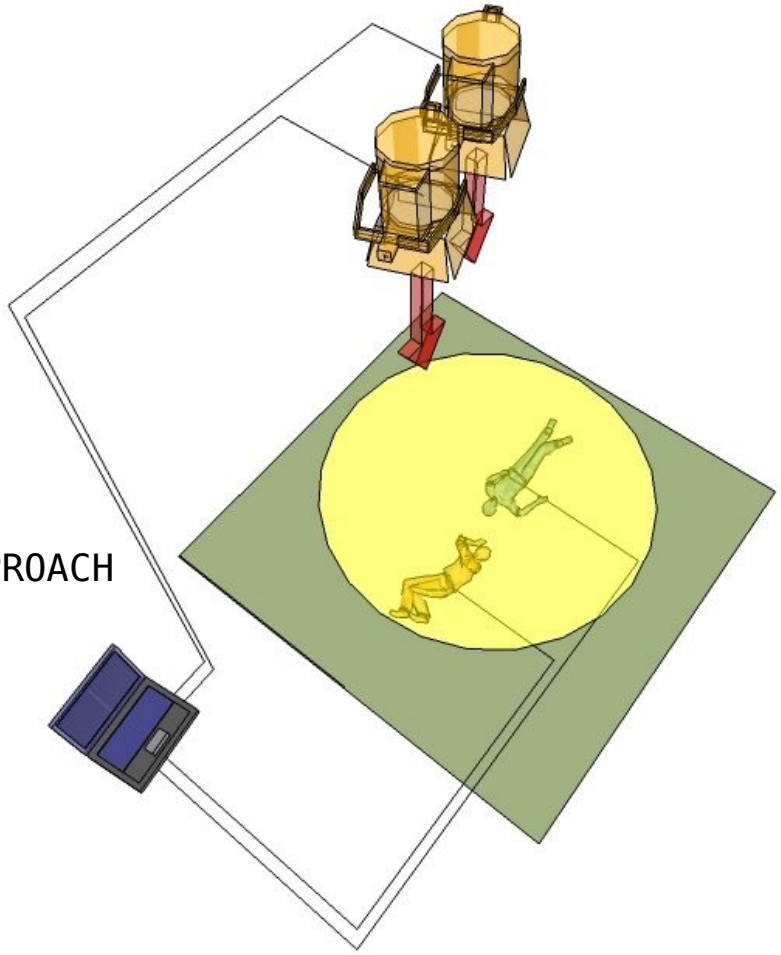
TOWARD A NON-VISUAL IMAGE
(an artistic approach)

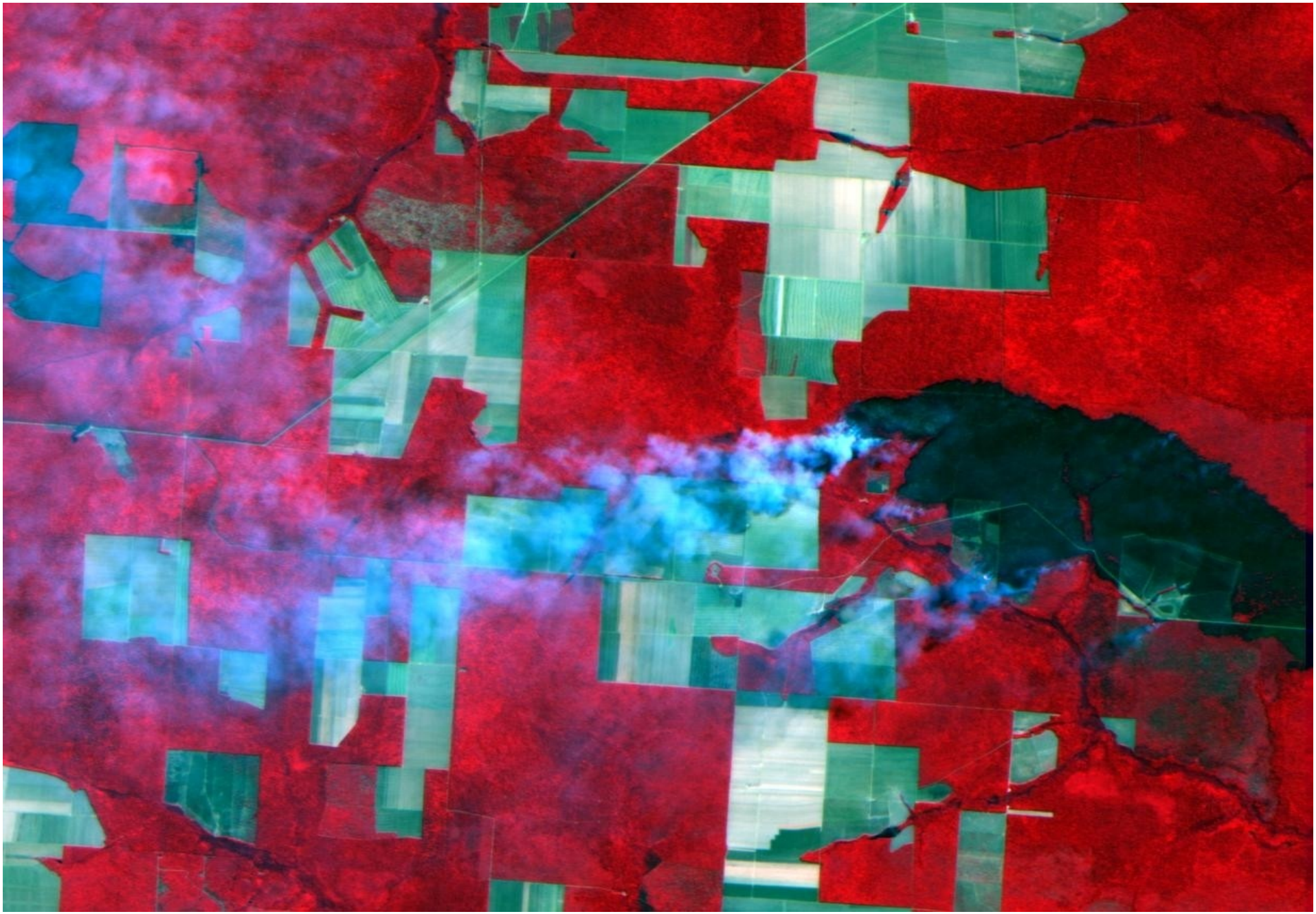
Olivier Perriquet

IMAGE IS AN AMBIGUOUS CONCEPT
THE POWER AND LIMITS OF IMAGES AND METAPHORS
VISUAL MODELS IN SCIENCE IMPOSE A CONCEPTUAL FRAMING
THE IMAGE SPARKS THE IDEA = DISCOVERY OF DNA STRUCTURE
THE IDEA PRECEDES THE IMAGE = NON EUCLIDEAN GEOMETRIES
LIMITS OF VISUALIZATION ?

