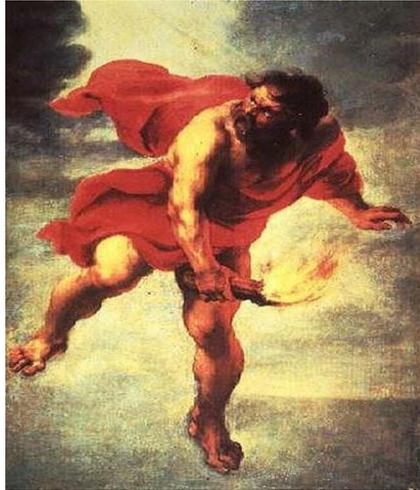


# from fire to computer: the evolution of τέχνη



## Προμηθεύς

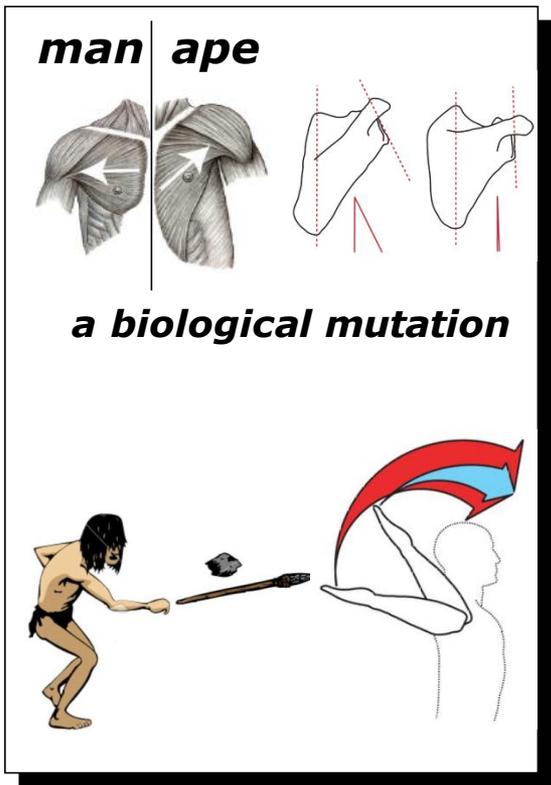
πρὸς τοιοῦδε μέντοι **πυρ** ἐγὼ σφιν ὤπασα  
.....  
ἄφ' οὐ γε πολλὰς **ἐκμαθησονται τέχνας**

