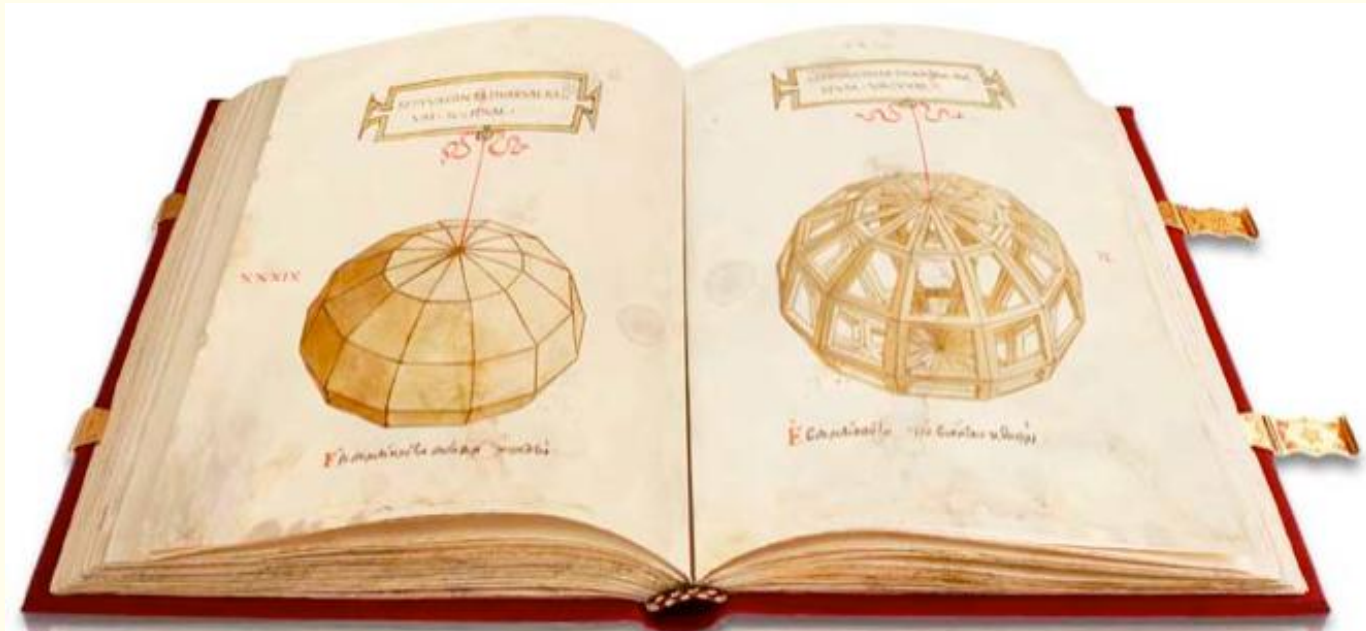


Science and Technology meet Humanities

An educational issue

Paolo Strolin (Univ. Federico II and INFN, Napoli)
Hiroshi Nakajima (UNESCO IAA/Japan Artists Association, Inc.)
Workshop Muographers 2016, Tokyo, 8 Nov. 2016

A multifaceted topic



Luca Pacioli, *De Divina Proportione* (1498)
With drawings by Leonardo da Vinci (?)