THE PAPER BEAD GAME

DESIGNING AN EXPéRIENCE // A SENSITIVE AND SEMIOTIC APPROACH





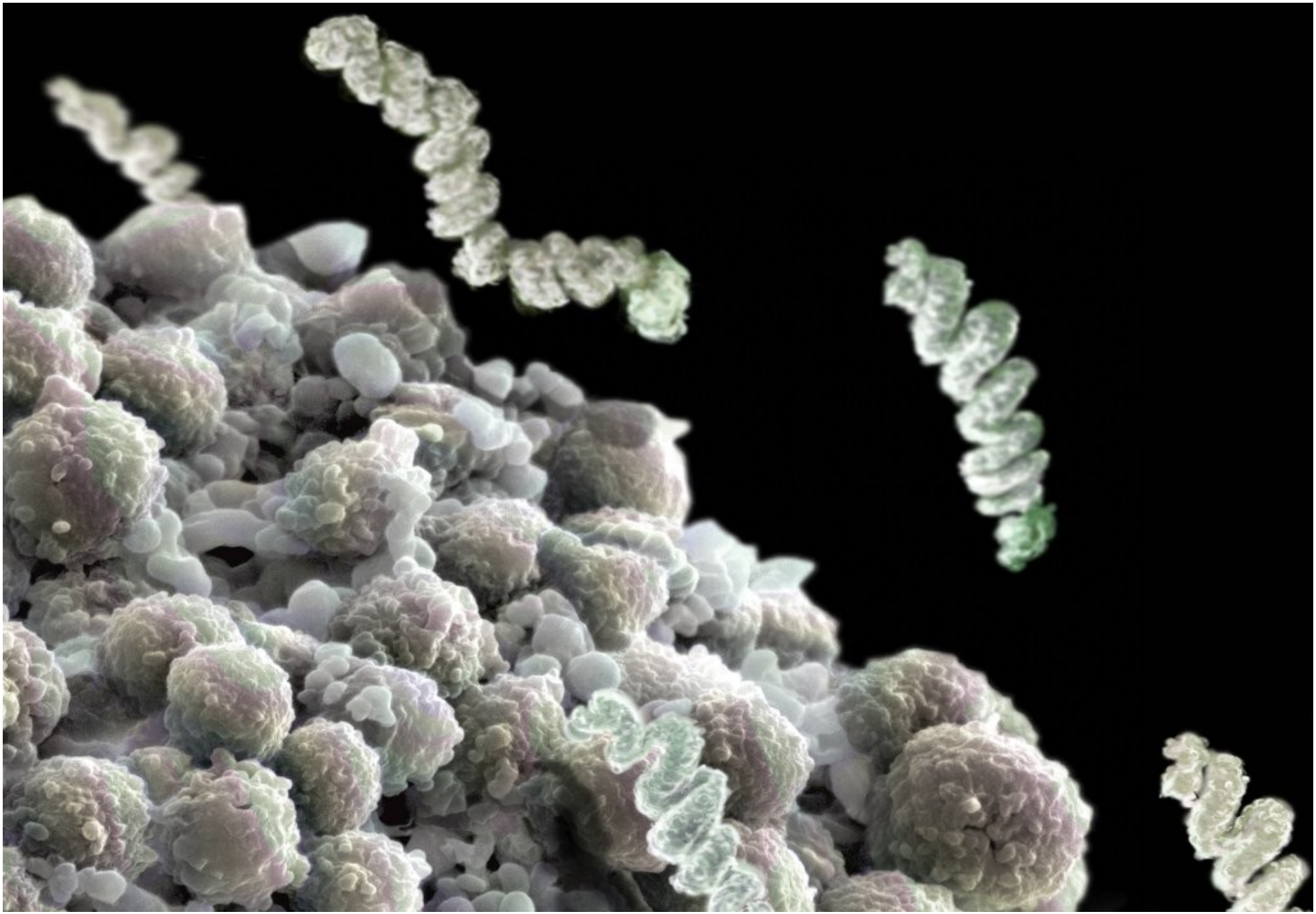


IMAGE IS AN AMBIGUOUS CONCEPT

Image:

1. perceptible representation or replica (~ faithful duplication)
   nature of the relation between the object and its image
   → physical / optical = photography
   → iconic (cf. in Pierce's semiotics sign => index, icon, symbol) = drawing
   → analogical = «he is the image of his father»

2. mental representation
   → reproduction of a percept
   → conceptualisation of an idea
   → mental production (eg. dreams)

I have coined the term 'bisociation' in order to make a distinction between the routine skills of thinking on a single 'plane', as it were, and the creative act, which, as I shall try to show, always operates on

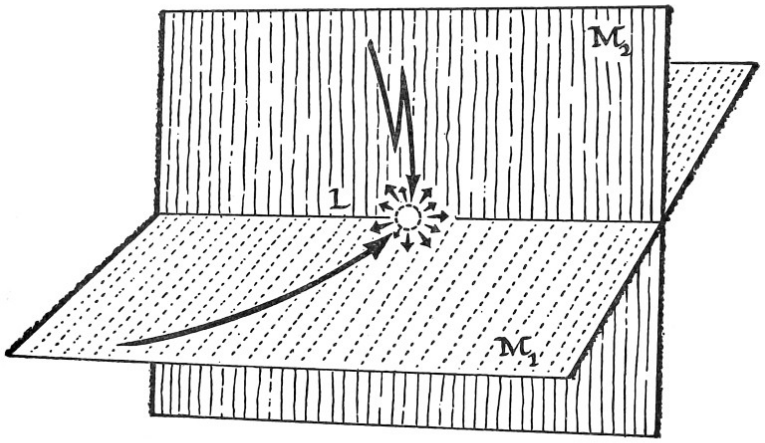


FIGURE 2

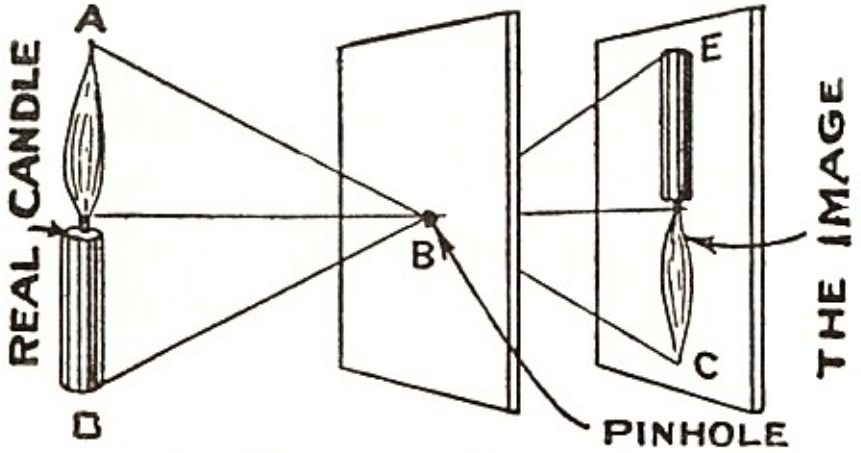


FIG. 131.—How Light and a Pinhole Form an Image.

Koestler's bisociation (The act of creation)

What happens if we try to break the «built-in» native bisociative functionality of the concept of image ?
can we think of a non-visual image ?