ΠΡΟΜΗΘΕΥΣ ΔΕΣΜΩΤΗΣ 254-256

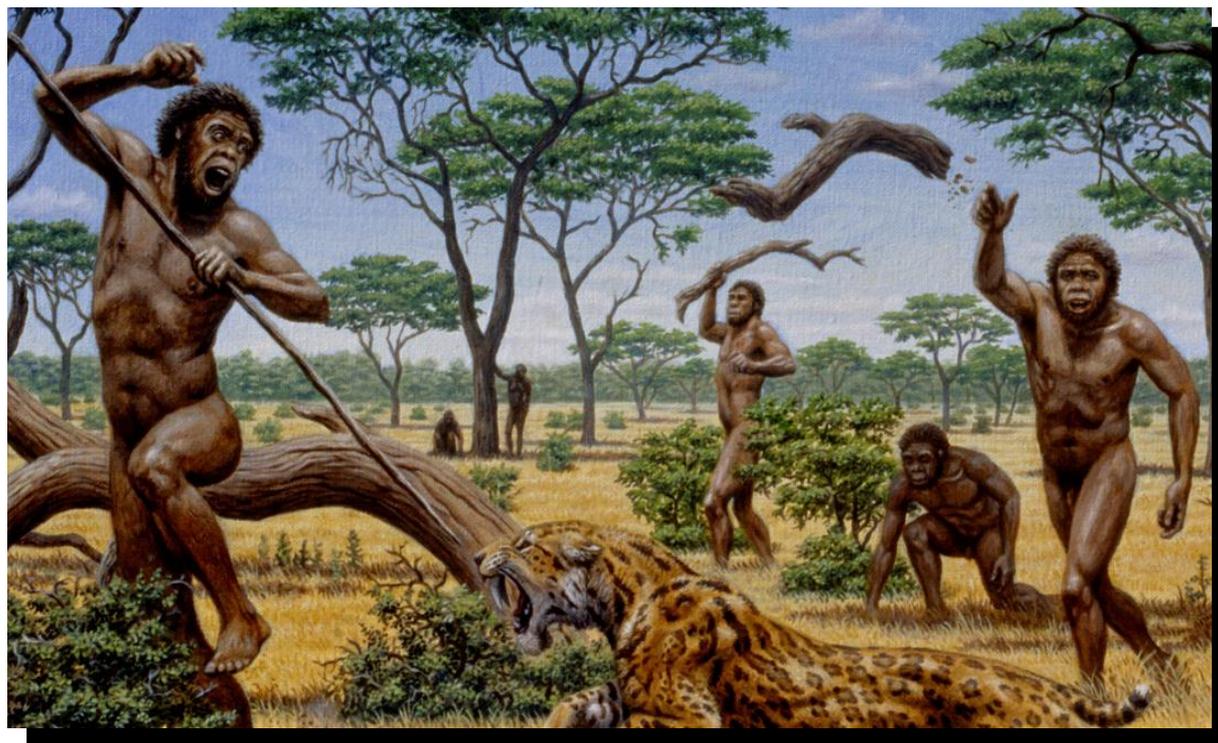


**probably the first technology: the lithic projectile technology**

**two million years ago : homo erectus**

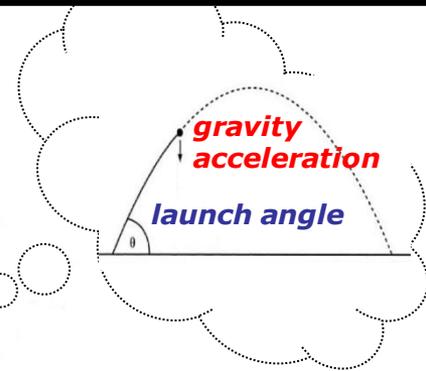
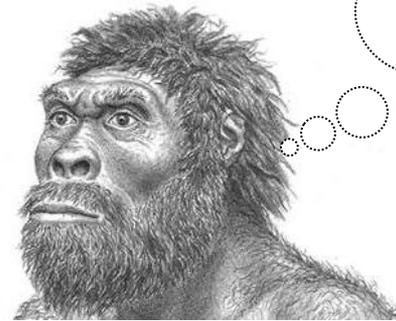


