

# SCIENTIFIC CULTURE AND EMANCIPATION

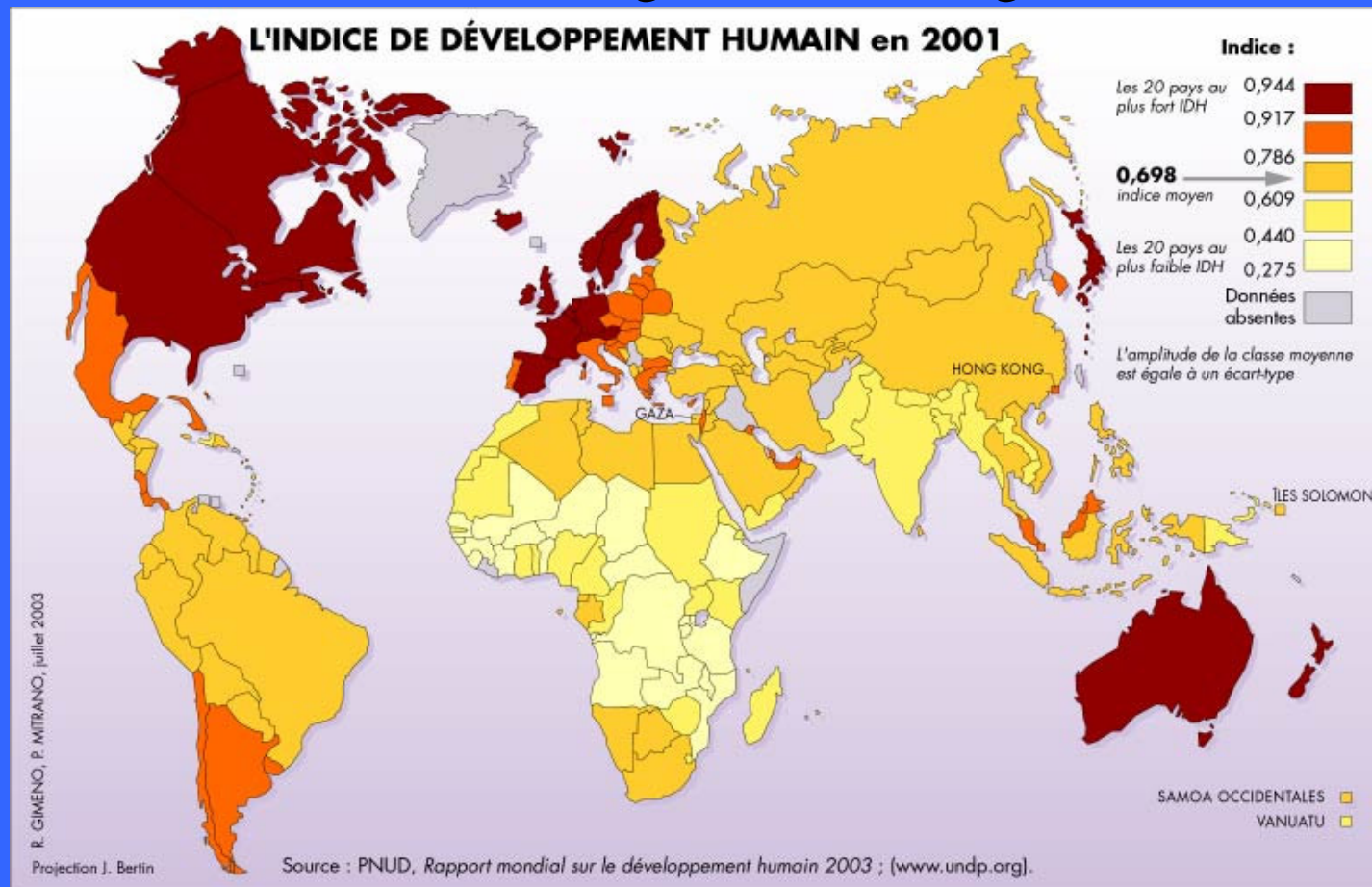
« There are two powers: sword and mind. Finally, mind wins ».

*Napoléon*

- Knowledge as a challenge
- Scientific culture
- Knowledge-sharing
- Importance of astronomy

# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge

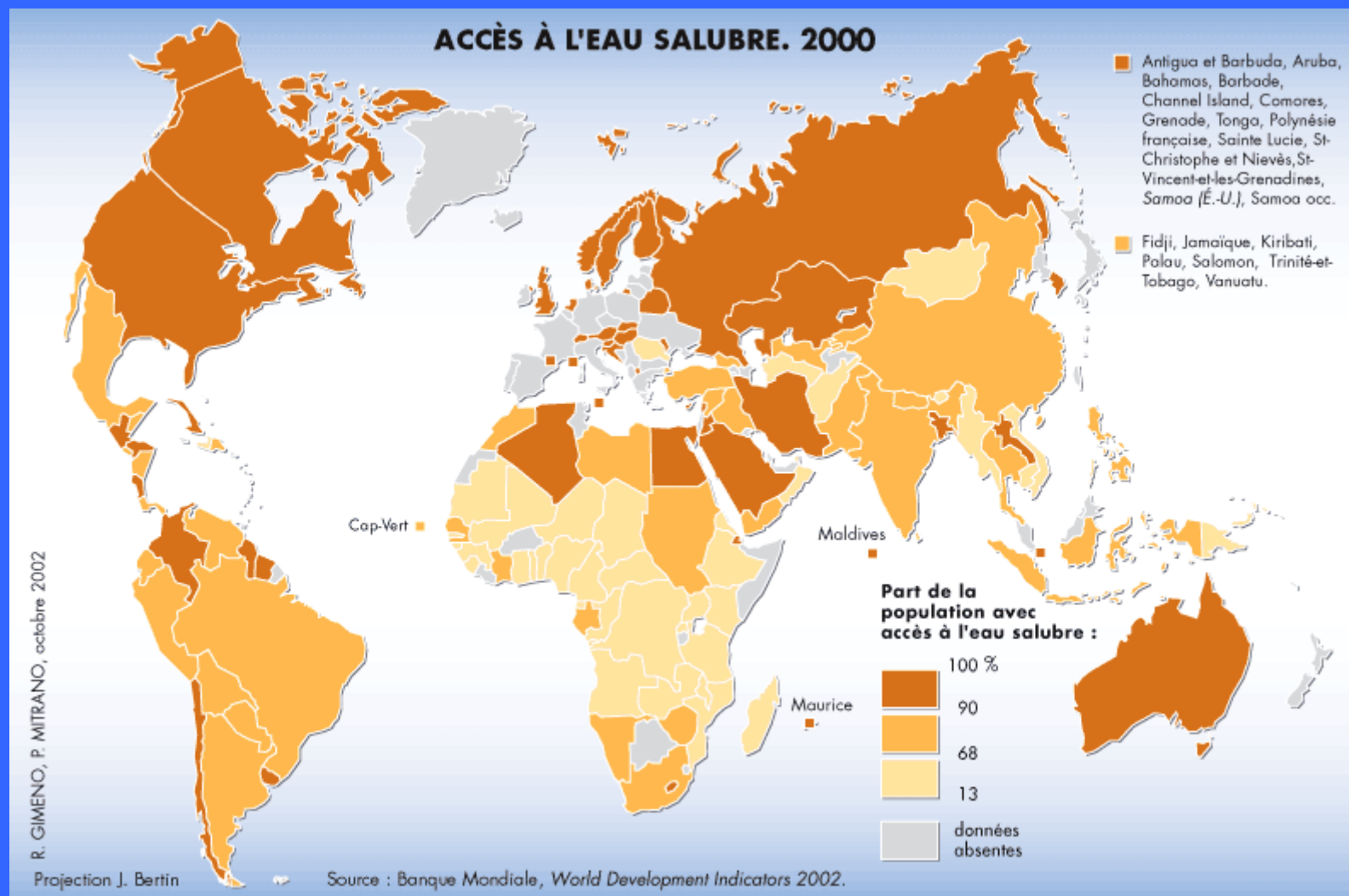


Human development Index  $HDI = (L + K + E)/3$

L: Life expectancy   K: Knowledge   E : Economics

# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge



Access to drinking water

# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge

### Nombre de personnes vivant avec le SIDA dans le Monde (Estimation OMS décembre 2001)

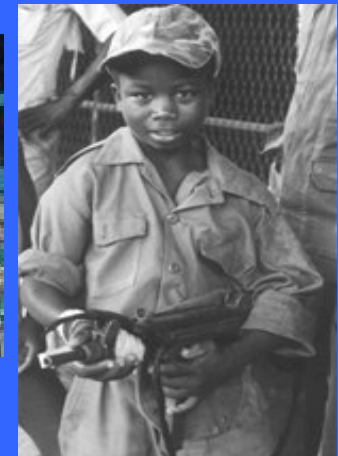