THE POWER AND LIMITS OF IMAGES AND METAPHORS

Metaphors we live by (Lakoff & Johnson)

About the expression: «visual field»:

« We conceptualize our visual field as a container and conceptualize what we see as being inside it. Even the term "visual field" suggests this. The metaphor is a natural one that emerges from the fact that, when you look at some territory (land, floor space, etc.), your field of vision defines a boundary of the territory, namely, the part that you can see. Given that a bounded physical space is a CONTAINER and that our field of vision correlates with that bounded physical space, the metaphorical concept VISUAL FIELDS ARE CONTAINERS emerges naturally. »

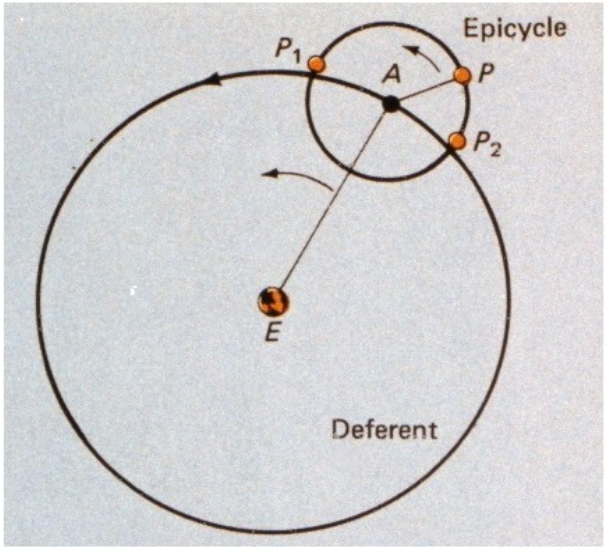
In relation with other expressions («artistic field», «magnetic field», …) they form a network of interdependant meanings

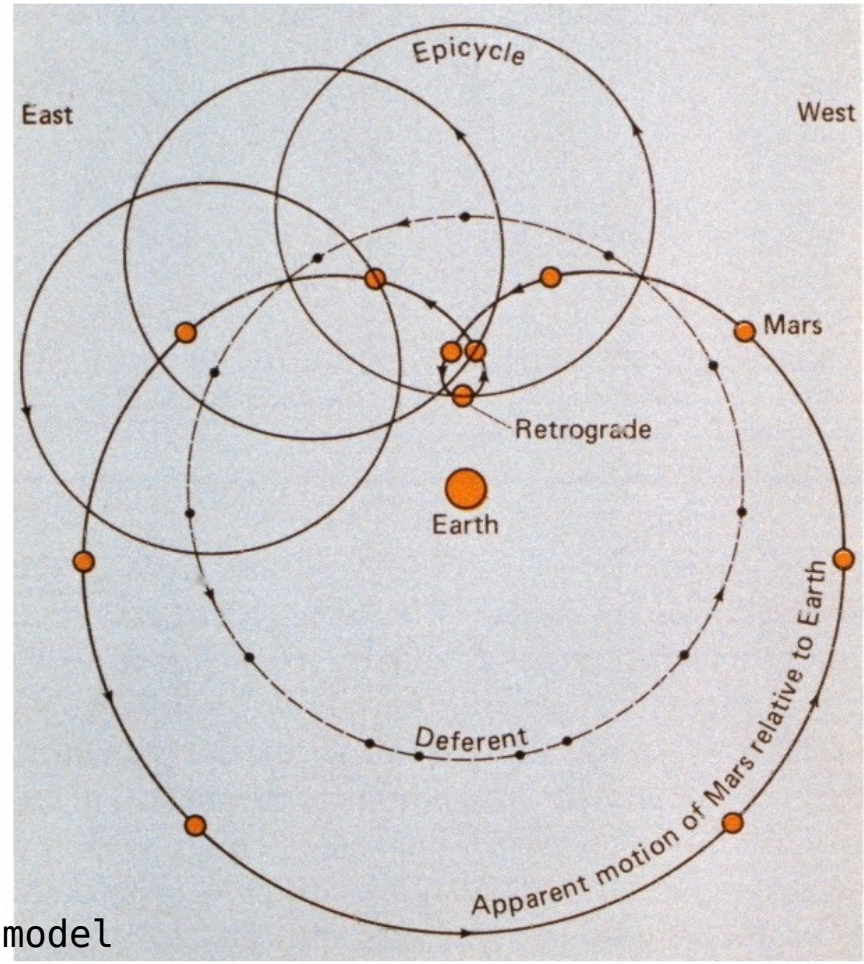
Metaphors as well as images imply that we will be thinking in a certain « plane ».

VISUAL MODELS IN SCIENCE IMPOSE A CONCEPTUAL FRAMING

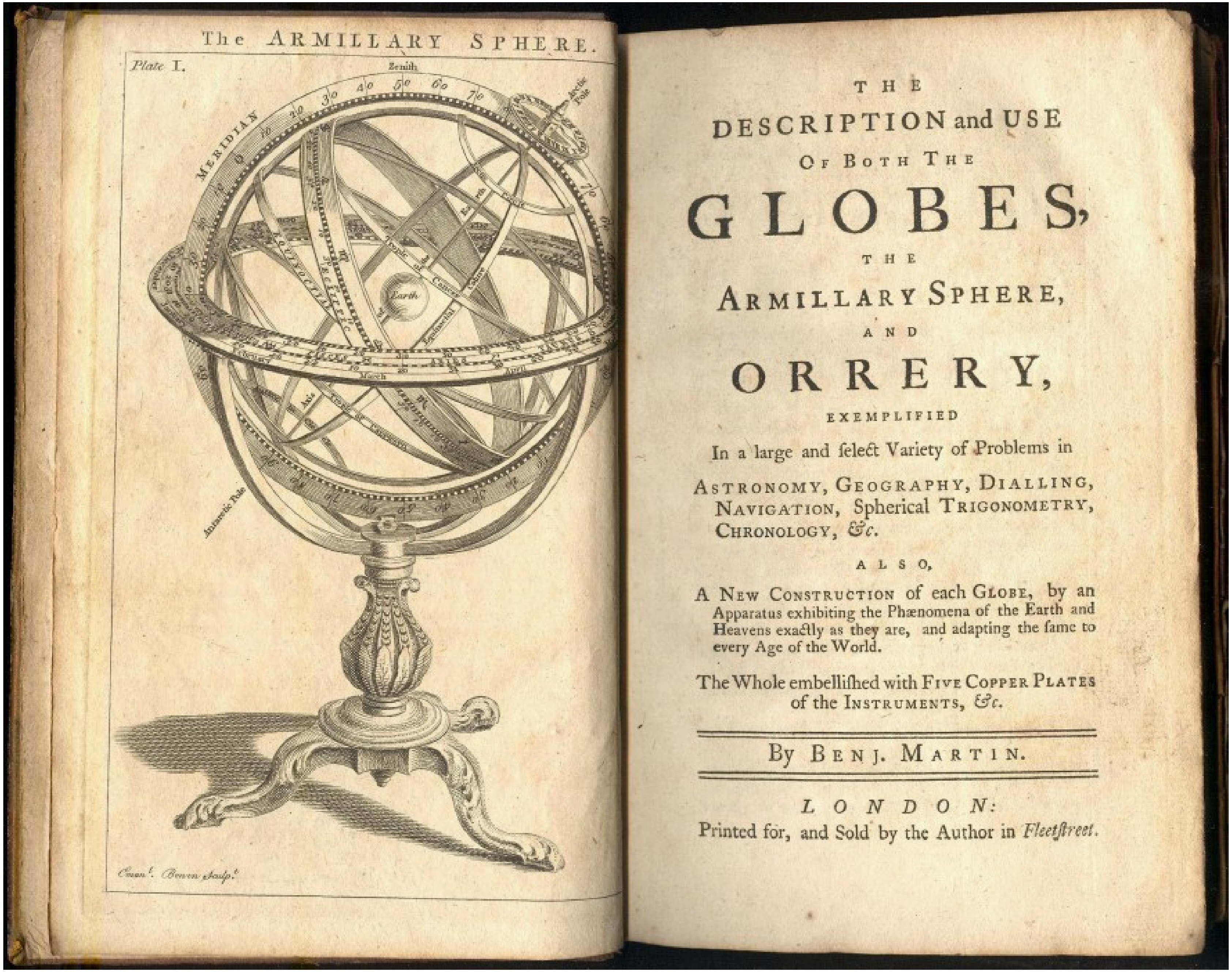
science (as we know it) has not always existed
«scientific revolution» 1543 → ~1800 (Alexandre Koyré's coin)