Science was born together with Philosophy



**Raphael, *Plato's Academy in classic Athens* (1509-1511)
*Stanza della Segnatura, Vatican***

Science and Technology dominate the world of today

**They have greatly improved the quality of our lives and
can bring further progress**

**Education in Science and Technology is fundamental
since the young age**



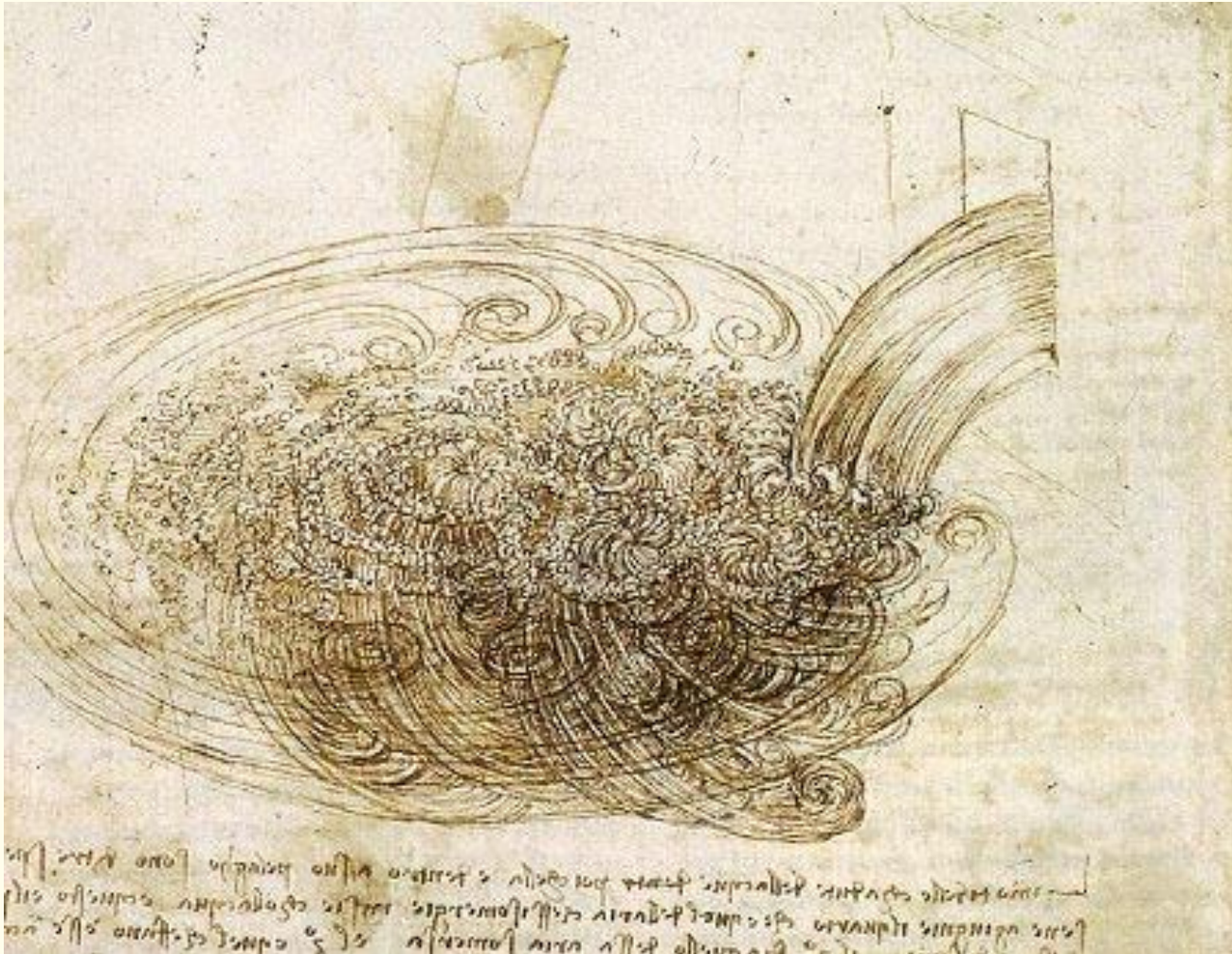
**What is the role of Humanities
in the present scientific and technical context?**

Among Humanities, the primordial language is Art



Lascaux Cave (France, ca. 17,000 years ago)

Art helps describing phenomena



Leonardo Da Vinci

A pioneering study of chaotic fluid motion

Codex Atlanticus (1478-1519), Biblioteca Ambrosiana, Milano

Art helps communicating to the general public messages from Science and Technology



Andy Warhol, *Vesuvius* (1985)

Museo di Capodimonte (Naples)

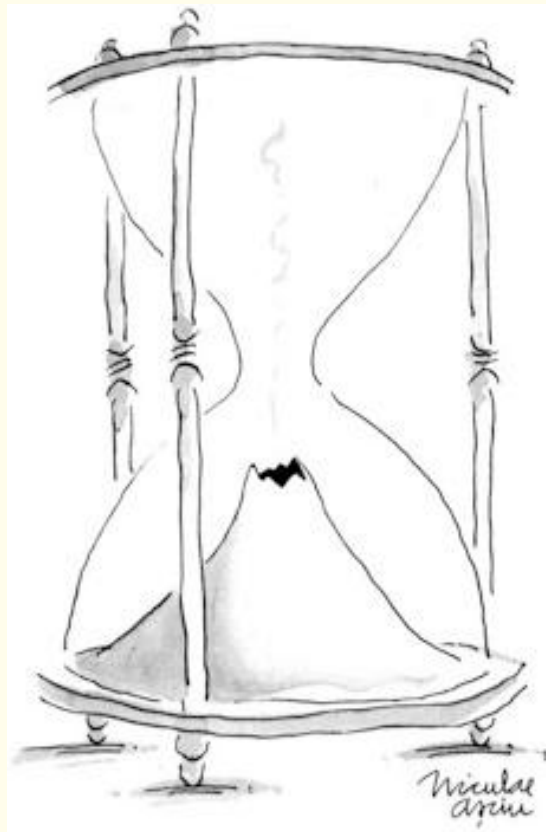
An image instantly hits: a graphic “haiku”