N.Roach et al., Nature, June 2013



source: Sabertooth by Mauricio Anton, 2013

**homo erectus was capable to throw  
but not to build models in his mind**



much later came the Great Technology (?) : **language**

*(how can I) reach! (you) ???*

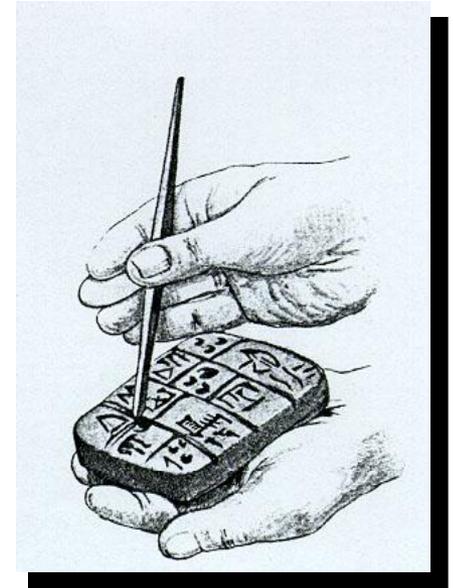
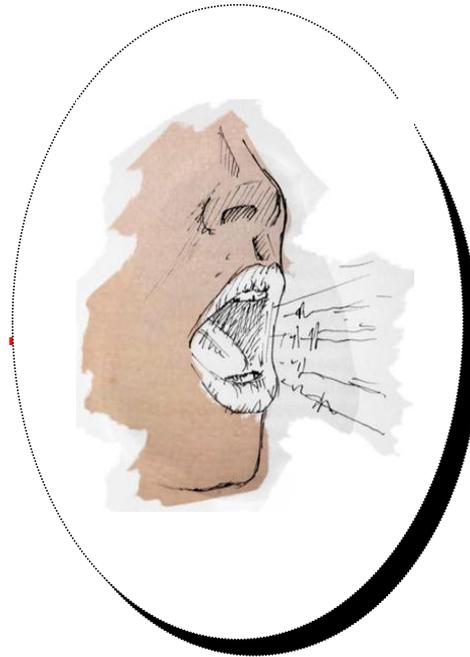
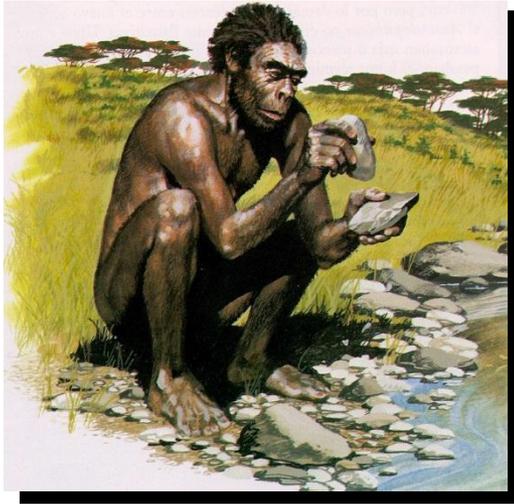