90-168 – Ptolemy → geocentric system
(cycles, epicycles, deferent)





1452-1519 – Leonardo da Vinci
1473-1543 – Copernicus → complex heliocentric circular model
1548-1600 – Giordano Bruno → infinity of the universe
1564-1642 – Galileo Galilei → defend heliocentric model
1571-1630 – Kepler → heliocentric elliptic system
1643-1727 – Isaac Newton → universal gravitation + considered the 'father' of modern science



The ARMILLARY SPHERE.

Plate I.

THE

DESCRIPTION and USE

OF BOTH THE

GLOBES,

THE

ARMILLARY SPHERE,

AND

ORRERY,

EXEMPLIFIED

In a large and select Variety of Problems in

ASTRONOMY, GEOGRAPHY, DIALLING, NAVIGATION, Spherical TRIGONOMETRY, CHRONOLOGY, &c.

ALSO,

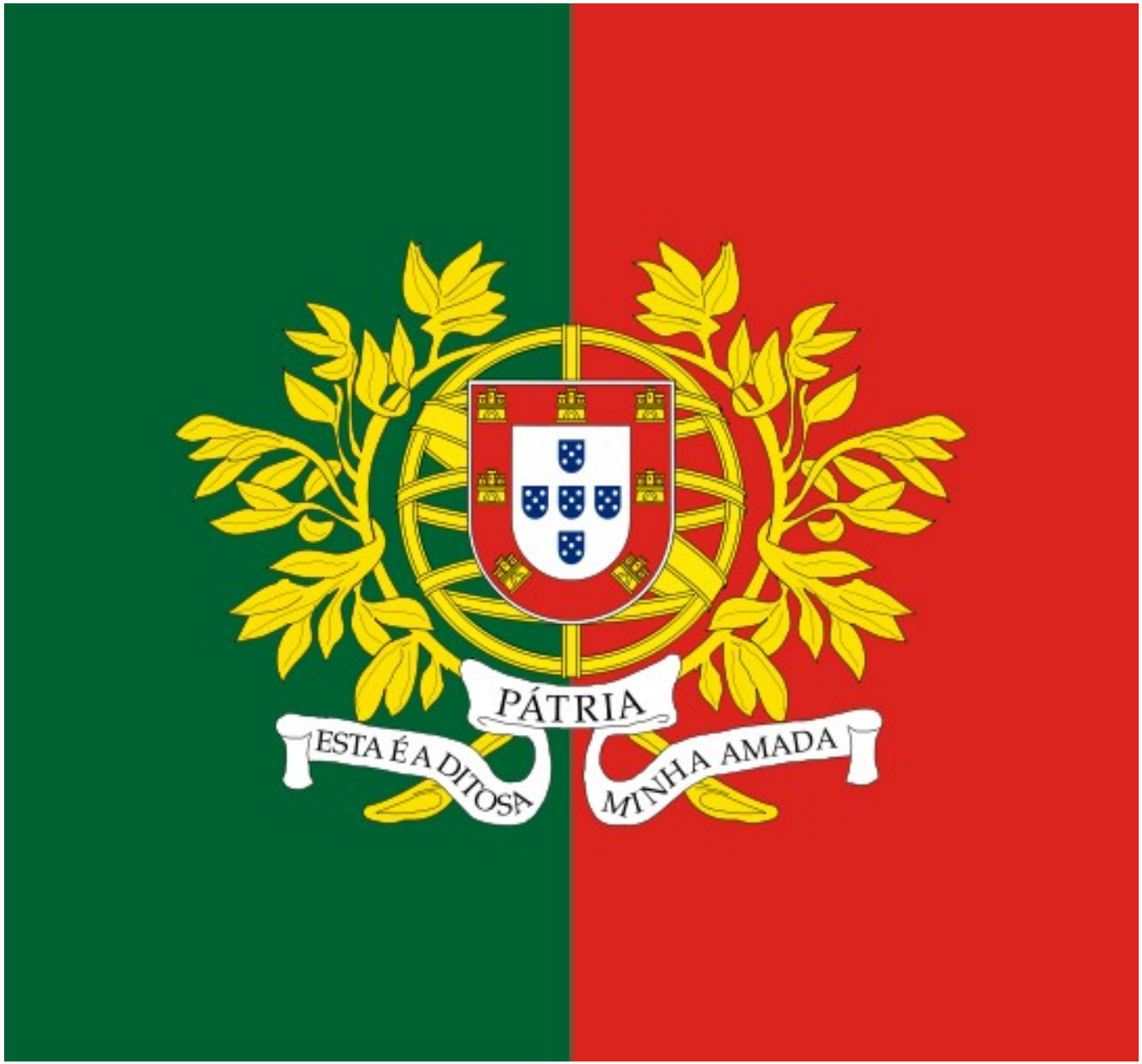
A NEW CONSTRUCTION of each GLOBE, by an Apparatus exhibiting the Phænomena of the Earth and Heavens exactly as they are, and adapting the same to every Age of the World.

The Whole embellished with FIVE COPPER PLATES of the INSTRUMENTS, &c.

By BENJ. MARTIN.