... this since centuries



Vesuvius, from the “Book of Miracles”, Augsburg (c. 1550)

... through different forms of Art

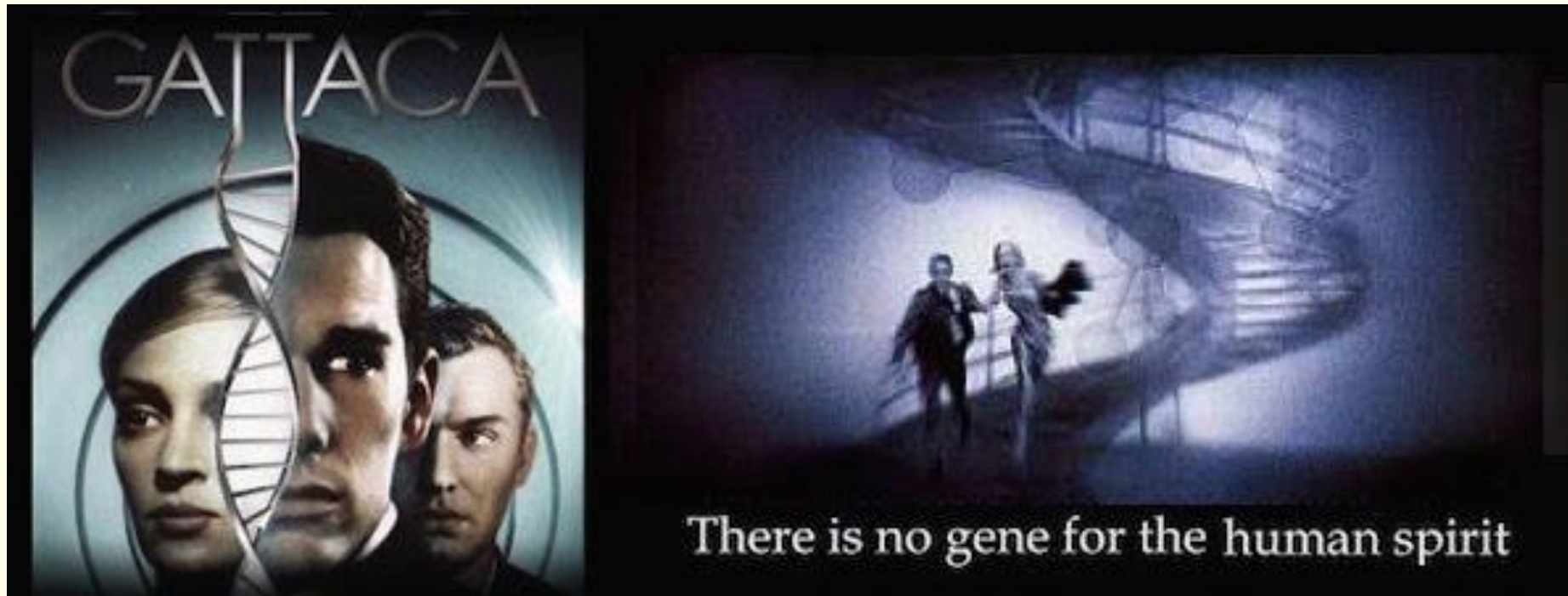


From *The New Yorker*

**A volcano is as a sand clock with invisible sand:
it can be over at any time**

