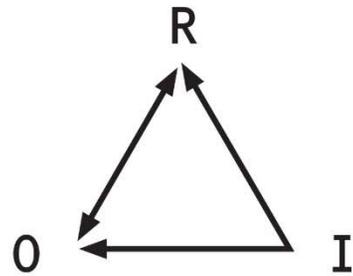
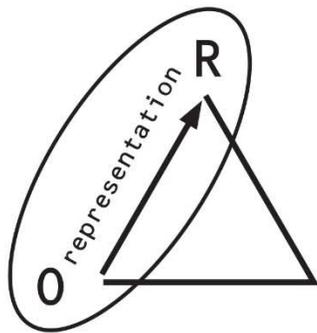
meaning of  
representation

Pragmatic

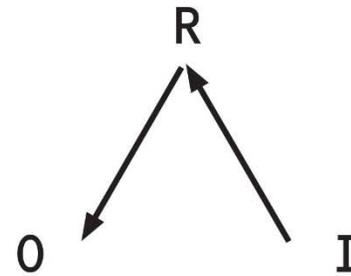


practical use of  
representation

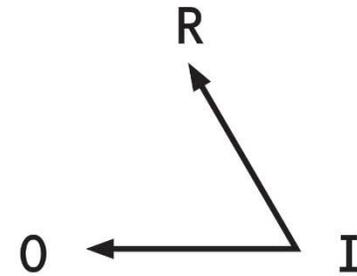
# Qualifying representations



Iconic

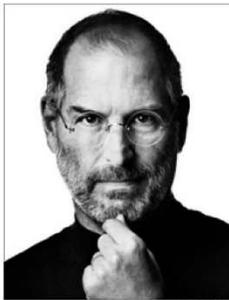


Indexic



Symbolic

The nature of specific representation:



person's picture

person's fingerprint

person's name



Steve Jobs

# The Monsieur Jourdain syndrome



Monsieur Jourdain: And this, the way I speak. What name would be applied to...?  
Philosophy Master: The way you speak?  
Monsieur Jourdain: Yes.  
Philosophy Master: Prose  
Monsieur Jourdain: It's prose. Well, what do you know about that! ...These forty years now, I've been speaking in prose without knowing it.

(Molière, *The Bourgeois Gentleman*)

Everybody does semiotics—without being aware of it  
*These forty years now, I've been "speaking" semiotics without knowing it*