LONDON:

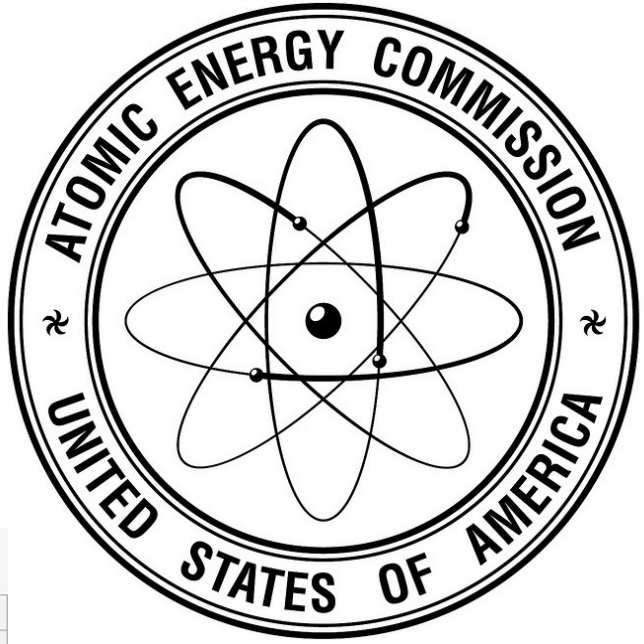
Printed for, and Sold by the Author in *Fleetstreet*.


PÁTRIA
ESTA É A DITOSA
MINHA AMADA

Atomic model of Rutherford (1911) inspired from astronomy
1871-1937 – Ernest Rutherford → Nobel Prize of chemistry,
considered the father or nuclear physics

In the model of Bohr (1913) orbits are quantized, the electron
can only occupy a discrete series of orbits.

The orbital models (1924) → classified according to orbit
patterns, showing the probability of presence of an electron



formed by taking linear combinations of the p_{+1} and p_{-1} orbitals (which is why they are listed under the m=±1 label). Also, the p_{+1} and p_{-1} are not the same shape as the p_0, since they are pure spherical harmonics.

	s (l=0)	p (l=1)			d (l=2)					f (l=3)						
	m=0	m=0	m=±1		m=0	m=±1		m=±2		m=0	m=±1		m=±2		m=±3	
	s	p_z	p_x	p_y	d_{z^2}	d_{xz}	d_{yz}	d_{xy}	$d_{x^2-y^2}$	f_{z^3}	f_{xz^2}	f_{yz^2}	f_{xyz}	$f_{z(x^2-y^2)}$	$f_{x(x^2-3y^2)}$	$f_{y(3x^2-y^2)}$
n=1																
n=2																
n=3																
n=4																
n=5										…	…	…	…	…	…	…
n=6					…	…	…	…	…	…	…	…	…	…	…	…
n=7		…	…	…	…	…	…	…	…	…	…	…	…	…	…	…

Understanding why atomic orbitals take these shapes

THE IMAGE SPARKS THE IDEA = DISCOVERY OF DNA STRUCTURE

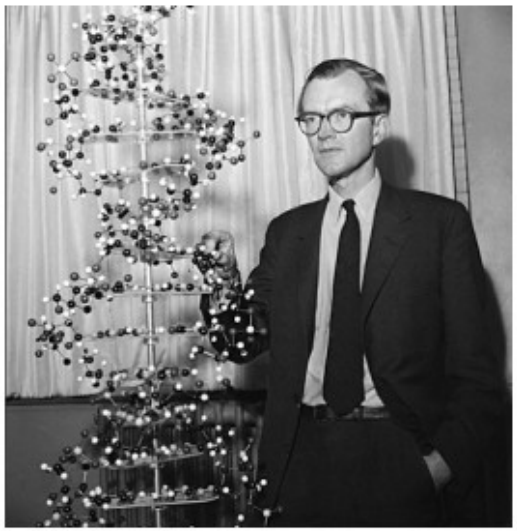
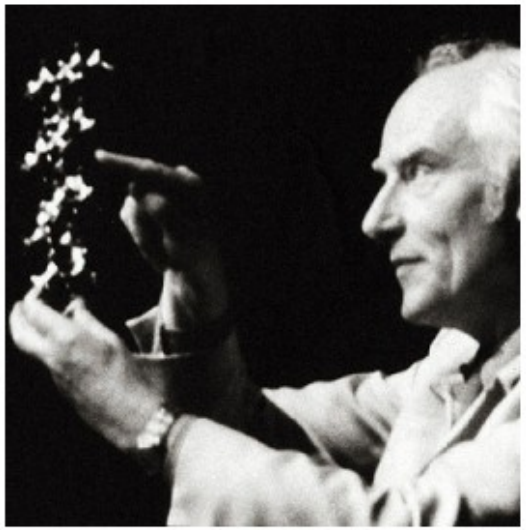
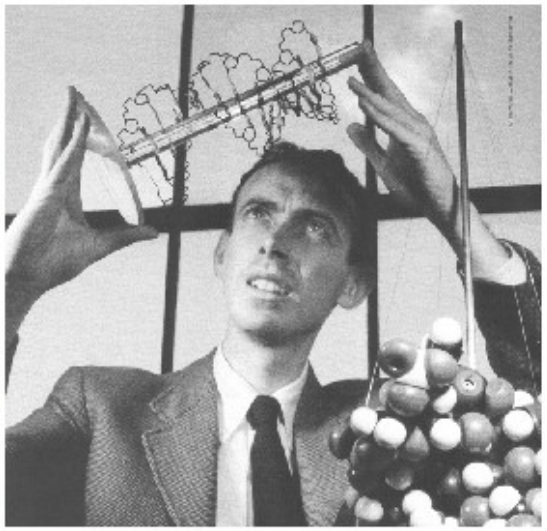
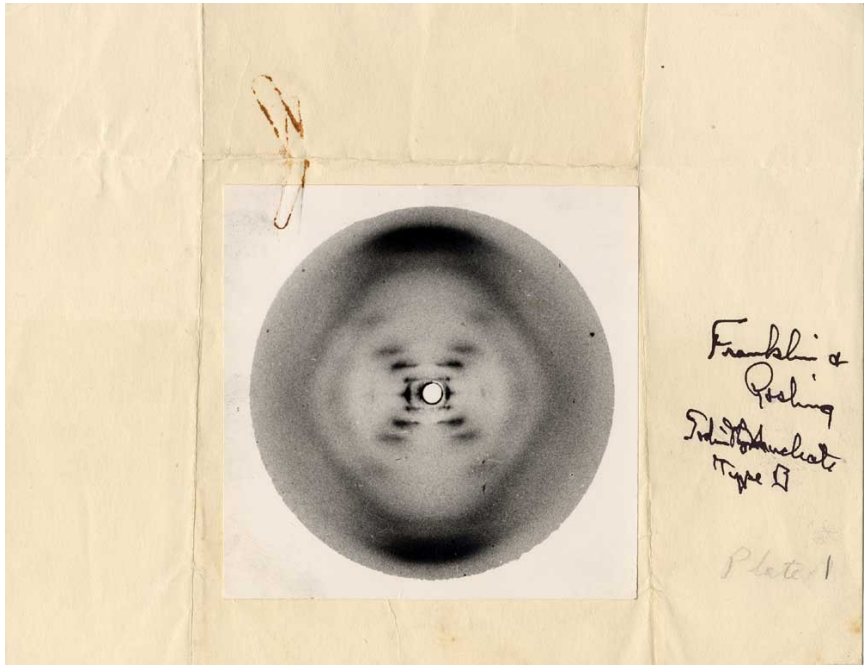






Photo 51

given the minimality of the representation on the image and the importance of the discovery (3 Nobel Prizes), if we could define a measure of the *non-visual* content coveyed by this image, it would be high.

