

# c.120: Geocentric System



**Claudius Ptolemaeus (Ptolemy)**  
(Alexandria, Egypt, c.90 - c.168)



16th-century representation of the  
Ptolemy's Geocentric System

# c.390: Mathematics + Astronomy



Hypatia

(Alexandria, Egypt, c.370 - c.415)

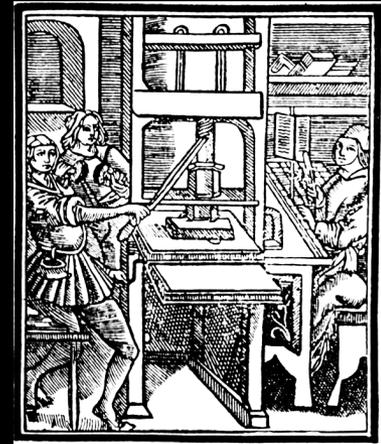


Astrolabe

# 1439: Movable Type Printing



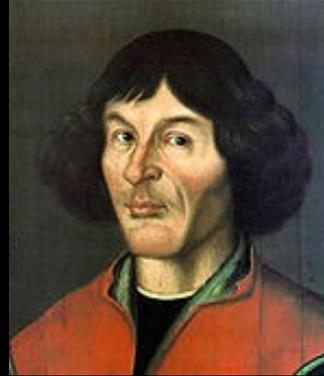
**Johannes Gutenberg**  
(Mainz, Germany, 1398 - 1468)



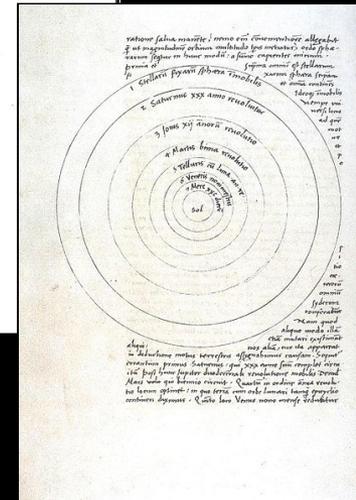
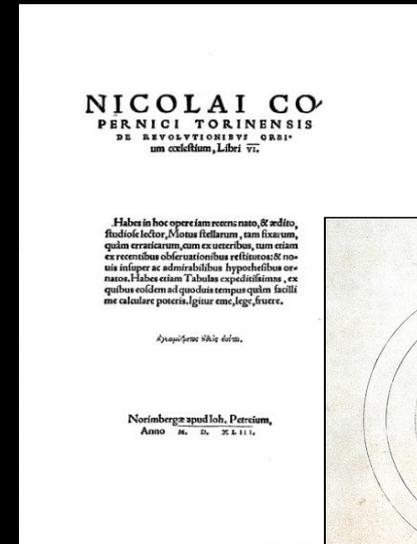
Gutenberg Bible, 1450

# 1st Revolution Copernicus

## 1543: Heliocentric Cosmology



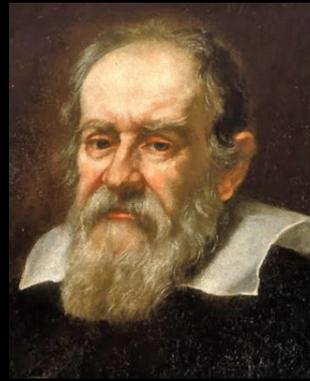
Nicolaus Copernicus  
(Thorn, Poland, 1473 - 1543)



Displaced the Earth (hence humanity) from the center of Universe.  
"We are not immobile, at the center of the Universe" (Floridi, 2009)

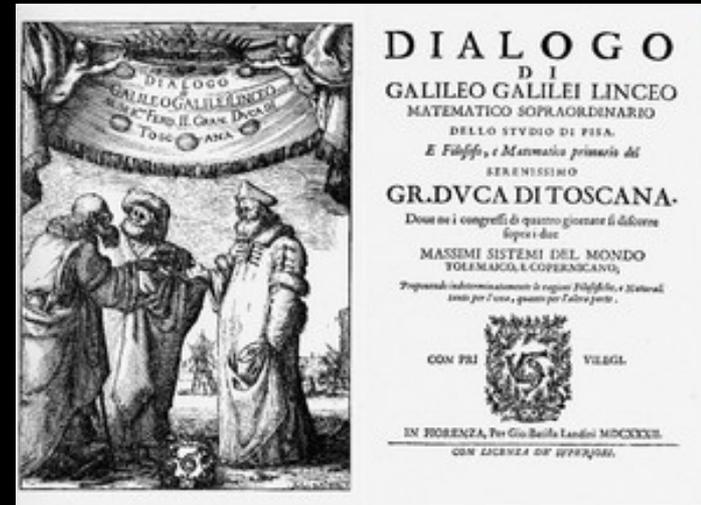
De revolutionibus orbium coelestium, Libri VI - Nuremberg, 1543