Humanities raise curiosity for Science

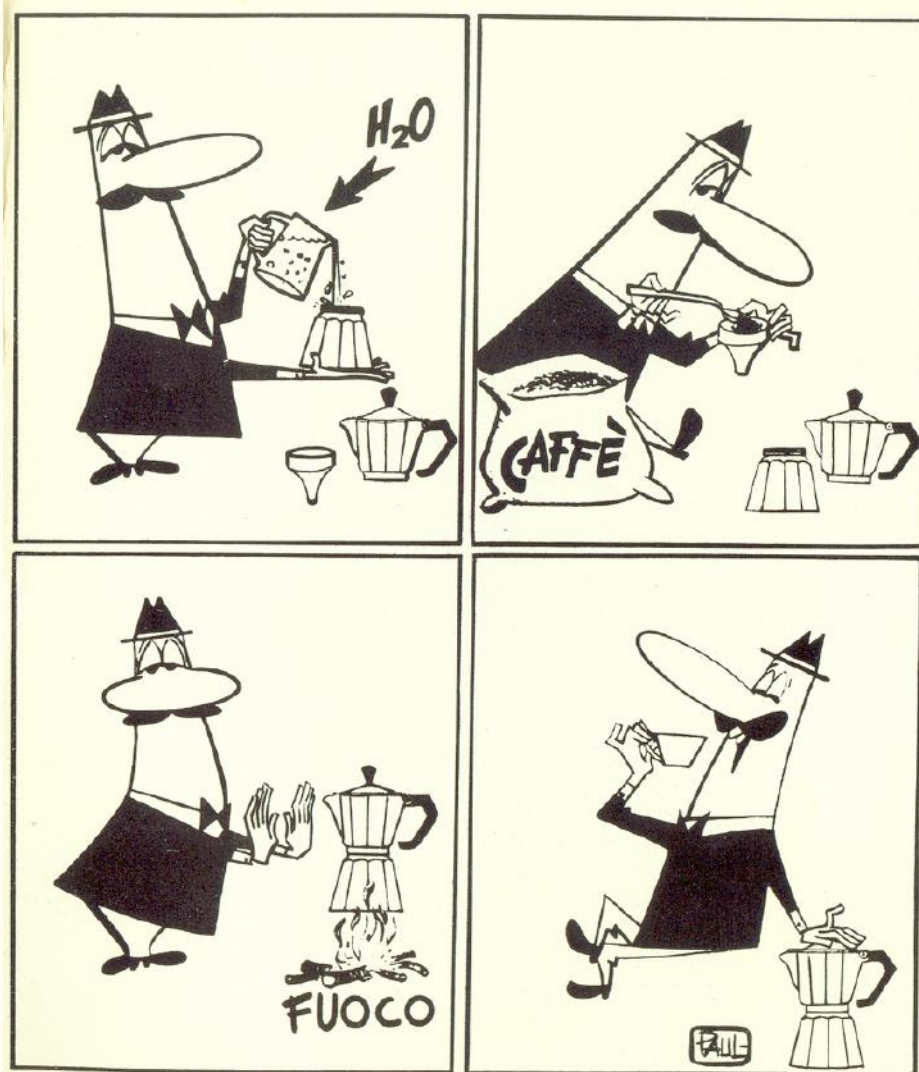
An example from Science Fiction



David Kronenberg, *Gattaca*, (1997)

What could happen if gene manipulations would be applied to “improve” human beings?