THE IDEA PRECEDES THE IMAGE = NON EUCLIDEAN GEOMETRIES

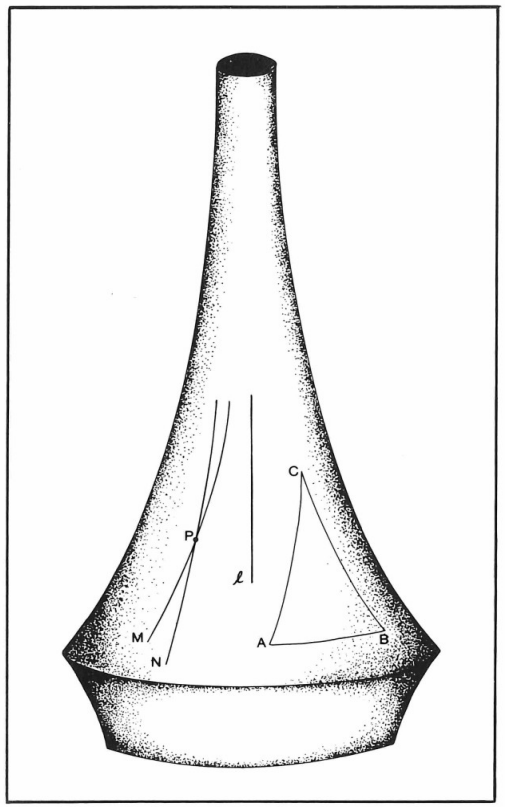
1. A straight line segment can be drawn joining any two points.
2. Any straight line segment can be extended indefinitely in a straight line.
3. Given any straight line segment, a circle can be drawn having the segment as radius and one endpoint as center.
4. All right angles are congruent.
5. If two lines are drawn which intersect a third in such a way that the sum of the inner angles on one side is less than two right angles, then the two lines inevitably must intersect each other on that side if extended far enough. This postulate is equivalent to what is known as the parallel postulate.

Euclid's parallel postulate reformulated: given a line and a point P that is not on the line, there is one and only one line through P that never meets the original line.

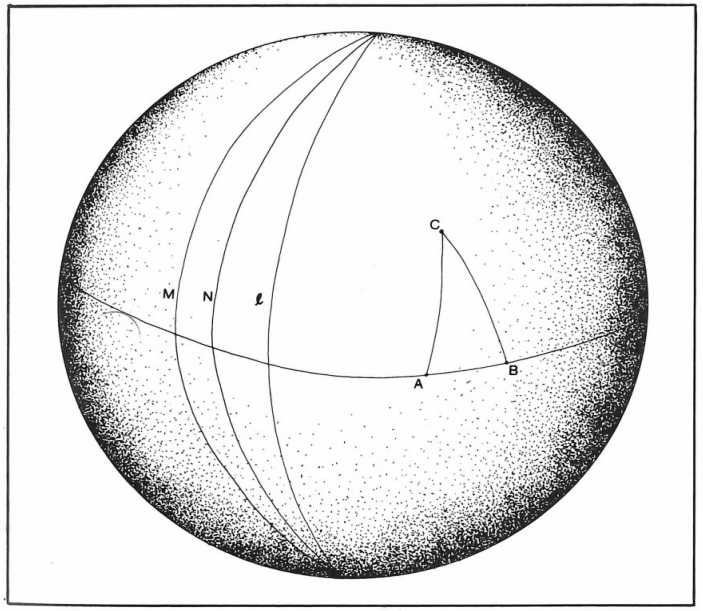
Axiomatization of mathematics...

Hilbert: *«One must be able to say at all times — instead of points, straight lines, and planes — tables, beer mugs, and chairs.»*

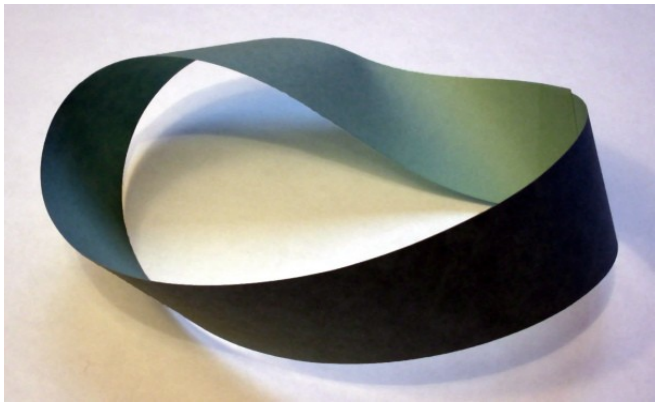
1. Beltrami's Pseudosphere for the Lobachevsky-Bolyai Geometry. Lines M and N through point P approach line *l*, but will never intersect it. $\sphericalangle ABC + \sphericalangle BCA + \sphericalangle CAB < 180°$.



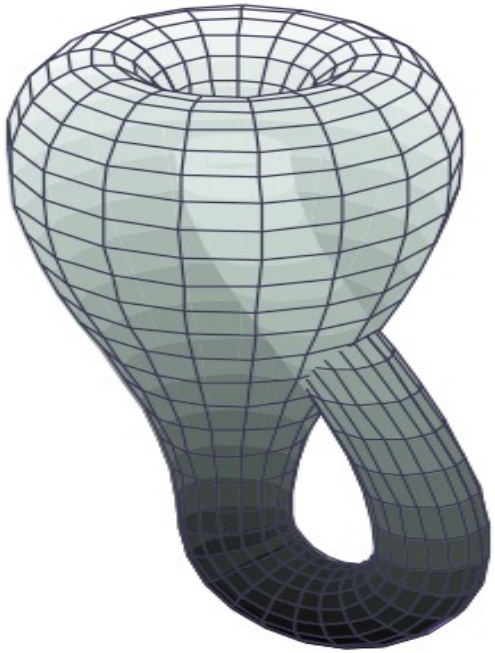
2. Riemannian Geometry Represented on a Sphere. Lines such as *l*, M, and N will always meet. $\sphericalangle ABC + \sphericalangle BCA + \sphericalangle CAB > 180°$.



LIMITS OF VISUALIZATION ?