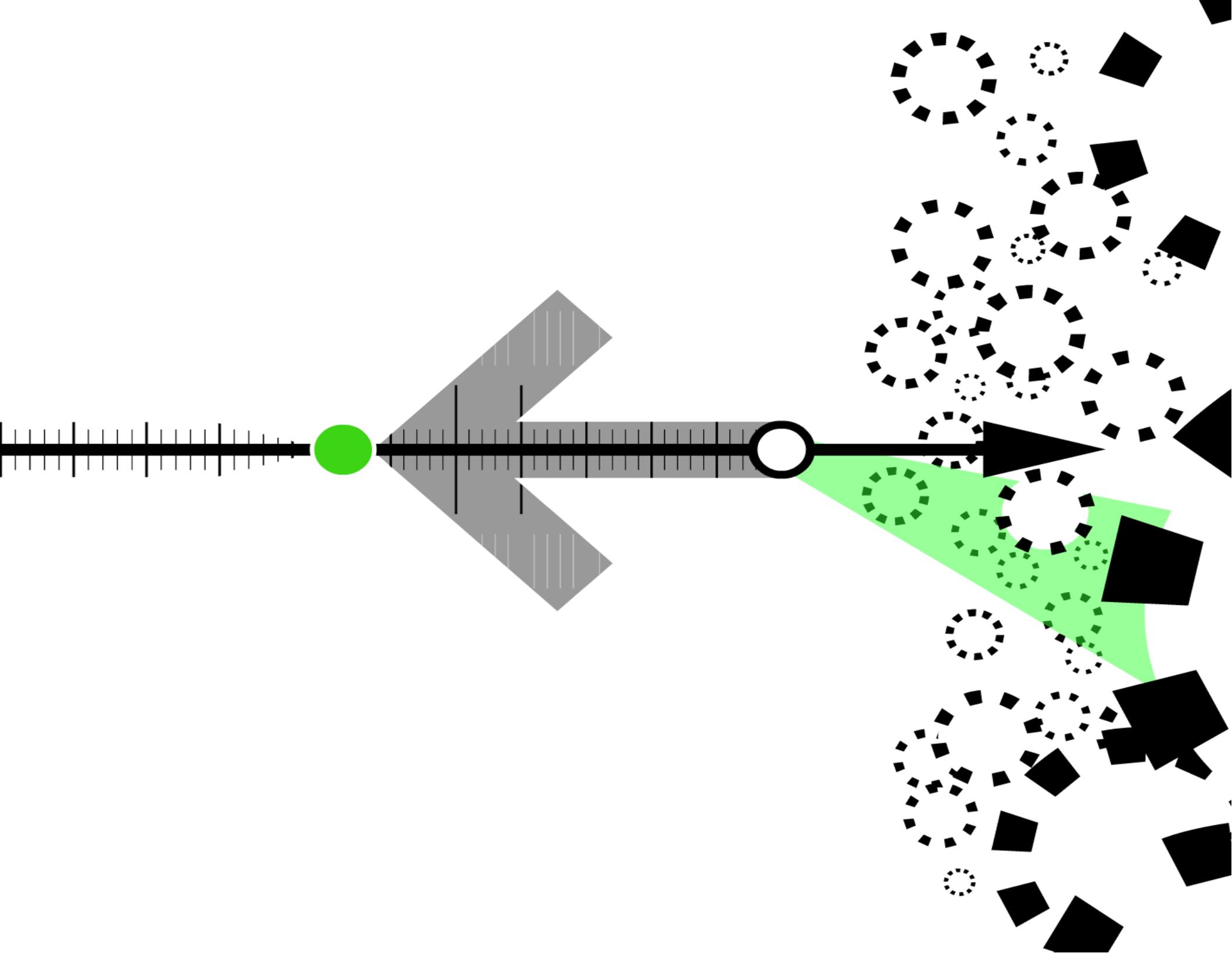
# The grounding of semiotics

Awareness of change

Defining semiotics from the perspective of its necessity: To couch semiotics in the fundamental dimension of life: anticipation

Life is goal driven: from what is to what might be

Sense of future



# Why is life not reducible to a machine? Signs are not signals

*Machine, or Engine, in Mechanicks, is whatsoever hath Force sufficient either to raise or stop the Motion of a Body... Simple Machines are commonly reckoned to be Six in Number, viz. the Ballance, Leaver, Pulley, Wheel, Wedge, and Screw... Compound Machines, or Engines, are innumerable.*

*Lexicon Technicum, John Harris, 1704*

*...that the machines were ultimately destined to supplant the race of man, and to become instinct with a vitality as different from, and superior to, that of animals, as animal to vegetable life. So... they made a clean sweep of all machinery that had not been in use for more than two hundred and seventy-one years...*

*The Book of the Machines, three chapters of Erewhon, Samuel Butler, 1872*

Machine metaphors:

hand ax, Archimedean simple machines: lever, pulley, and screw, inclined plane, clock, pneumatic, hydraulic, thermic, electric, computer, etc.

Singularity

The machine's future state

Ambiguity is implicit in the dynamics of the living

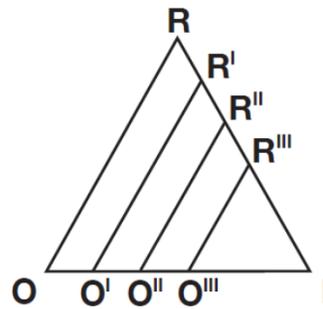
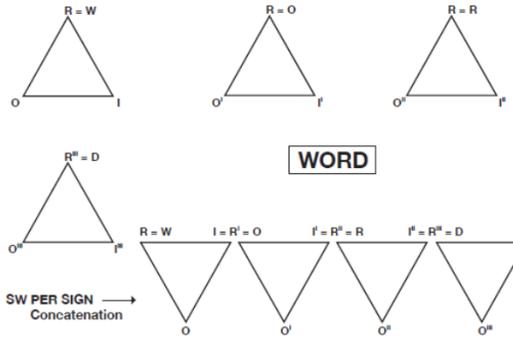
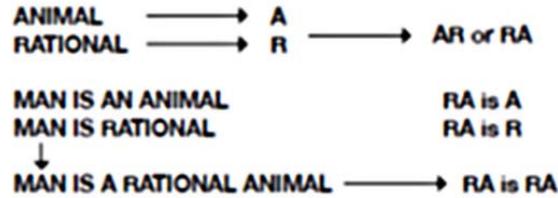
In the machine domain ambiguity is eliminated