Synergy of Science and Technology with Art may produce benefits



Applied Physics gave us
the Moka Express

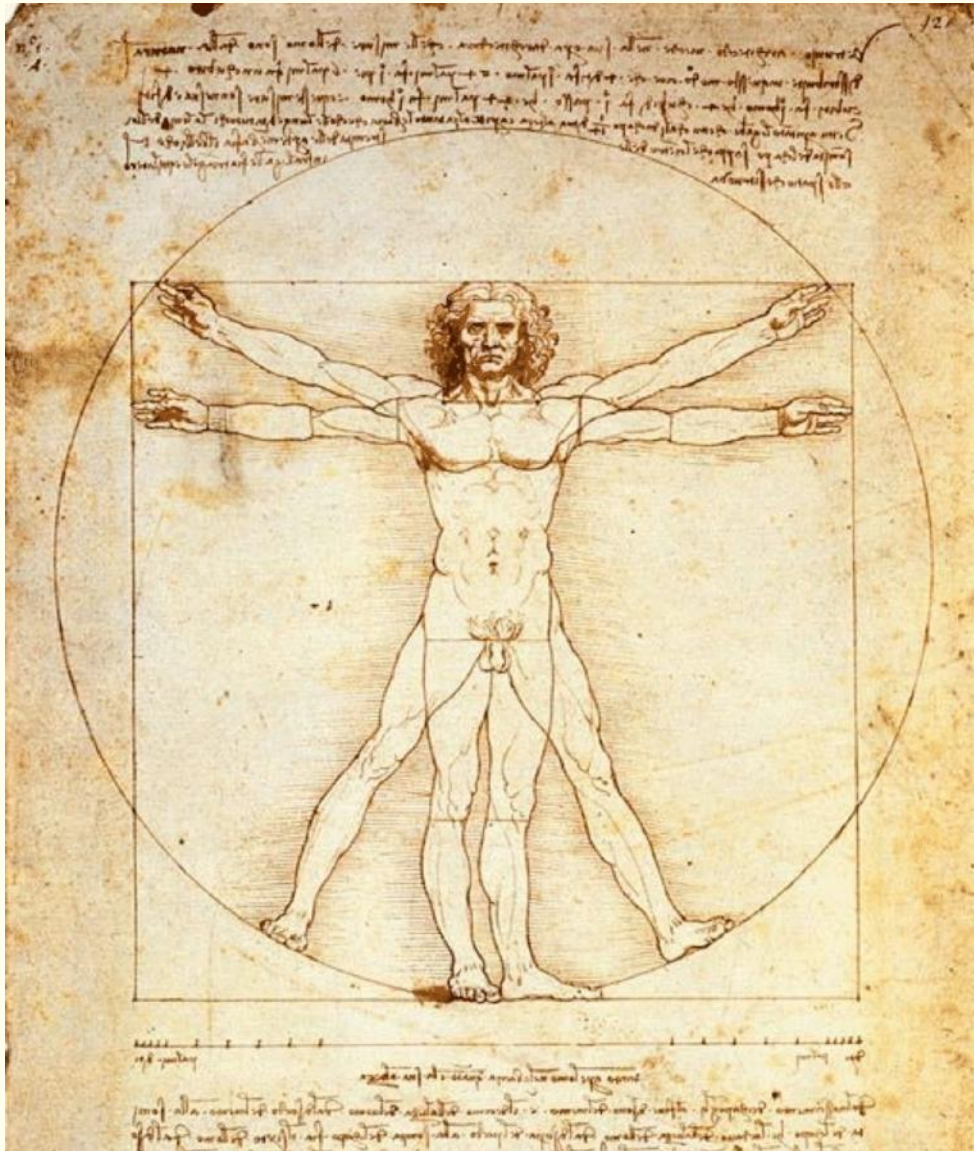
by the creativity
of Alfonso Bialetti (1933)

Synergy with Art
made it known to people

Renato Bialetti and the
cartoons by
Paul Campani (1953)

Thanks,
every morning

Humanities added
to Science and Technology
make human beings
more “human”



Leonardo da Vinci (1452-1519)
“Vitruvian man” (c. 1490)

@ Accademia Galleries, Venice

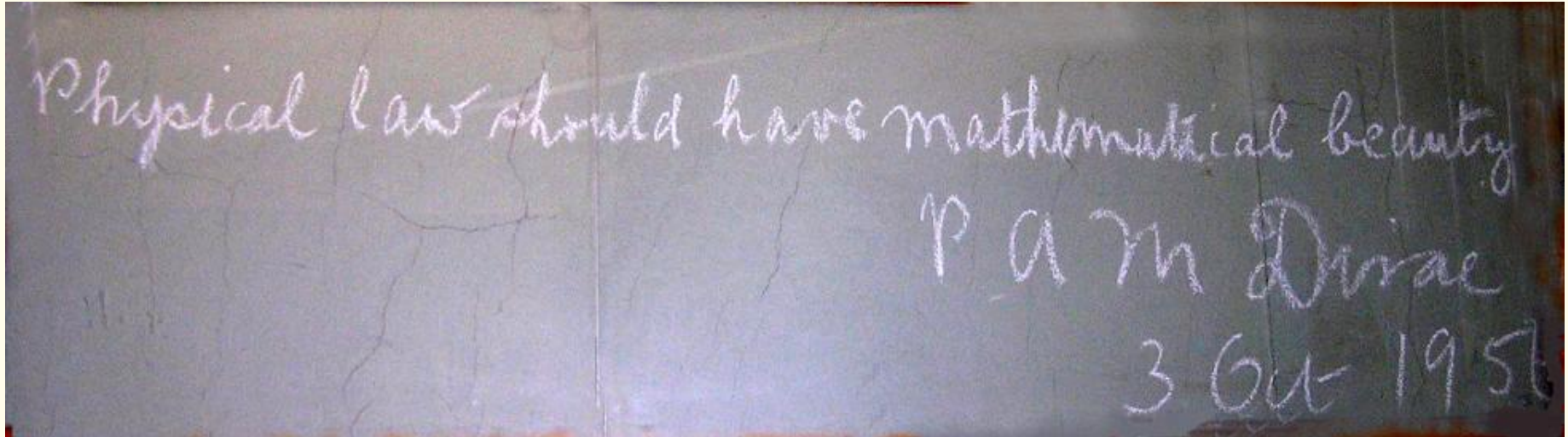
Synergy with Humanities may stimulate creativity
(required for further progress)