Population affected with AIDS



# SCIENTIFIC CULTURE AND EMANCIPATION

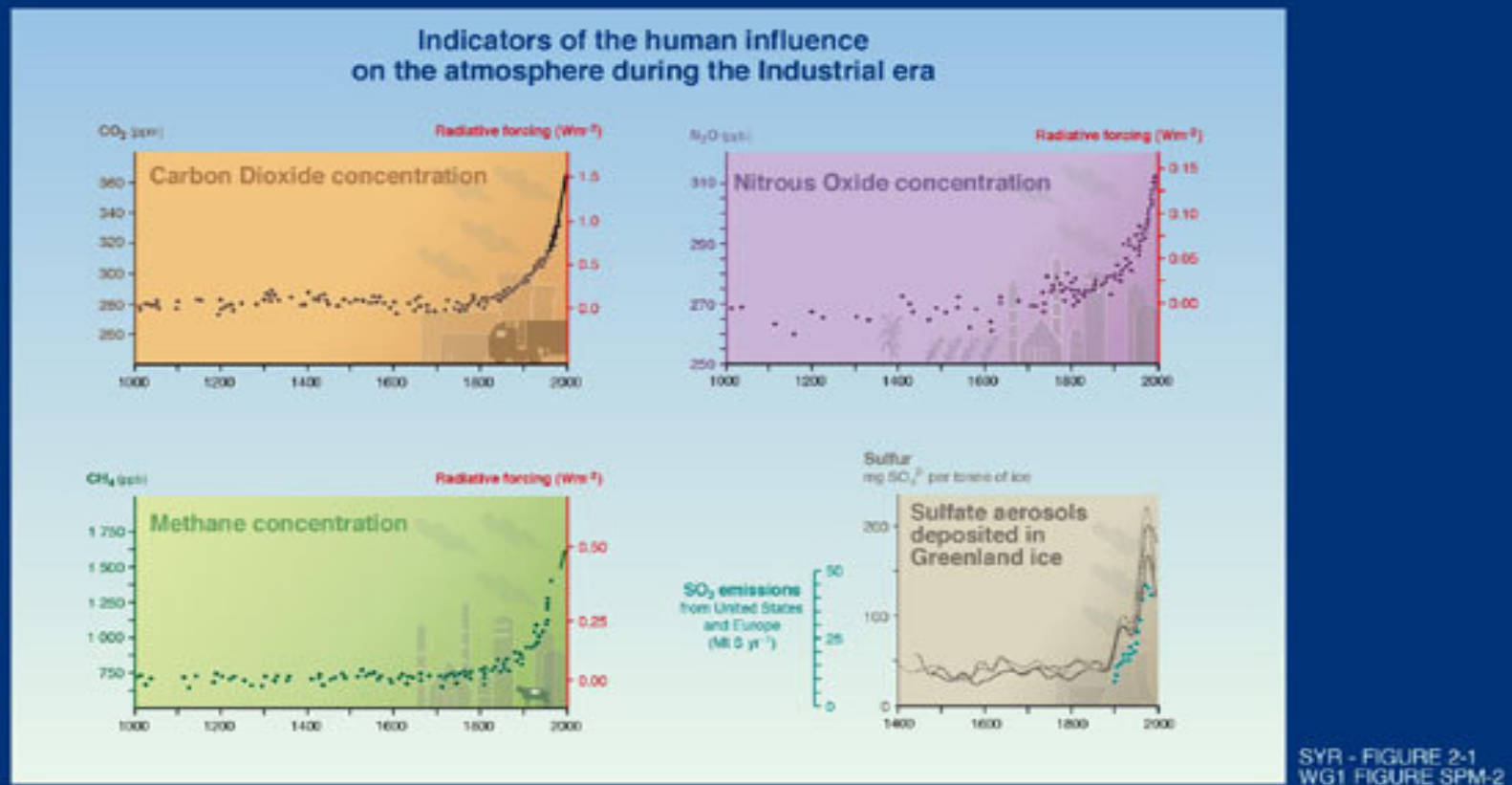
## Knowledge as a challenge



Children

# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge



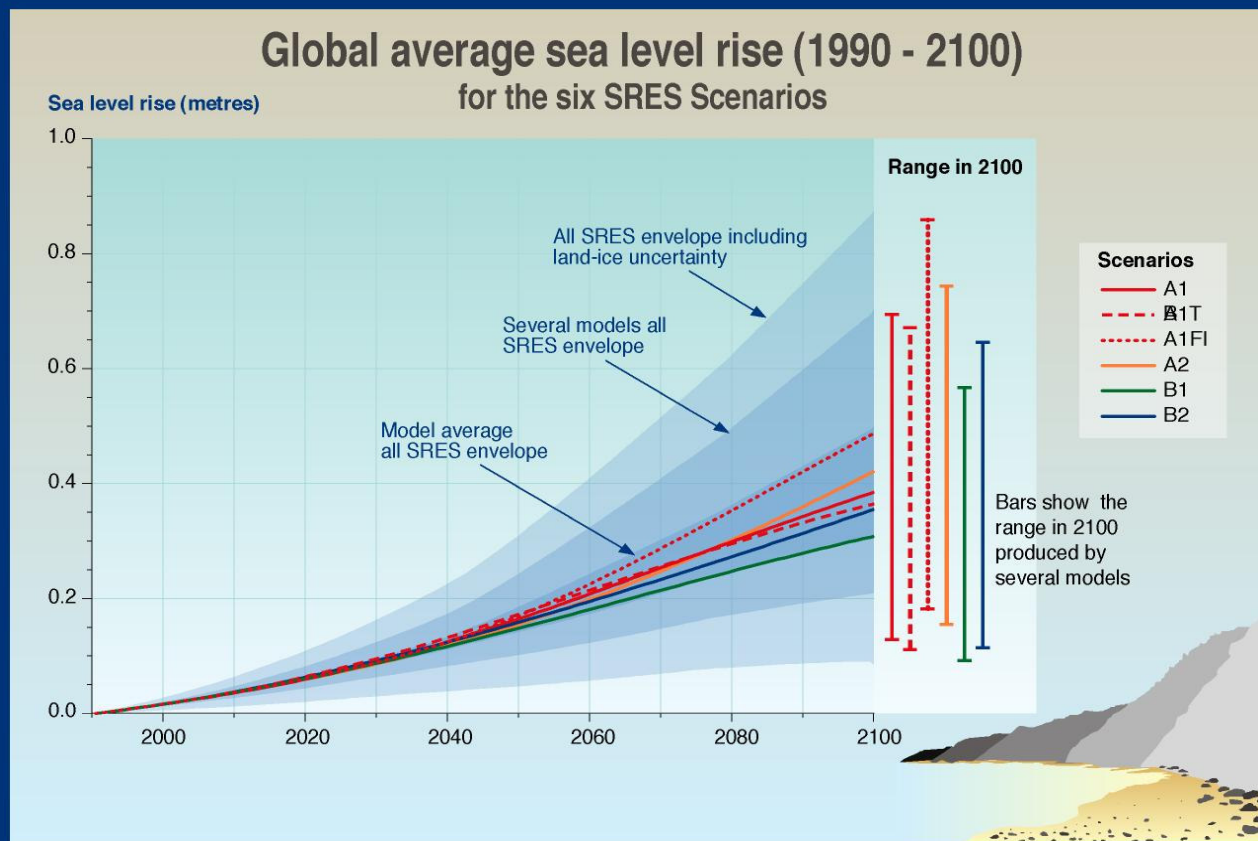
IPCC

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge



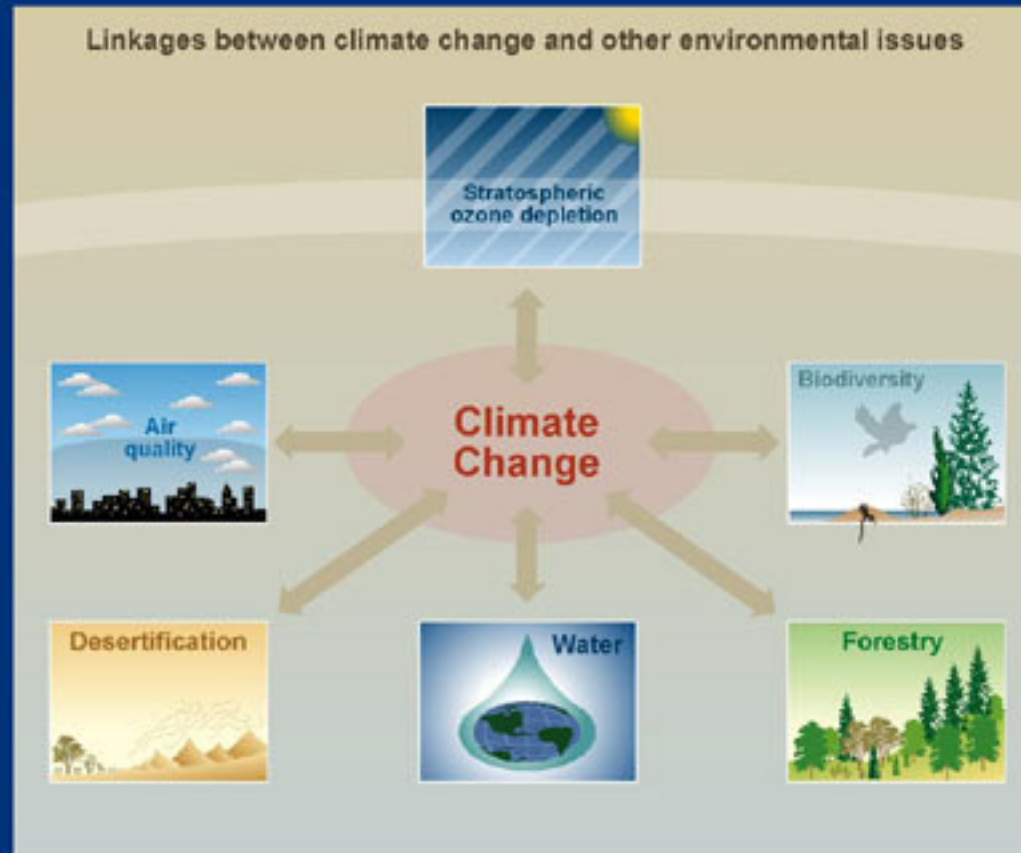
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# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge



SYR - FIGURE 8-1

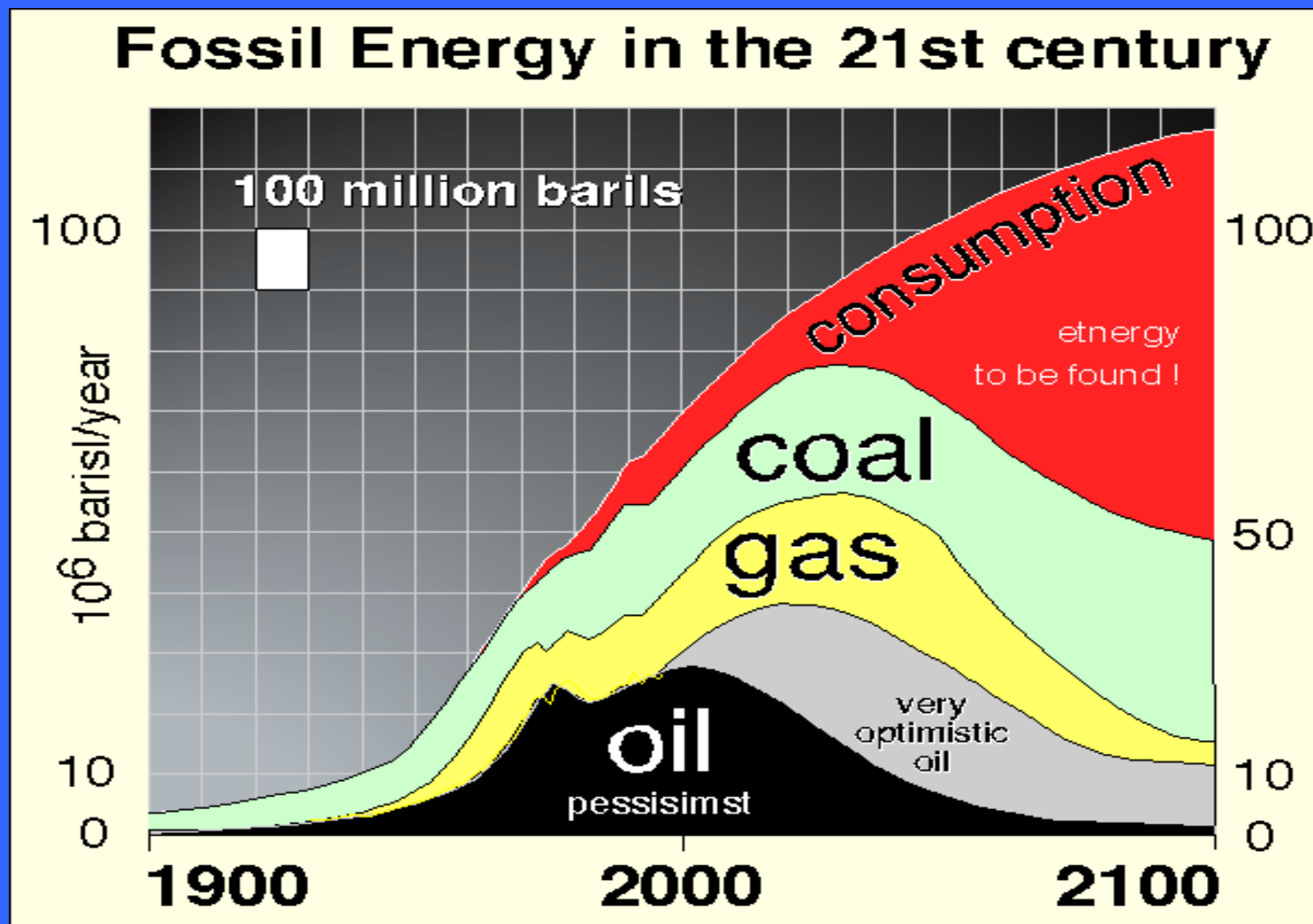
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# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge





# SCIENTIFIC CULTURE AND EMANCIPATION

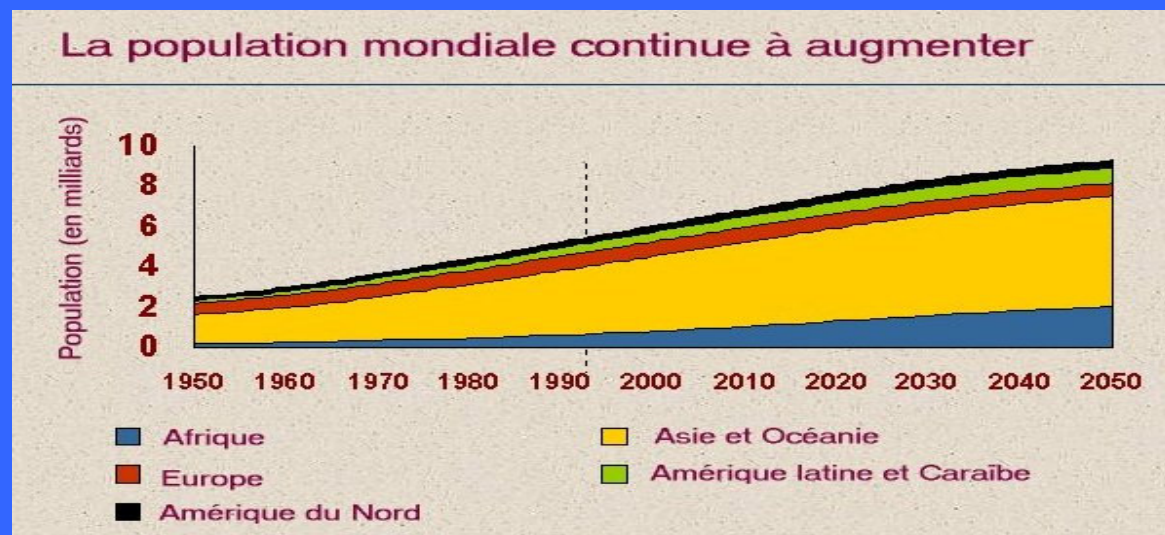
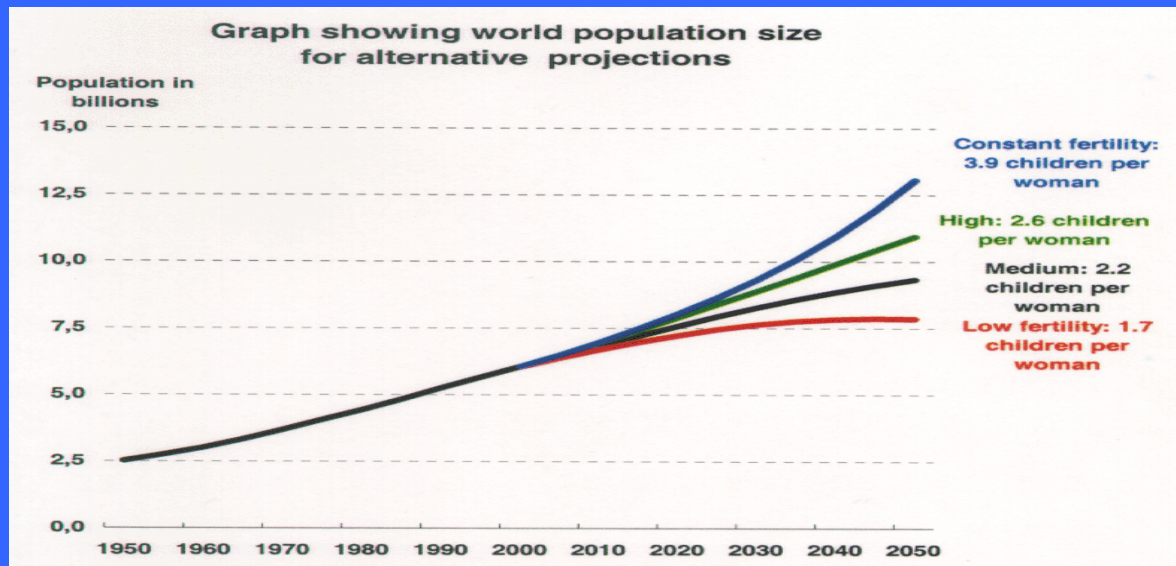
## Knowledge as a challenge

### Pollution



# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge



World population



# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge



Female education

# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge as a challenge

Knowledge (scientific) as a tool of emancipation

In order to understand, decide an act

- World demography
- World population health
- Natural and technical phenomena
- Sustainable development :
  - + Ways of consumptions (material, immaterial,...)
  - + Energy saving
  - + Environment
  - + Effects of human behaviours (collective and individual)
- Knowledge-sharing
- ...

# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

### Scientific culture in France

#### ACTORS

- Education System and research institutions
  - Cité des sciences et de l'industrie, Palais de la découverte
  - Partners
  - Authorities
  - Firms
  - Média, Editions, libraires,...
- 174 scientific museums (out of 3000), 54 centres, 13 associations, 150 associations, artistic companies,...

#### MODES

- Teaching (Curricula + IDD, TPE, PPCP, TIPE)
- Expositions
- Science festivals
- Innovative actions + scientific and technical workshops
- Contracts between State and Regions
- National and international competitions
- Special events (Phys. Int. Year, ...)



# SCIENTIFIC CULTURE AND EMANCIPATION

Scientific culture

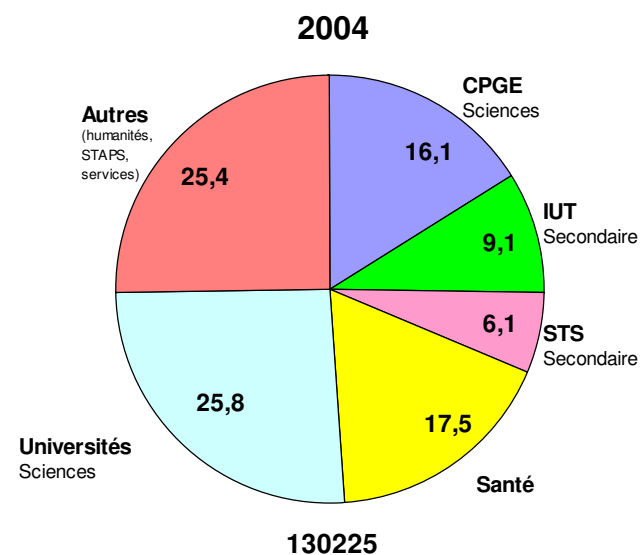
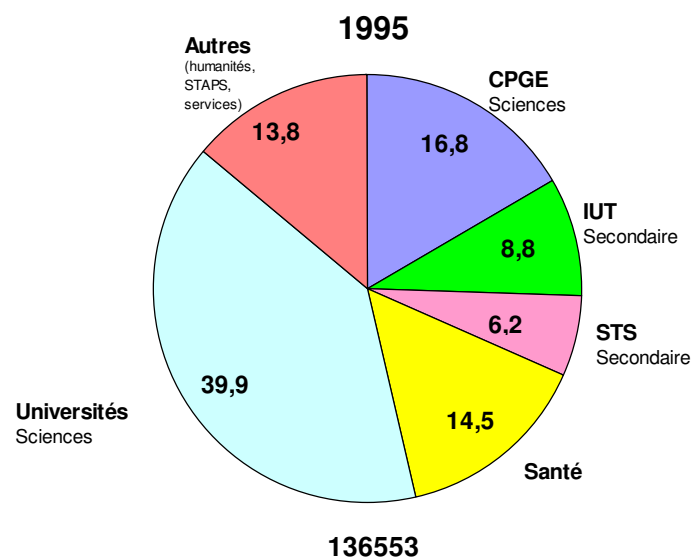
General problems

- Reduced place for science in mass medias
- Distortion of scientific concepts and language
- Attitude towards science : between fascination and rejection
- Small place for girls in scientific studies and for women in technical-scientific professions
- Brain drain
- Drop in student populations in fundamental sciences
- Difficulty to recruit science teachers

# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

### Destinations of secondary school laureates

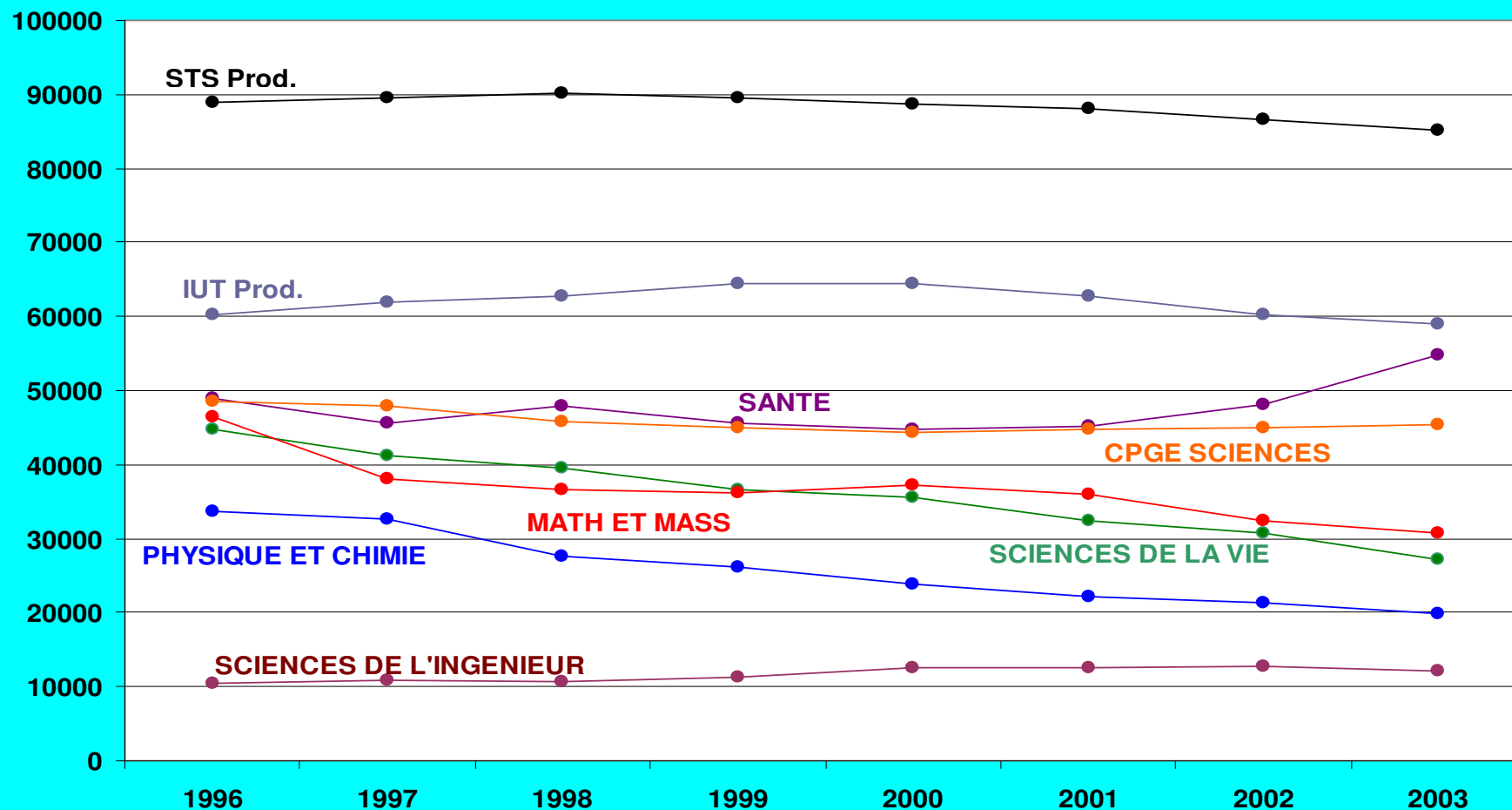


# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

Population of two first years in science universities

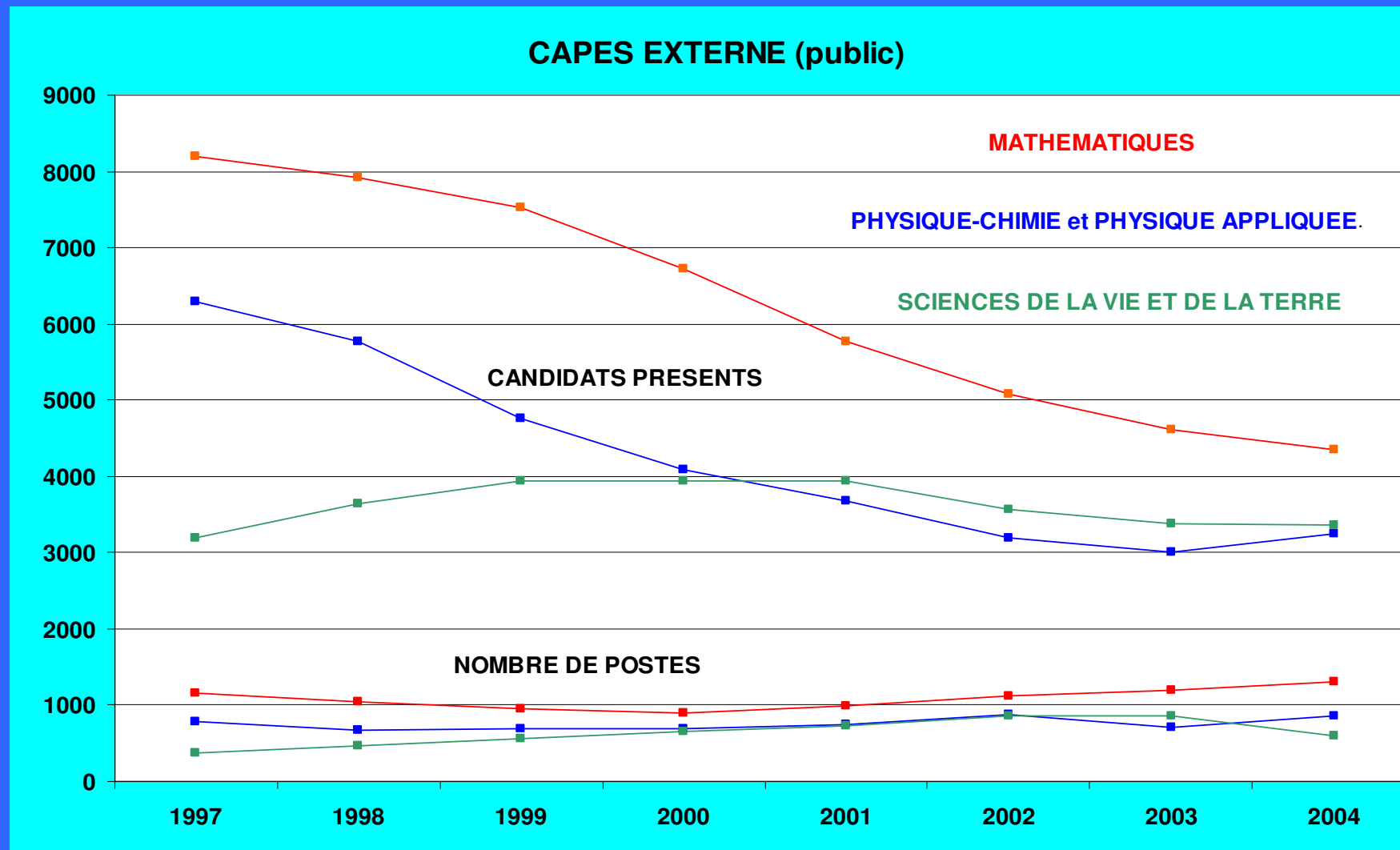
### EFFECTIFS PREMIER CYCLE



# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

### Recruitment of science teachers



# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture Origins of Problems



- Cultural prejudices (against manual, technical or experimental professions)
- Specific requirements of science (rigour, humility, patience, broad-mindedness,...)
- Sexual prejudices
- Social competition (with business, management, computing,...)
- Images presented by mass medias (complexity, inhumanity, formalism,...)
- Reactions against science (obscurantism, manipulation, exaggerations of ecology)
- Images presented by education (difficulty, abstraction, selectivity,...)

## Consequences

Disparities of development between nations

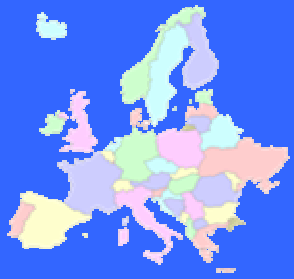
Disparities of positions inside societies



# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

### A planetary situation

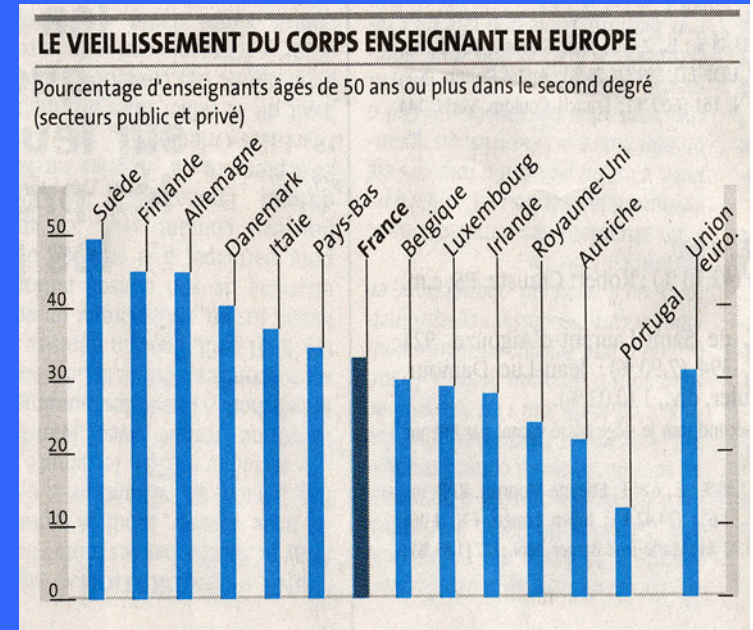


European situation, especially as fundamentals sciences are concerned. A crucial challenge : the recruitment of scientific teachers in the next years



World situation : the case of scientific departments in american universities..