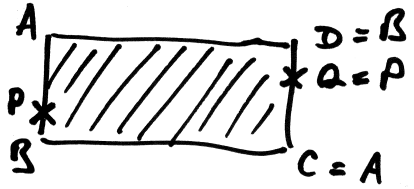


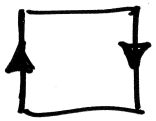
[Möbius strip]

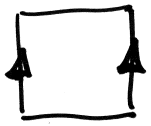


[Klein Bottle]

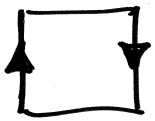
The Möbius strip is the quotient space R x [-1,1] by the relation of equivalence:
$(x,y) \equiv (x',y')$ if $\{ \exists k \in Z, (x',y') = (x+k, (-1)^k y) \}$



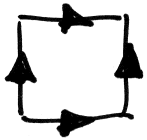




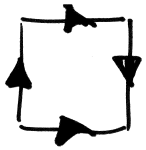
cylinder



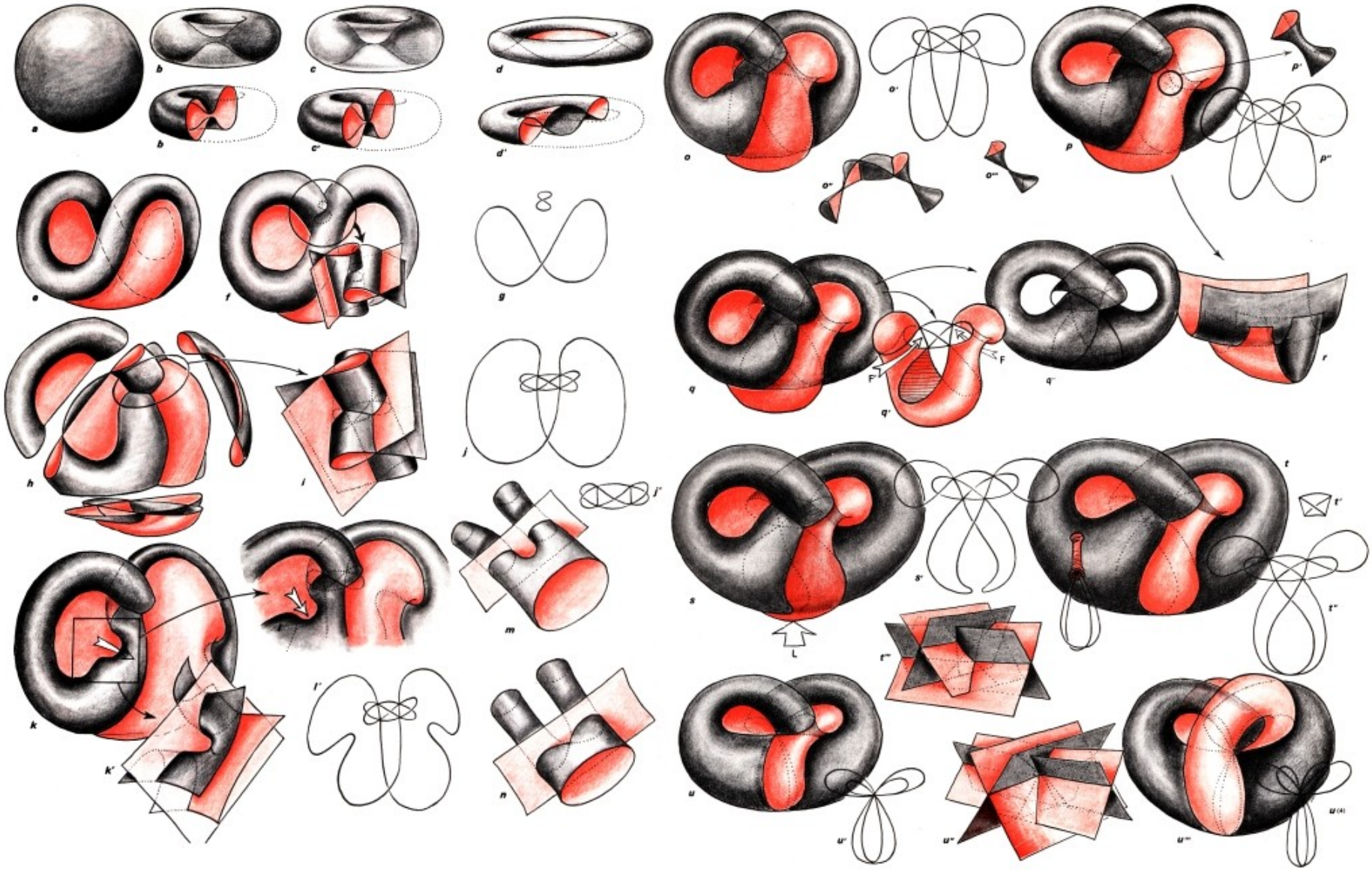
Möbius Strip



torus



Klein Bottle

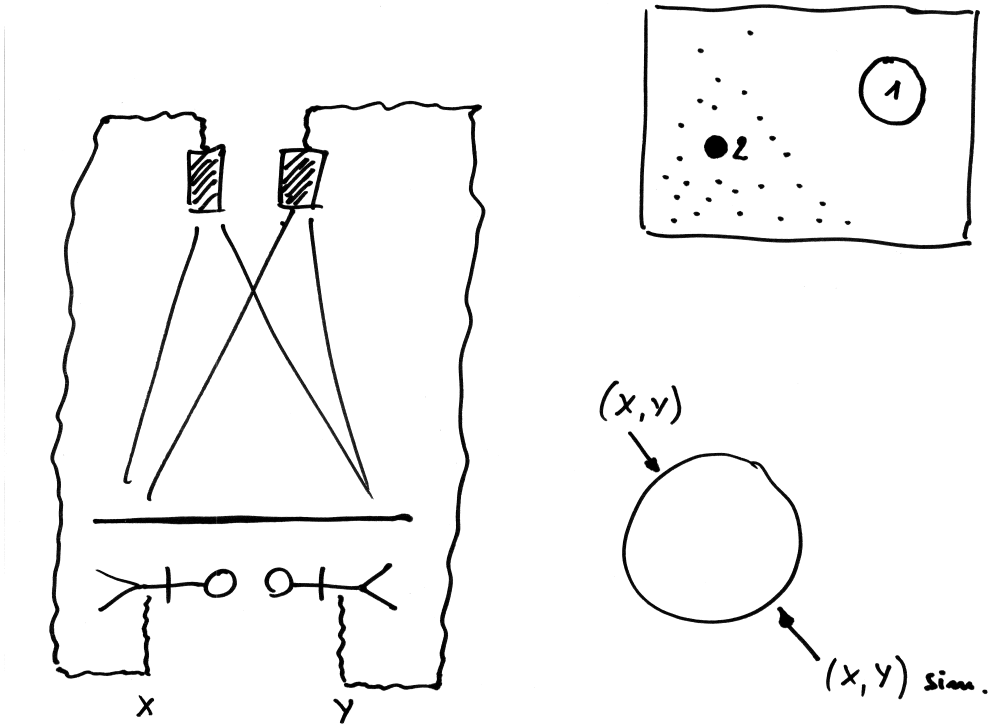


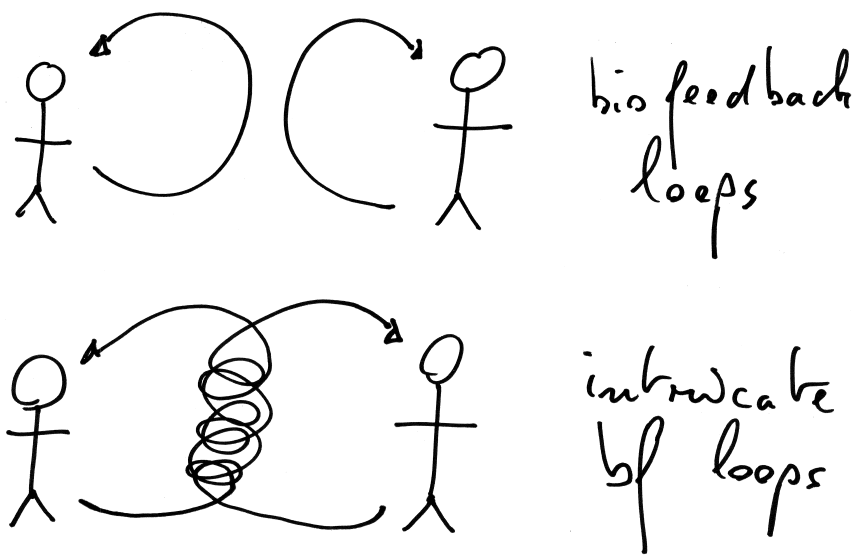
Boy’s surface was discovered in 1901. Sphere eversion was proven by Smale in 1958, and was a surprise. The gap of over 50 years is shocking: a form of sphere eversion is immediate from the existence of Boy’s surface.