*William Gibson, The Miracle Worker 1957*

***one word and I can put the world in your hand***

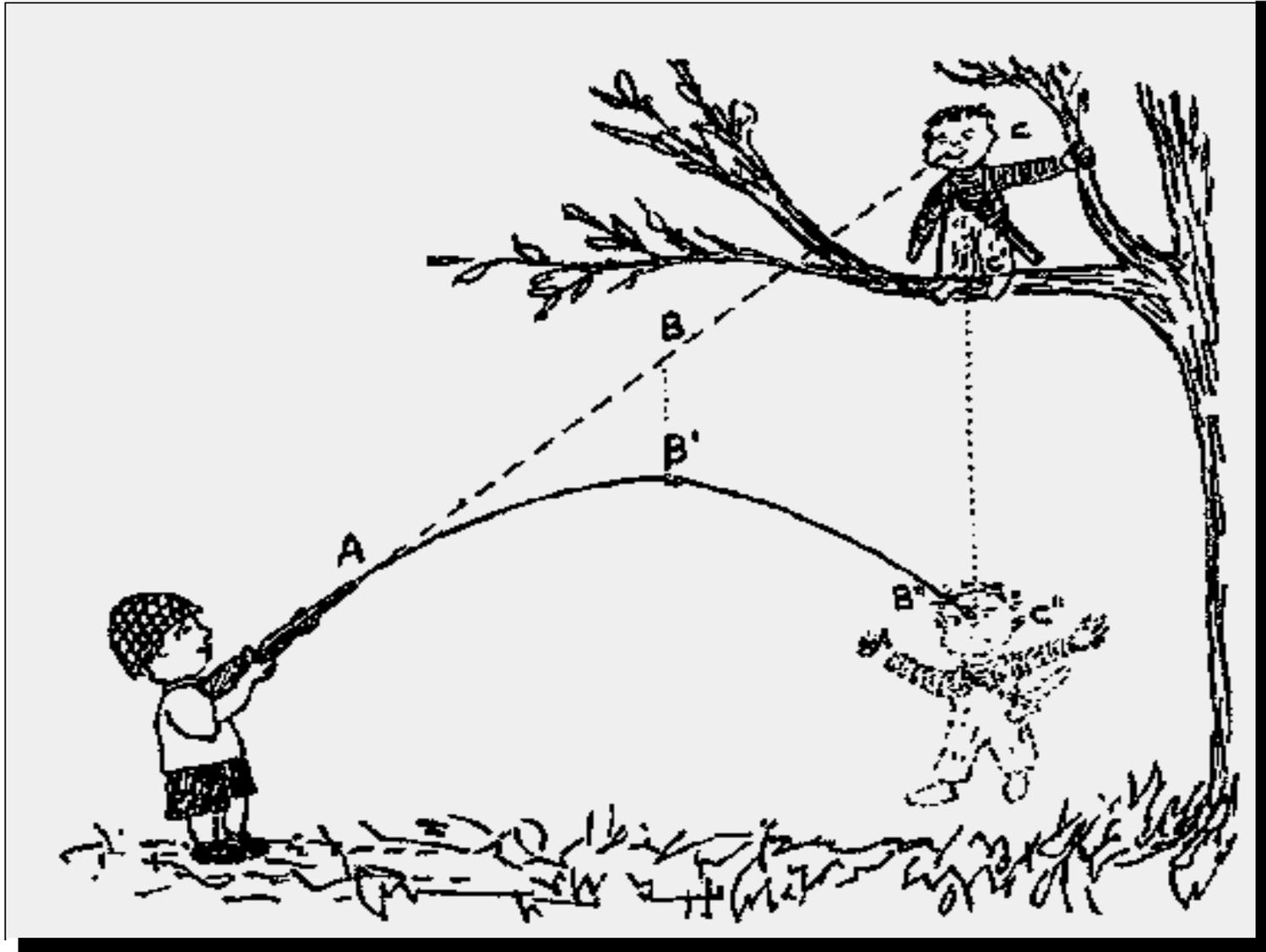
**and then another great technology: *writing***

***mother of science***



καὶ μὴν ἀριθμόν, ἔξοχον σοφισμάτων,  
ἐξηύρον αὐτοῖς, γραμμάτων τε συνθέσεις,  
μνήμην ἀπάντων, μουσομήτορ ἐργάνην