P. Picasso (1963), Museum Reina Sofia, Madrid

*Creativity is capability
of a novel view:
a common feature
with Humanities*

Beauty plays a role also in Science



**Manuscript of P.A.M. Dirac
on a blackboard of the Moscow State University**

From R. H. Dalitz, *Biographical Memoirs of Fellows of the Royal Society*, vol. 32 p. 139 (1986)

**... even if what in practice means beauty
differs in different fields, cultures and times**

A permanent caveat:
Human beings can be possessed by Technology



Modern times (1936) by Charlie Chaplin (1889-1977)

A dramatic issue

Science and Technology used for offensive weapons

From primordial times to Hiroshima and ...



Stanley Kubrick
2001: A Space Odyssey
(1968)



Akira Kurosawa
Rhapsody in August
(1991)

Since the antiquity Humanities help developing a critical thinking

Tibullus, Latin poet (c. 54-19 BC)

Who was he, who first forged the fearful sword?

Then slaughter was created, war was born to men.

Then a quicker road was opened to dread death.

But perhaps it's not the wretch's fault

we turn to evil

what he gave us to use on savage beasts?

Elegy 10 in Book 1 (translation by A. S. Kline, © 2001)

PRESENT TIMES

Very many human beings are suffering

New countries are emerging

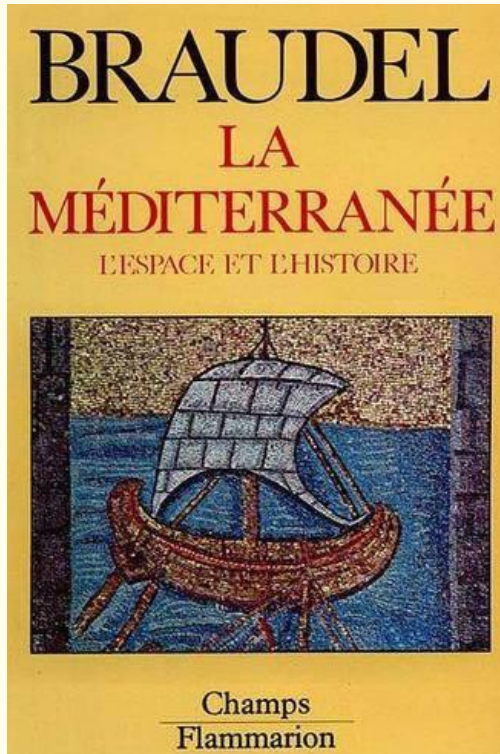
The previous equilibrium of forces is over



“A new World Disorder”

War(s), violence, destructions, ...

In particular, concerning the Mediterranean



“What is the Mediterranean? ...

It is at the same time immersion in the archaic world of islands and marvel at the extreme youth of very old towns, open to all the winds of culture ...

All because the Mediterranean is a very old crossroads”

Fernand Braudel

La Méditerranée, l'espace et l'histoire (1977)

What “is” or what “was”?

Are millennia of Mediterranean history really over?

Is it still a “crossroads” or a hard “border”

Human beings want Peace
Can Humanities help?

About conflicts and culture in general



*Gegen das Tod ich keine Angst
geheissen, gegen das Tod keine
Angst, Regal gefüllt die no-own
1925 Sigmund Freud*

From a letter of Sigmund
Freud to Albert Einstein
(Sept. 1932)
in their correspondence
when the 2nd World War
was approaching

Sigmund Freud
by Robert Kastor (1925)

Albert Einstein
by Emil Orlik (1928)



*“On the psychological side two of the most important
phenomena of culture are,*

firstly, a strengthening of the intellect,

which tends to master our instinctive life, and,

secondly, an introversion of the aggressive impulse,

with all its consequent benefits and perils”.



Parliamentary Assembly
Assemblée parlementaire

COUNCIL OF EUROPE



CONSEIL DE L'EUROPE

Report

Doc. 10341

19-10-2004

Combating terrorism through culture

Recommendation (2004)

The humanisation of education
is an instrument
for the development of civilised relations
between generations, peoples and nations