## A holistic view

- Nomothetic science: advances descriptions of reality through general laws
- Idiographic science: advances descriptions of specific events (Windelband, 1915)
- The living is the domain of infinite diversity: repetition without repetition (N.A. Bernstein, 1937)
- The living can be investigated
  - from the perspective in which all entities are alike (homogeneity)
  - from an interest in understanding infinite heterogeneity

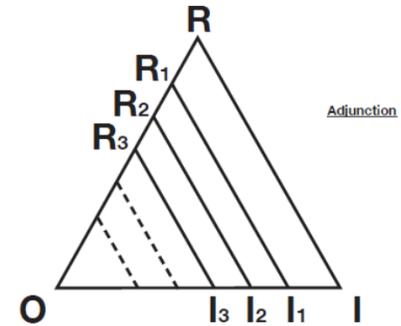
The living is the expression of creativity: nothing is the same (Elsasser, 1987)

# Semiosis: a challenge



Equivalence  
 °C ~ "Fahrenheit  
 f ~ m  
 \$ ~ SF  
 RIT ~ Rochester Institute of Technology

Mary, Sweetheart, Honey, Candy.



120 permutations

Leibnitz - binary system

1 2 3 4 5 6 7  
 1 10 11 100 101 110 111...

Man is a rational animal  
 110 = 10 x 11

All ideas expressed with only 2 signs

Music - 1 - tone; 0 - semitone

C<sup>1</sup> D<sup>2</sup> E<sup>4</sup> F<sup>8</sup> G<sup>16</sup> A<sup>32</sup> B<sup>64</sup>

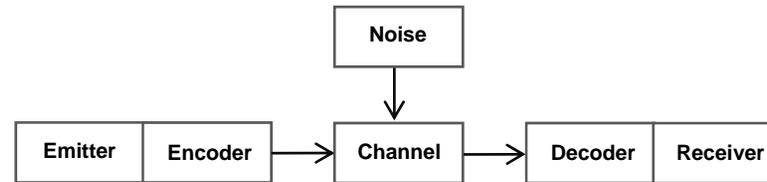


## From the sign to the semiosis called narration

- The king died March 23, 1766. The queen died three days later.  
Narration: time series (*narrare*: to recount)
- The king died, and then queen died of grief: story
- E. M. Forster, *Aspects of the Novel* (1927)
- The king died and then the queen died . . . and there was something interesting about that. Would you like to hear the story?

# Data and information

Meaning is defined through interpretation: from narration (the tossing of the coins) to story—What does it mean?



*The Mathematical Theory of Communication*, Claude Shannon and Warren Weaver (1949)