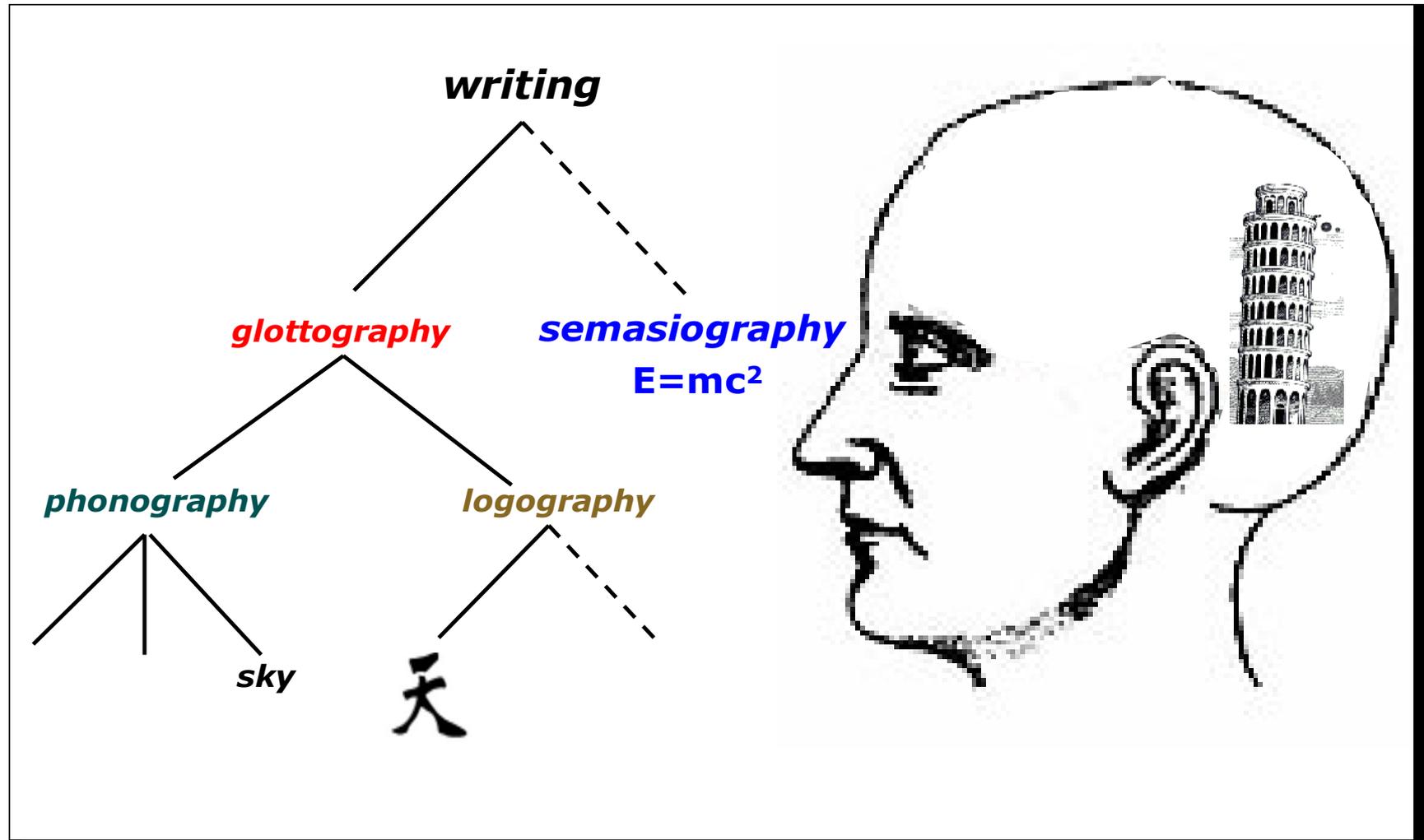
**but, could one move from projectile culture to science ?**