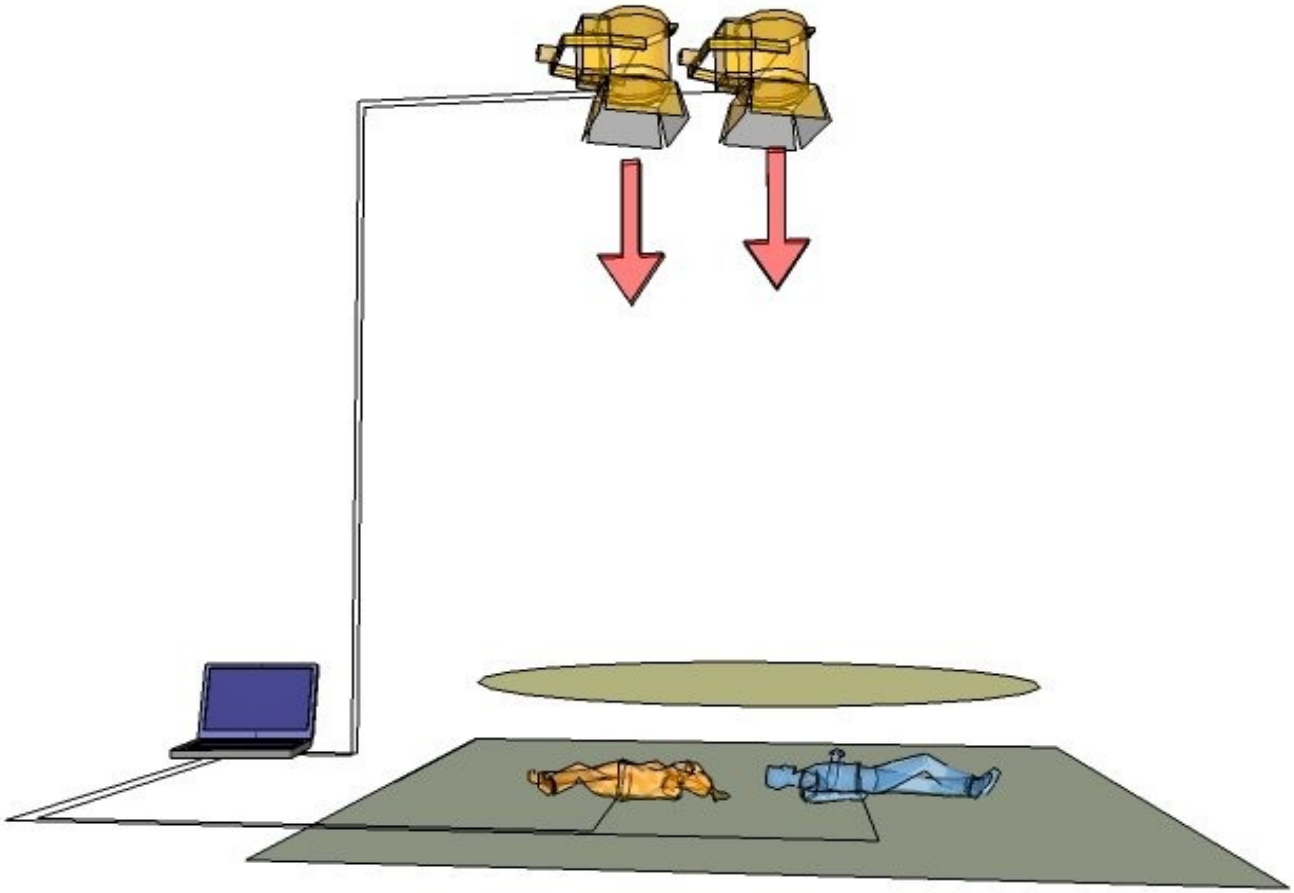
THE PAPER BEAD GAME

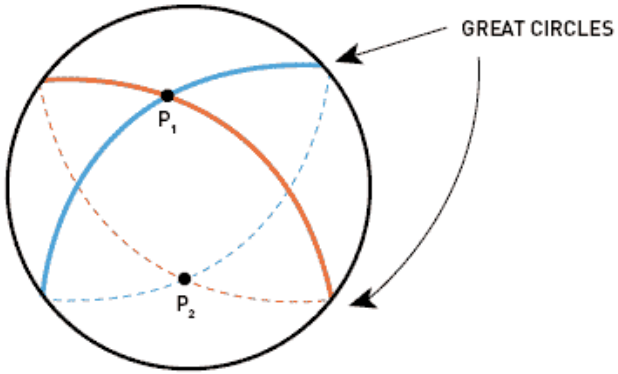
designing an *expérience* that would have the double flavour of *experience* and *experiment*

concept:
a mise-en-scene of the inner image (a sensory expérience)
and the outer image (a mathematically inspired representation)

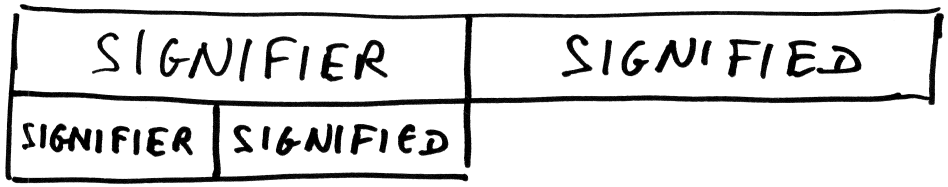







GREAT CIRCLES
P1
P2

Denotation vs. conotation



science = importance of the denotation, often default conotations

art is often inverting the importance of conotative and denotative lines
weakening the denotation by cancelling logical approaches
working directly at the conotative level, finding new organizations of signs

art + **science** = rehabilitating the coexistence of the two levels ?