# 1632: Birth of Modern Science



Galileo Galilei  
(Pisa, Italy, 1564 - 1642)

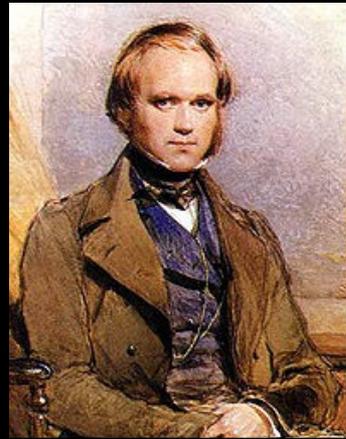
Dopo Leonardo da Vinci,  
Galileo fu il primo ad abbinare  
sperimentazione scientifica e  
linguaggio matematico



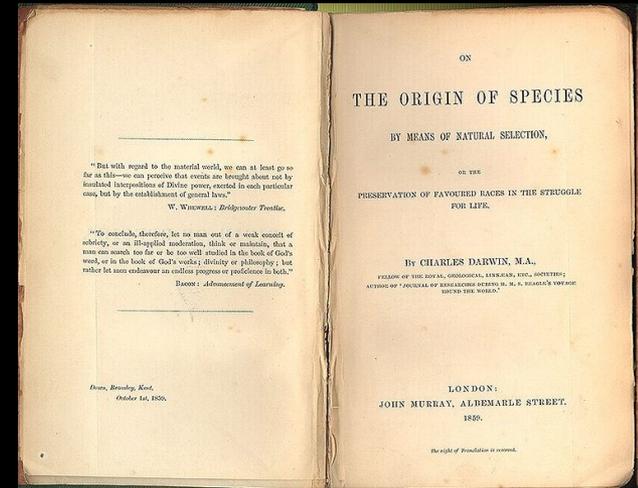
1632, Dialogue Concerning the Two Chief World Systems  
(Dialogo sopra i due Massimi Sistemi del Mondo)

# 2nd Revolution Darwin

## 1859: On the Origin of Species (Evolutionary Theory)



Charles Darwin  
(1809 - 1882)



The Origin of Species, Murray, London, 1859

Displaced Humanity from the Center of Biological Kingdom

"We are not unnaturally separate and diverse from the rest of the animal kingdom" (Floridi, 2009)



1  
1829. 22 Ottobre. - 1830. 3 Aprile.  
Canto notturno di un pastore vagante dell' Asia (1).

(1) *Plusieurs d'entre eux* (parla dei Kirghis; <sup>di una delle</sup> nazione errante che vive a settentrione dell' Asia centrale) passent la nuit assis sur une pierre à regarder la lune, et à improviser des paroles assez tristes sur des airs qui ne le sont pas moins. El baron de Meyendorff, Voyage d'Orébourg à Boukhara, fait en 1820; appreso il giornale dei Dotti, 1826, settembre, p. 518.

1. Che fai tu, luna, in ciel? Dimmi, che fai,  
Sfilanziosa luna?  
Sorgi la sera, e vai,  
Contemplando i deserti; inèi tu poi.  
Ancor non sei tu paga  
Di rianzare i sempiterni calli?  
Ancor non prendi a schivo, ancor sei vaga  
Di mirar queste valli?  
Somiglia a la tua vita  
La vita del pastore.

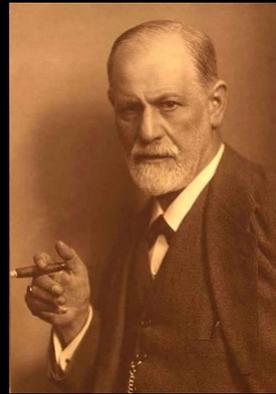
C.L.XIII.25

"... Dimmi, o luna: a che vale  
Al pastor la sua vita,  
La vostra vita a voi? **dimmi: ove tende**  
**Questo vagar mio breve,**  
**Il tuo corso immortale? ..."**