**George Gamow, *The Great Physicists from Galileo to Einstein*, 1959**

**we need to write not the spoken language but the thoughts**

## **Galileo Galilei's role**

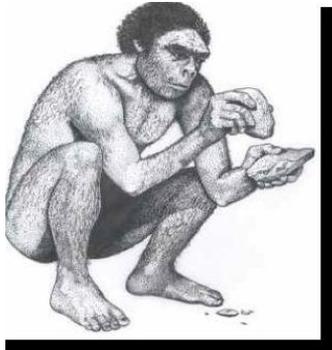


**we need a different language that paves the way to science**

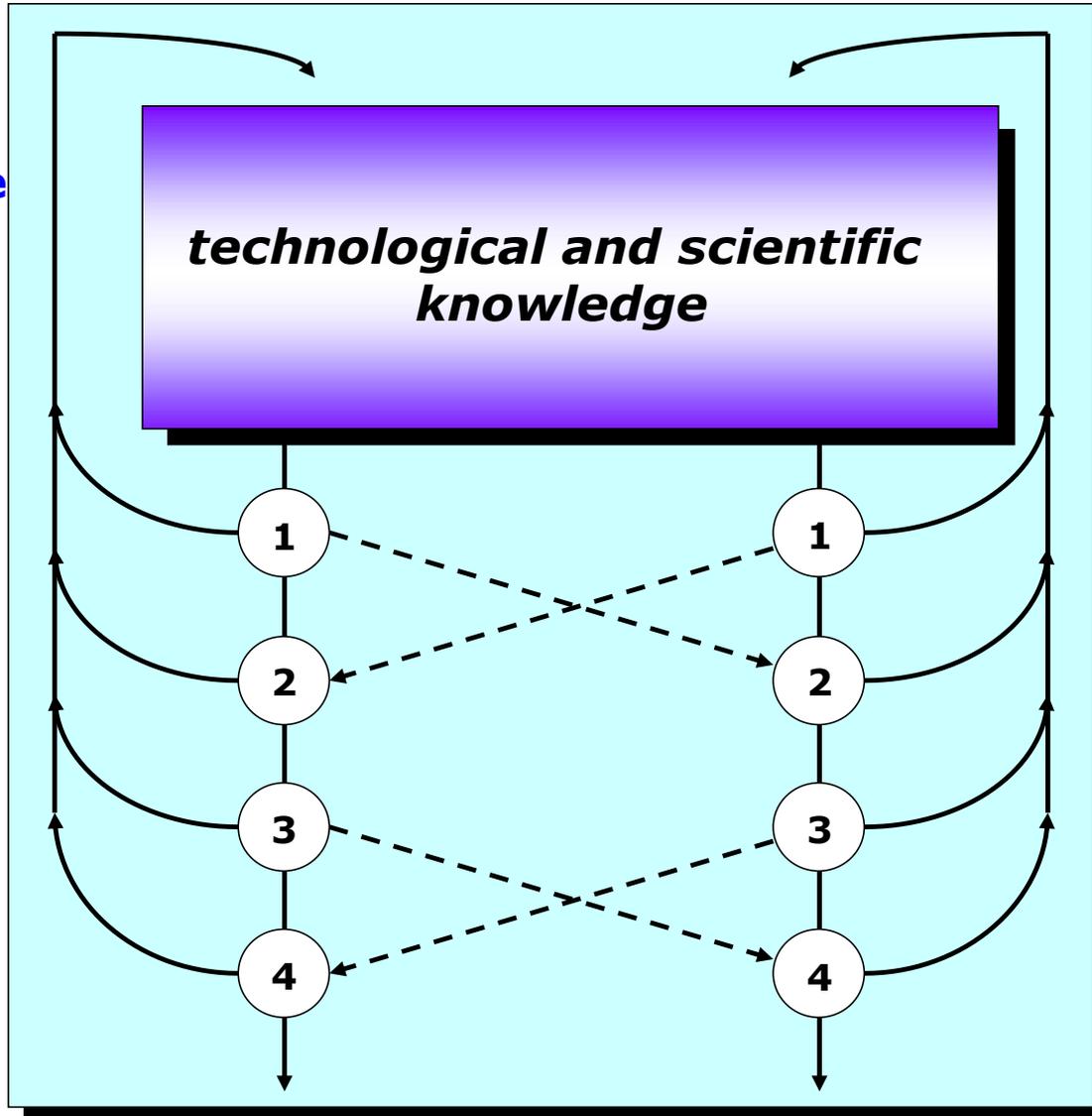
***the engines of innovations became two: technology and science***

***in a continuous interaction***

**use the world  
to our advantage**



**τέχνη**



**understand  
the world**



**ἐπιστήμη**

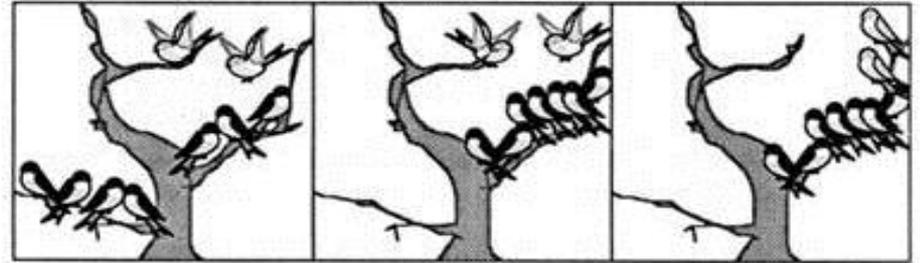


yet even an apparently simple exercise...