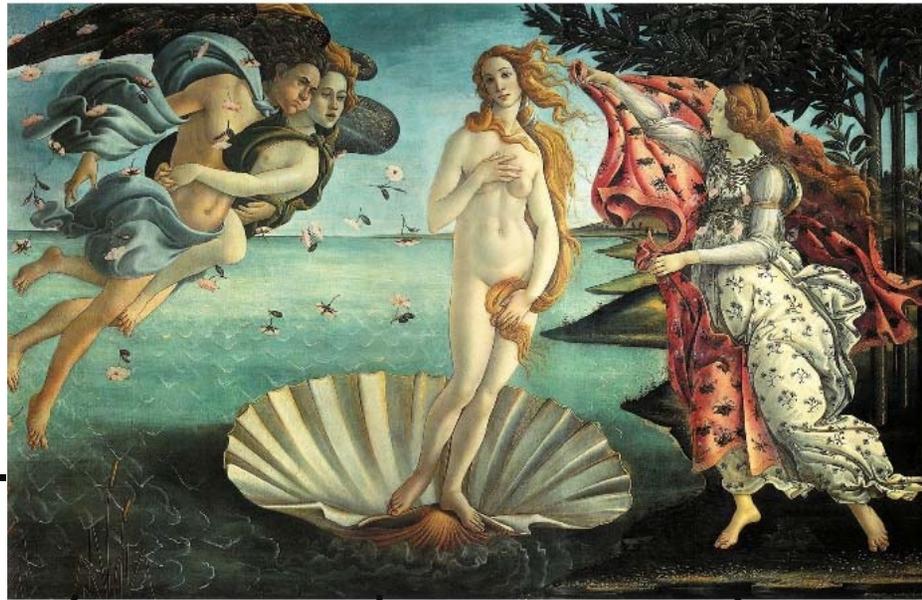
$$H = - \sum p(x) \log p(x)$$

The bit:  $p(\text{heads})$  and  $p(\text{tails})$   $\frac{1}{2}$



Data associated with meaning  $\longrightarrow$  INFORMATION

# The knowledge domain of semiotics is meaning



*The Birth of Venus*

## Greek mythology

Venus: naked goddess isn't a symbol of earthly but of spiritual love.

Shell held by Zephyrus: spiritual passions

Zephyrus: god of winds

One of Ores, goddesses of the seasons

## Roman mythology

**Pliny the Elder** had mentioned a lost masterpiece of the celebrated artist, **Apelles**, representing *Venus Anadyomene* (Venus Rising from the Sea). Was the two-dimensionality of this painting a deliberate attempt to replicate the style of ancient painting as found on Greek vases or on the walls of Etruscan tombs?

## Piero de Medici

Celebration of the love of Giuliano di Piero de Medici for Simonetta Cattaneo Vespucci, who lived in Portovenere, a town by the sea with a local tradition of being the birthplace of Venus. It must be noted that Botticelli himself also privately loved the beautiful Simonetta, who was de Medici's mistress.

## Neoplatonism

"Stanzas", a famous poetic work by **Agnolo Poliziano**. The work would mean the birth of love and the spiritual beauty as a driving force of life. Great physical beauty was a direct springboard to spiritual beauty and intellectual love.

## Aesthetic

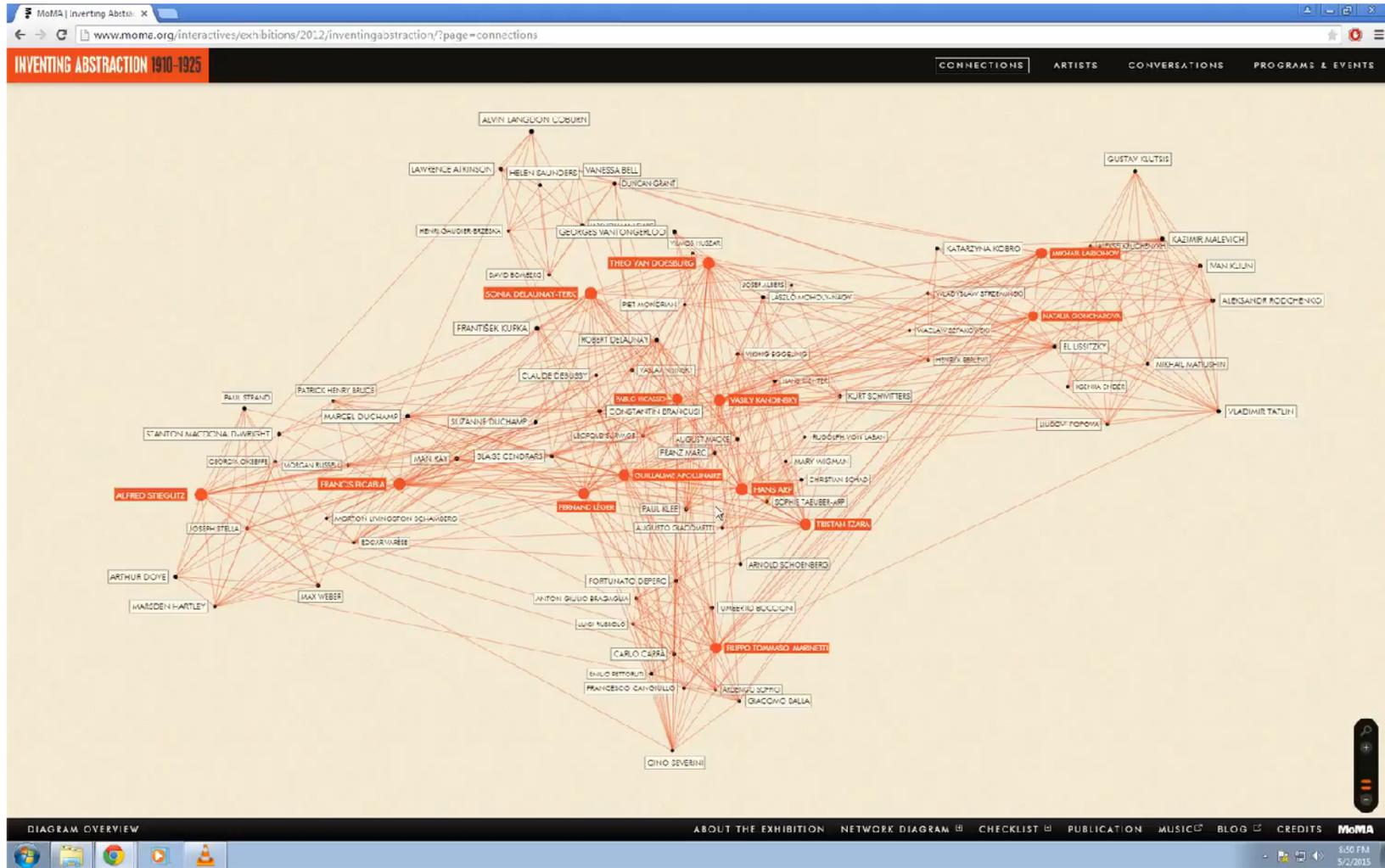
Ovid's *Metamorphoses*  
The scene was inspired by the text in a Homeric hymn published in Florence in 1488 by the Greek refugee Demetrios Chalkokondyles.