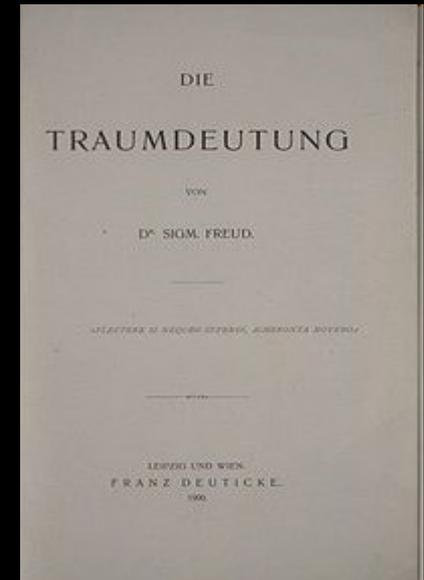
Giacomo Leopardi, 1829  
Canto notturno di un pastore errante dell'Asia

# 3rd Revolution Freud

## 1899: The Interpretation of Dreams



Sigmund Freud  
(1856-1939)



Franz Deuticke Publishing, Vienna, 1899

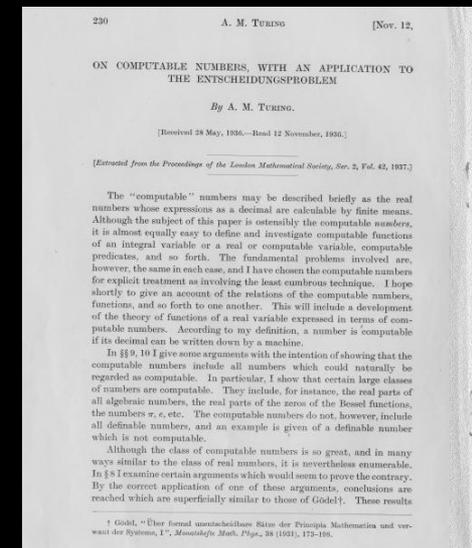
"The mind is also unconscious and subject to the defence mechanism of repression"  
"We are very far from being Cartesian minds entirely transparent to ourselves" (Floridi, 2009)

# 4th Revolution Turing

## 1937: Artificial Intelligence



Alan Turing  
(1912-1954)



Turing A., "On computable numbers, with an application to the Entscheidungsproblem" from Proceedings of the London Mathematical Society, (Ser. 2, Vol. 42, 1937)

"We are experiencing what maybe described (after Copernicus, Darwin, Freud), as the 4th revolution in the process of dislocation and reassessment of humanity's fundamental nature and role in the Universe. **We do not know whether we may be the only intelligent form of life**" (Floridi, 2009)

# XVIII Century

# XX Century

# XXI Century

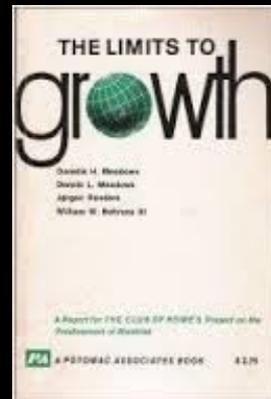
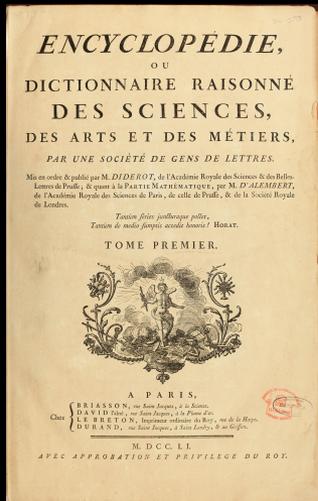
*"Sapere aude!  
Abbi il coraggio di servirti  
della tua propria intelligenza  
- è dunque il motto dell'illuminismo."  
Immanuel Kant, 1784*



## Enlightenment

## Sustainability

## HyperConnectivity



*The Sky  
is the Limit*

*The Earth  
is the Limit*

*The Self  
is the Limit*

# Global CO<sub>2</sub> Emissions

"  
...