*A large number of violent extremists have
a high technical qualification*



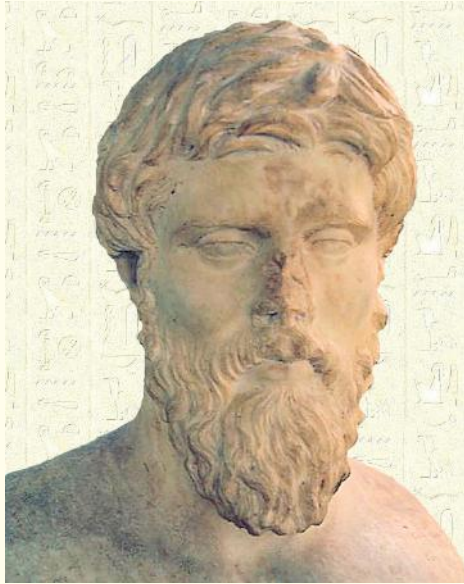
*Young people need to be taught
how to think*

*to immunise their minds against ideologies
that seek to teach them what to think*



*Increase the exposure to
the moral and philosophical uncertainties
associated with
Social Sciences and the Humanities*

Plutarch (c. 46-127 AD)



Plutarch (?), Museum of Delphi (Greece)

*“The mind is not
a vessel to be filled,
but wood
that needs igniting”*

From *On listening to lectures*



**Communicate “passion”
rather than just transmit a technique**



Teach *how* to think

Science and Technology meet Humanities already in Education



Progress associated to peaceful human relations



P. Picasso, *Dove of Peace* (1949)

Altogether

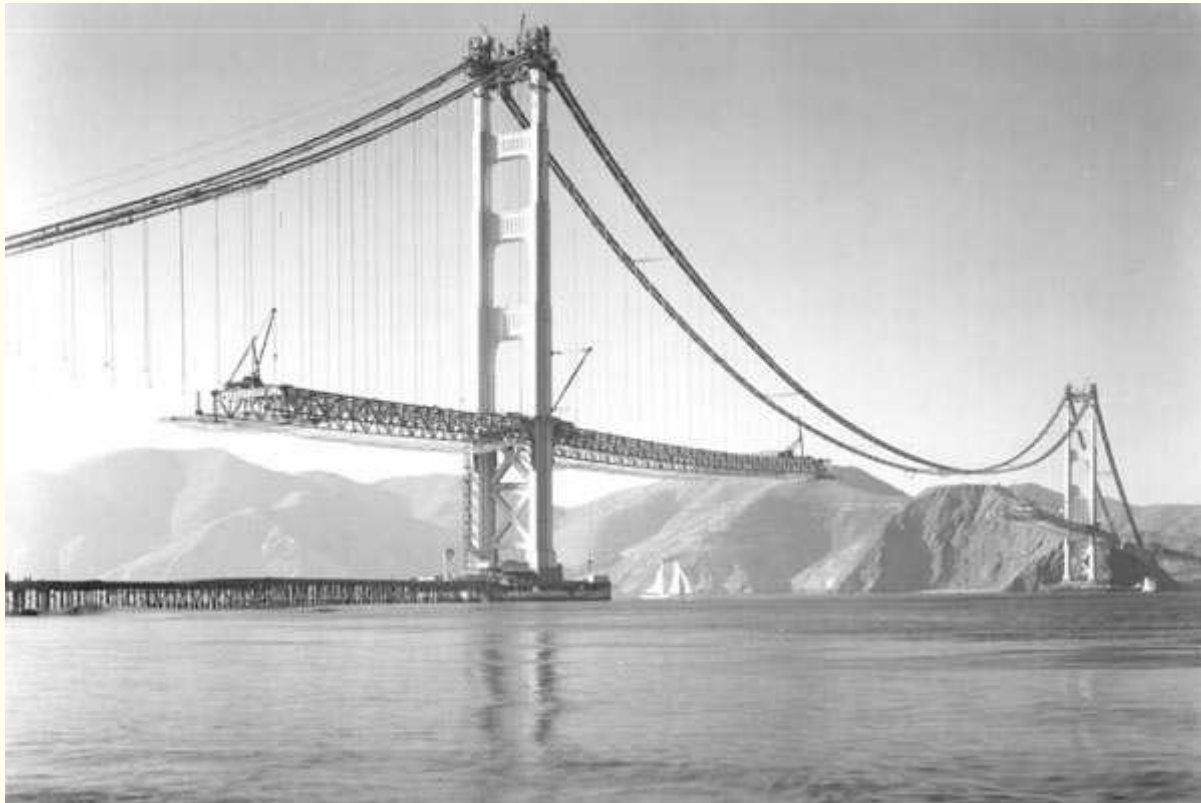


Teach how to think,
in synergy with Humanities

Science and Technology should meet Humanities already at School



Construct bridges



The Golden Gate bridge in construction (San Francisco, 1936)

A practical case in Italy



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*An educational program
mainly for High School*

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Bridges connecting:

Science-Technology-Humanities
Different scientific or technical disciplines
Schools or cultures over the World

.....