The *Birth of Venus* is the first example in Tuscany of a painting on canvas. Moreover the special use of expensive alabaster powder, making the colors even brighter and timeless, is another characteristic that makes this work unique.

## Christianity

Standard portrayals of the Virgin Mary  
Zephyrus: angel  
Baptism of Christ (St. John the Baptist)

# Complex networks and semiotics



# Knowledge is a construct

- Data, information, meaning
- Semiotics and anticipation

## Counting

- Big Data
- Algorithmic computation
- Neuronal networks
- DNA computing
- .....
- Repetitive domain

## Re/counting

- Meaning of data: premise for anticipatory expression
- Non-repetitive

$$X = f(x(t-1), x(t), x(t+1))$$

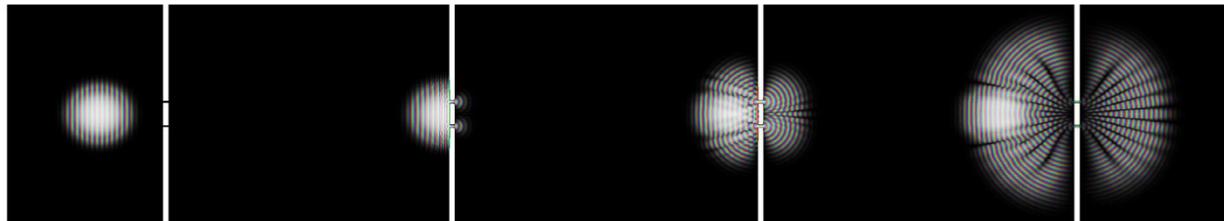


The domain of  
the probable

The domain of  
the possible

# Knowledge is a construct

- The *Universe* is made of *stories*, not of atoms  
Muriel Rukeyser, *The Speed of Darkness*, 1968
- Heliocentrism, natural selection, plate tectonics, gravity, thermodynamics, relativity, quantum mechanics
- Narration and associated story



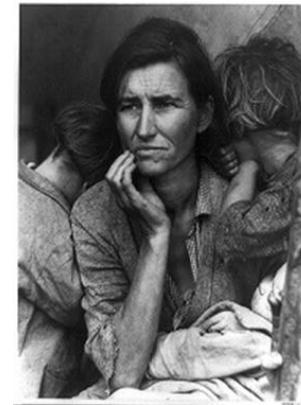
- Nomothetic and idiographic aspects. All expressed in language: written, visual, etc., scientific, specialized, computational, etc. The semiotics of knowledge acquisition, expression, and communication
- The meaning of science: the pragmatic dimension of the knowledge

# Semiotics and the necessity of dealing with meaning

- Narration: meaning of data as in re/counting



1929 crash



- Story: meanings, ambiguity
- Narrations: 9/11 events; elections; accidents; landing on the moon
- Stories: political implications, medical consequences, scientific, economic, political, moral aspects