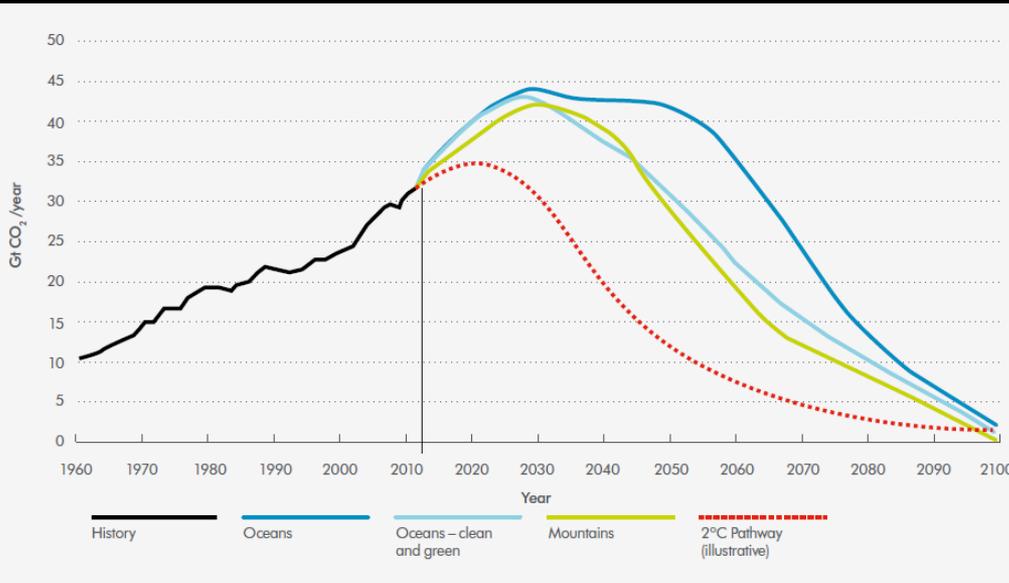
*Dipinte in queste rive  
son dell'umana gente  
le magnifiche sorti e progressive*

...

*Cosí fatti pensieri  
quando fien, come fur, palesi al volgo;  
e quell'orror che primo  
contra l'empia natura  
strinse i mortali in social catena,  
fia ricondotto in parte  
da verace saper, l'onesto e il retto  
conversar cittadino,  
e giustizia e pietade altra radice  
avranno allor che non superbe fole,  
ove fondata probità del volgo  
cosí star suole in piede  
quale star può quel c'ha in error la sede.*

"  
...

Giacomo Leopardi  
La Ginestra, 1836

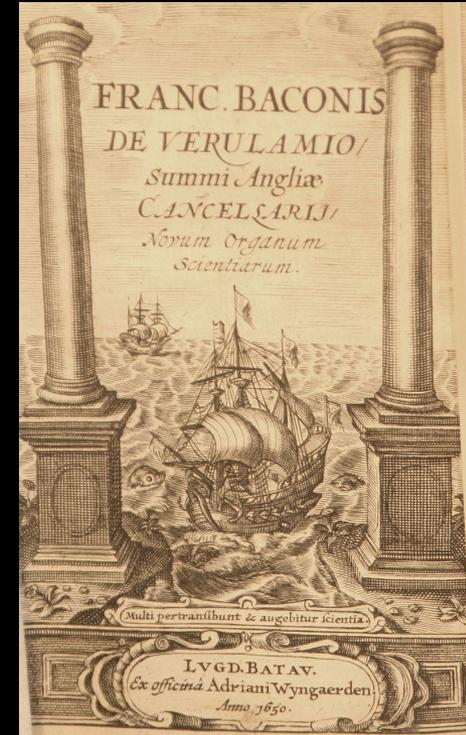


L'Universo - Macchina:  
la Visione Meccanicistica della Natura

# "Knowledge is Power"



Francis Bacon  
(1561 - 1626)



## Scientific Method - Scientific Revolution

### Prima di Bacone:

Obiettivo della Filosofia Naturale: la Saggezza, comprensione dell'ordine naturale e vivere in armonia con esso.

### Dopo Bacone:

La visione organica della Natura viene sostituita con la metafora del Mondo-Macchina.

Obiettivo della Scienza: Conoscenza per Dominare e Controllare la Natura.

L'Universo - Rete  
la Visione Sistemica della Natura

# Complex Systems - Theory

## Reductionism:

a Complex System  
is nothing but  
the Sum of its Parts



Robert Laughlin  
(1950-)

1998 Nobel Prize in Physics  
(Fractional Quantum Hall Effect)

## Emergence:

The way  
Complex Systems  
(and patterns)  
arise out of a Multiplicity of  
Relatively Simple Interactions.

*"The Whole becomes  
More and Very Different  
From the Sum of its Parts"*

(P.W.Anderson, "More is Different", Science, 1972)

Emergence is the replacement for Reductionism

# Il Pensiero Sistemico

Spostamento di prospettiva dalle parti all'intero

Multidisciplinarieta' intrinseca

Dagli oggetti alle relazioni

Dalla misurazione alla mappatura

Dalle quantita' alle qualita'

Dalle strutture ai processi

Dalla scienza oggettiva (Cartesio)  
alla scienza epistemica (Heisenberg):  
il metodo di indagine diventa parte integrante  
delle teorie scientifiche