Some of the practical activities and their icons from Art



Open Tables



Astronomy Olympics



Physics Olympics



First Page



Thematic Essays

.....

Art: a basic “principle” is symmetry



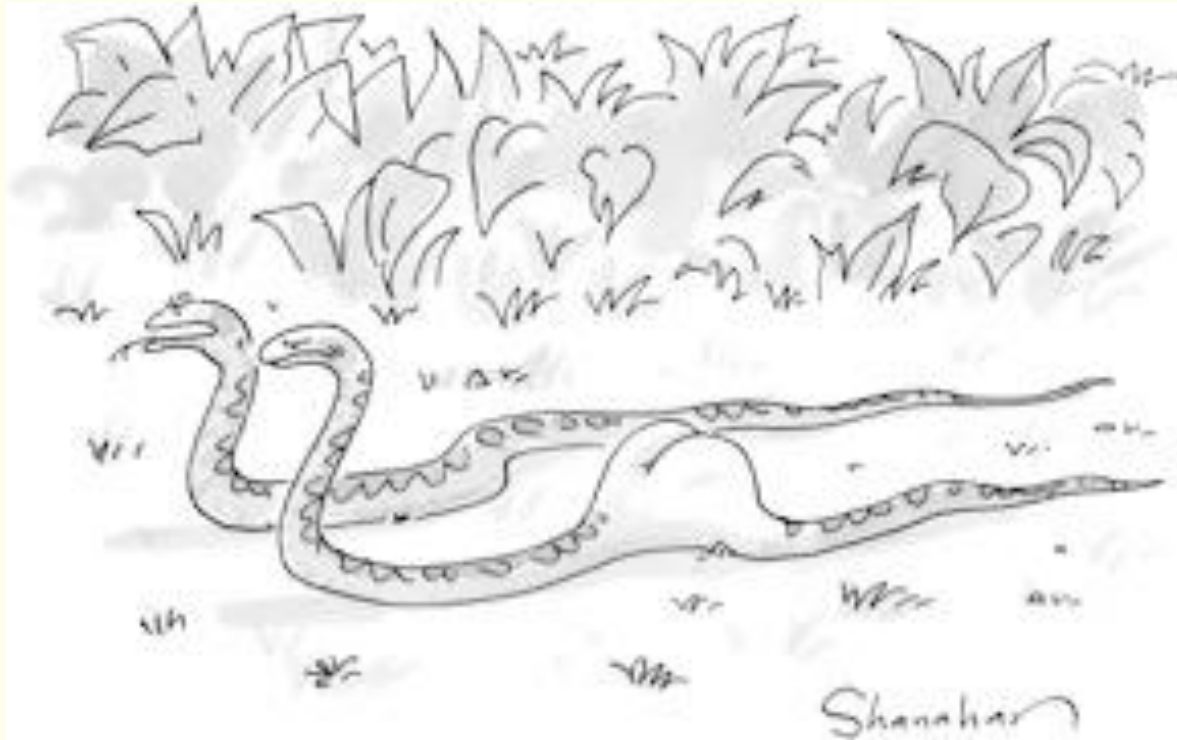
Attic Kylix (c. 550 BC)

R. N. Milns Museum, Queensland, Australia

Physics: fundamental laws arise from symmetries

e.g. Einstein's Theory of Relativity arises from the symmetry ensuring that the velocity of light is a constant

... and let's not forget asymmetries



Danny Shanahan, *The New Yorker* (2012)

Art

A slight asymmetry
generates a dynamic
sense of evolution



Earthenware vessel (c. 3000 BC)
Middle Jomon period, Japan

Metropolitan Museum of Art, New York

Physics

Asymmetries produce an
evolution with time of
physical systems

e.g. A tiny asymmetry in the
behaviour of elementary
particles and anti-particles
may have produced the
disappearance of anti-matter
from the times of the Big Bang

... and

saves us from annihilation
with anti-us

To conclude

We have talked about the role of Humanities in connection to Science and Technology

What about the symmetric topic?

“Humanities meet Science and Technology”

Just two slides

“Music cannot move forward without Science”

(Pierre Boulez, *The Observer*, 27 July 1975)



God Pan: inventor of the flute according to Greek Mythology

From the House of Fatal Love, Pompeii



Max Matthews and his *Radio-Baton* (1980)

Pioneer of electronic music

Science and Technology for Archaeology

From the first muography
by Alvarez at the Chefren Pyramid (1970)
to the Scan Pyramids Mission (now)