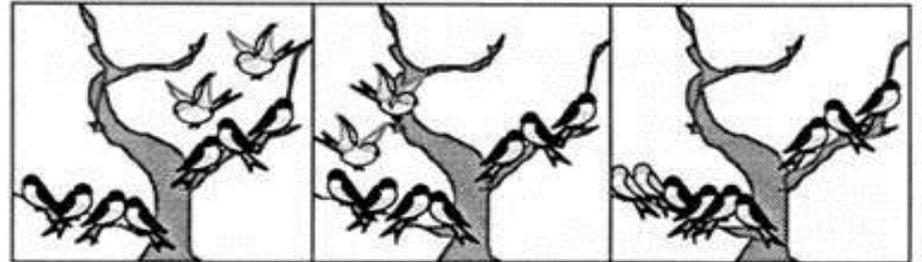
*...shows how long is the way to learn how to build models of reality*



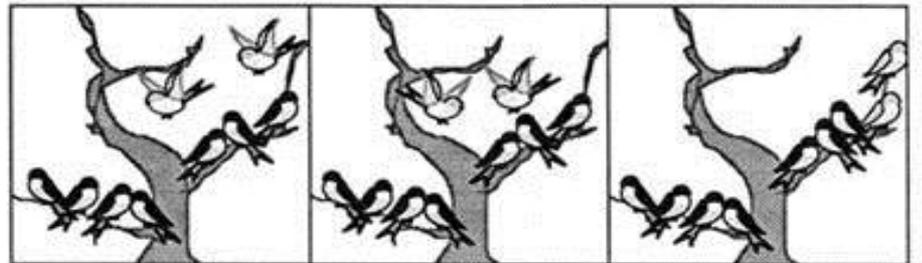
**one should start early and well**



$$(4 + 3) + 2 = 7 + 2 = 9$$



$$(4 + 3) + 2 = (4 + 2) + 3 = 6 + 3 = 9$$



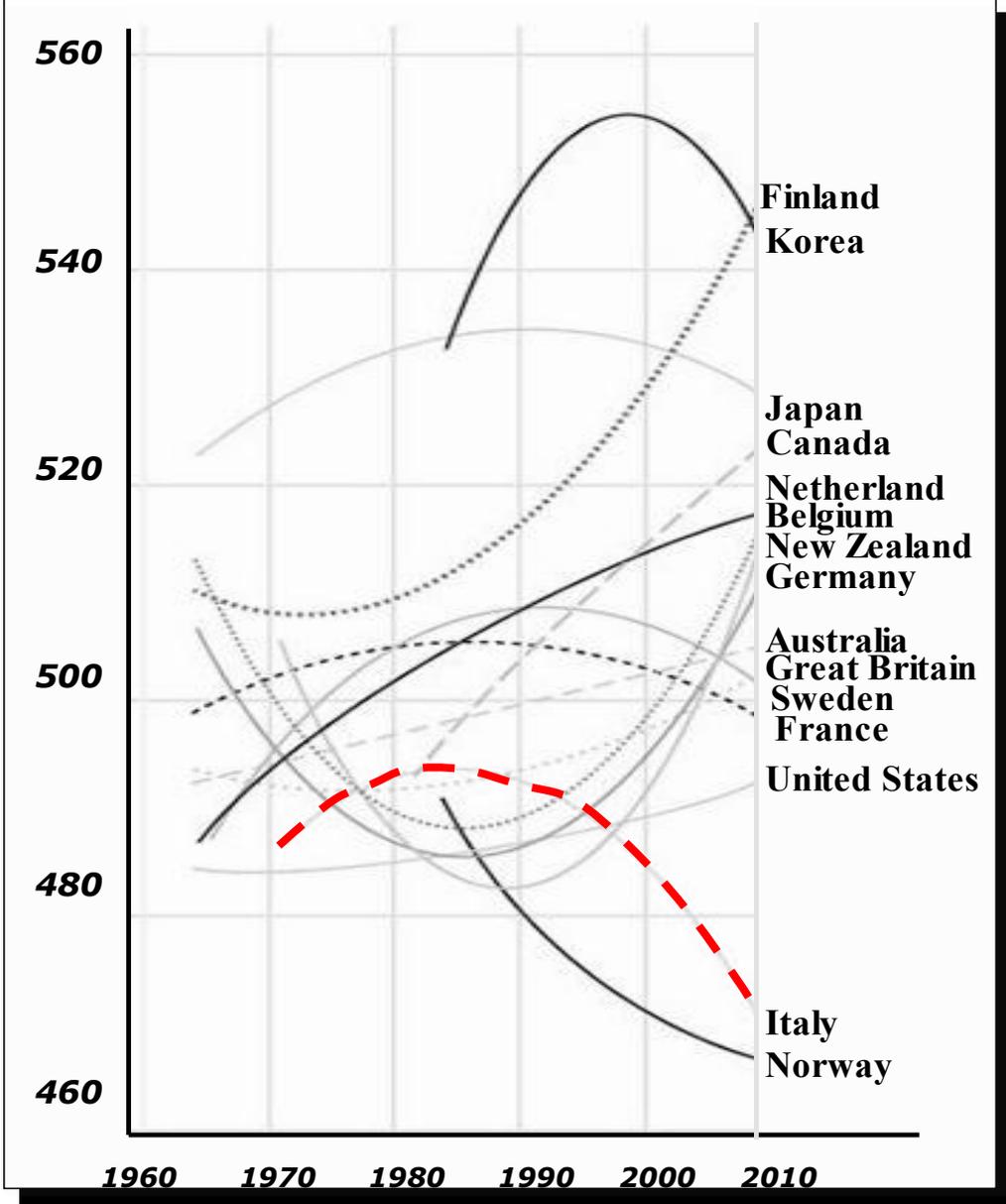
$$(4 + 3) + 2 = 4 + (3 + 2) = 4 + 5 = 9$$

# how important are educational outcomes in OECD countries ?



Source: NYTimes 22,8,2013

PISA index



**Eric A. Hanushek - Ludger Woessmann**  
**How Much Do Educational Outcomes**  
**Matter in OECD Countries?**

[http://dev3.cepr.org/meets/wkcn/9/979/papers/hanushek\\_woessmann.pdf](http://dev3.cepr.org/meets/wkcn/9/979/papers/hanushek_woessmann.pdf)

reworking from: **A. Ripley, The Smartest Kids in the World : And How They Got That Way, 2013**

# **the technological challenges that lie ahead are not few**

**Internet mobility**



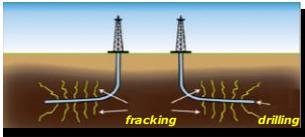
**renewable energies**



**Internet of things**



**shale fracking**



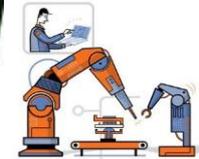
**cloud computing**



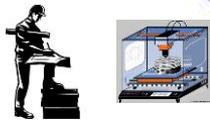
**new materials**



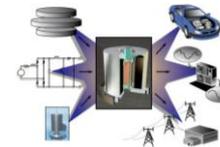
**robotics**



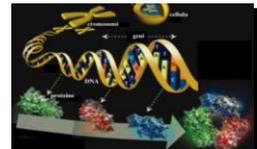
**3D printing**



**conservation of energy**



**epigenetics-evo-devo**



" if children grew up according to early indications we should have nothing but geniuses "

*Goethe, Truth and Poetry , II book*

*Albert, stop playing and answer my question, how much is it: 2+2 ?*