### Age of teachers



# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

### Reforms

- Promotion of experimentation at school
- « La main à la pâte » (« Hands On »)
- New sciences and technology curricula at primary school
- New sciences curricula at « first cycle » of secondary school
- Shared scientific and humanistic culture at the end of the « first cycle » of secondary school (Act which lays down the basic principles in the field of education)
- Setting up the LMD reform
- National plan for the diffusion of scientific and technical culture
- « Sciences à l'Ecole » (« Sciences at school »)

# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

New sciences and technology curricula at primary school



From questioning to knowledge by means of experimental investigation



# SCIENTIFIC CULTURE AND EMANCIPATION

## Scientific culture

« Sciences à l'Ecole »



Science on stage



IPHO



# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge-sharing

Mavinga (Angola), december 04 2002

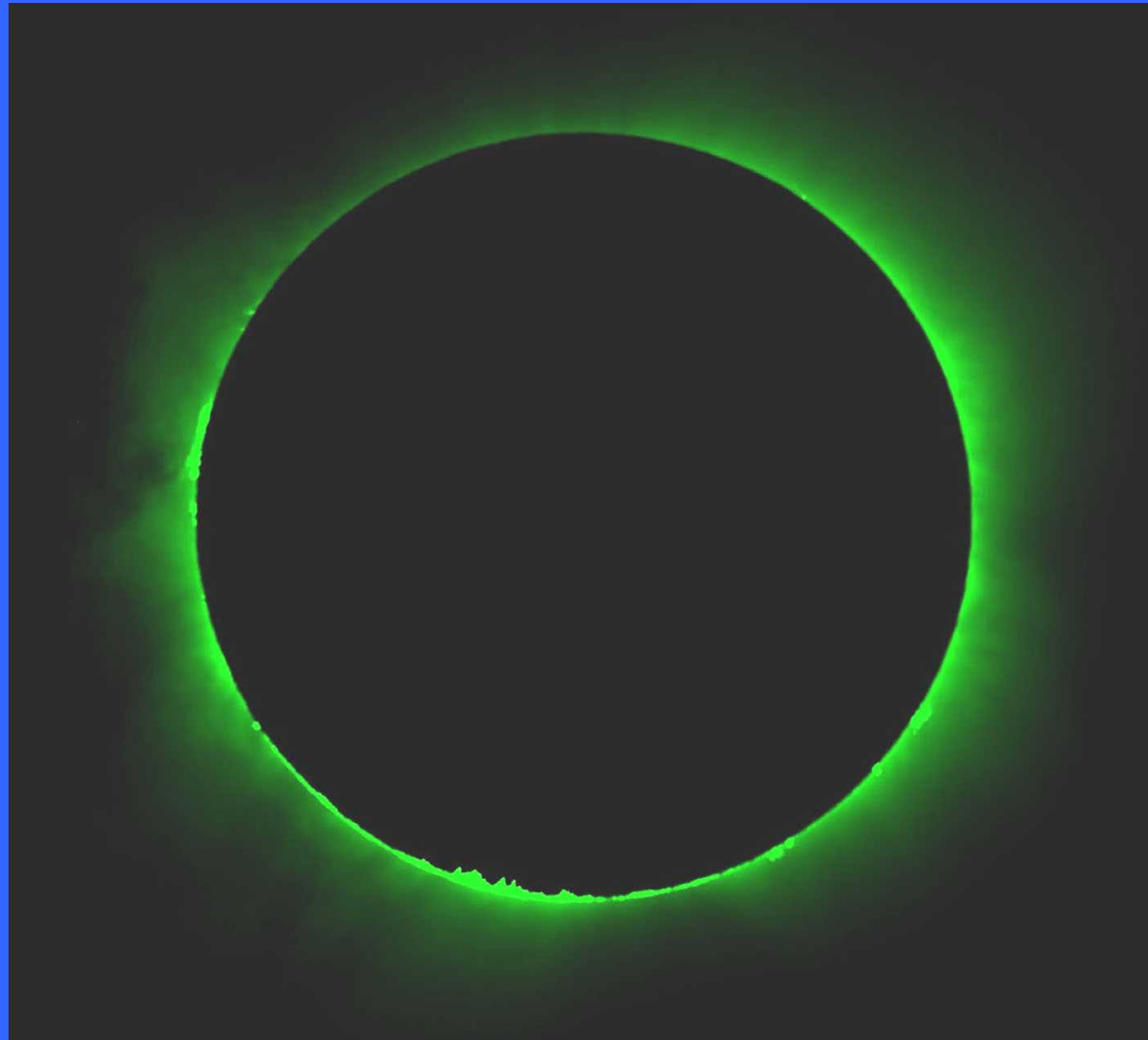




# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge-sharing

Solar eclipse, Angola, december 04 2002



# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge-sharing

Mavinga (Angola), december 04 2002



# SCIENTIFIC CULTURE AND EMANCIPATION

## Knowledge-sharing

### A planetary challenge

Science is universal. It belongs to all mankind. It transcends ethnic, political and religious differences.

It must be a tool of progress rather than one of selection. Scientific progress which instead leads to elitism, widening of disparities between nations and discrimination between peoples, is no more than a brain and sensitiveness limitation, a loss for all mankind



### African proverbs

It is better offering a fishing-rod one day, than fishes every day

The fool knows his house better than the neighbouring wise man does

The best weapon to give a child is school

Science is as essential to developing countries as to developed ones. Inspiring imagination as well as requiring rigour, it contributes to emancipation of peoples and human dignity

# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

Immemorial skies



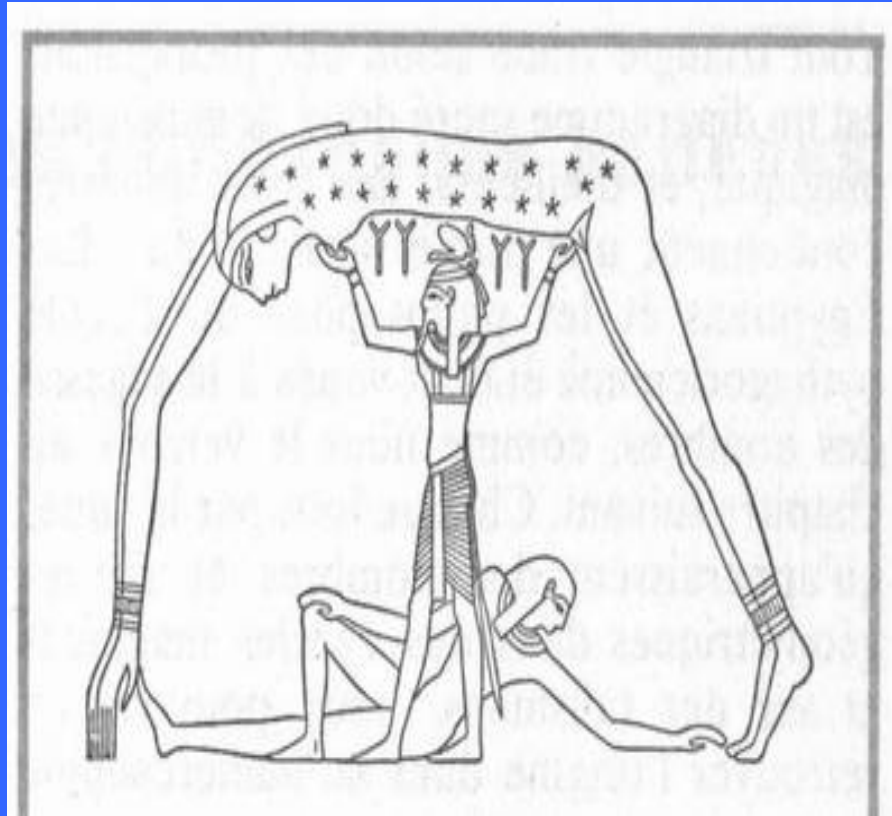


# SCIENTIFIC CULTURE AND EMANCIPATION

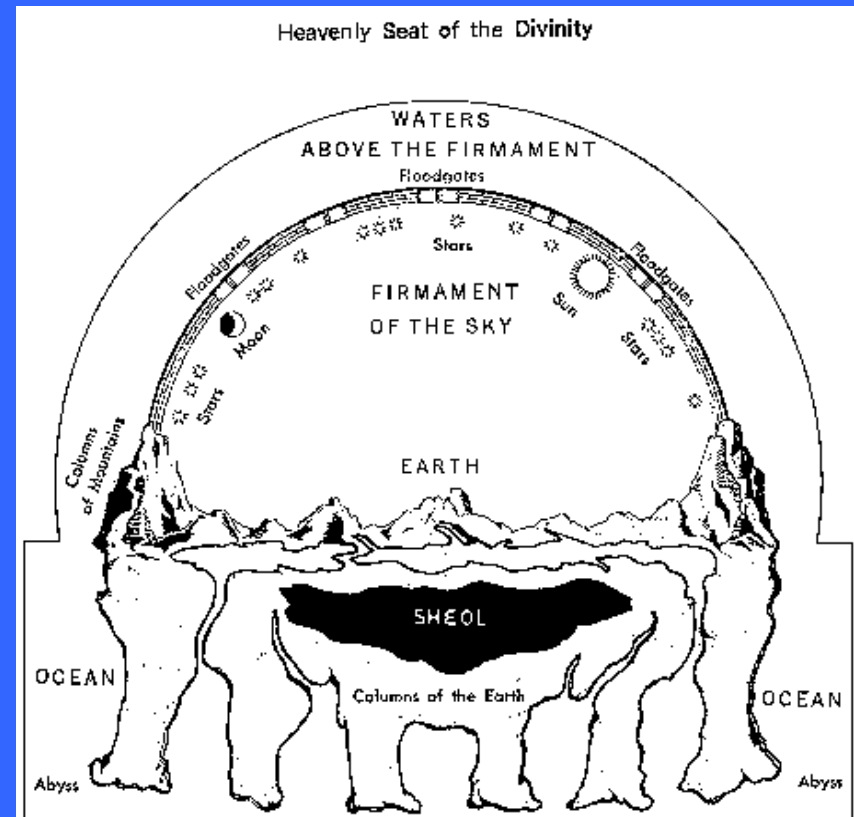
## Importance of astronomy

### Cosmogonies

#### Egypt



#### Mesopotamy



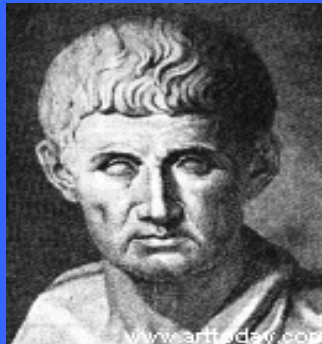


# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

### Geocentrism

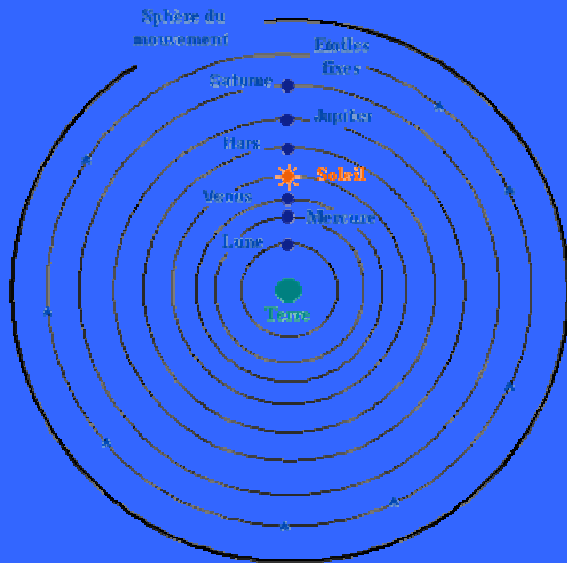
Aristotle



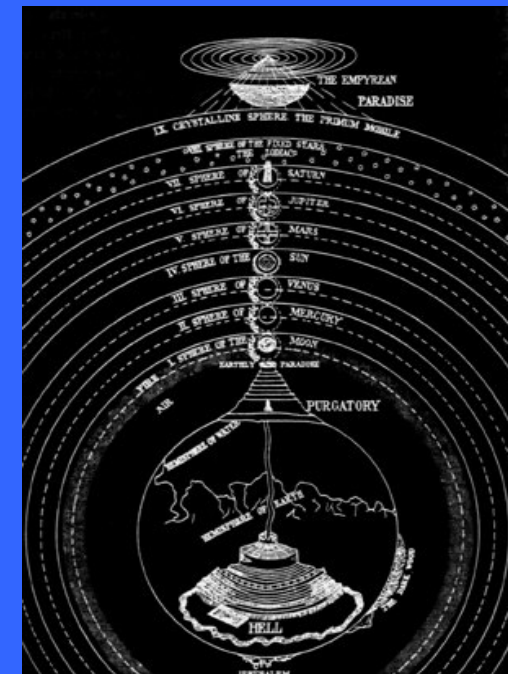
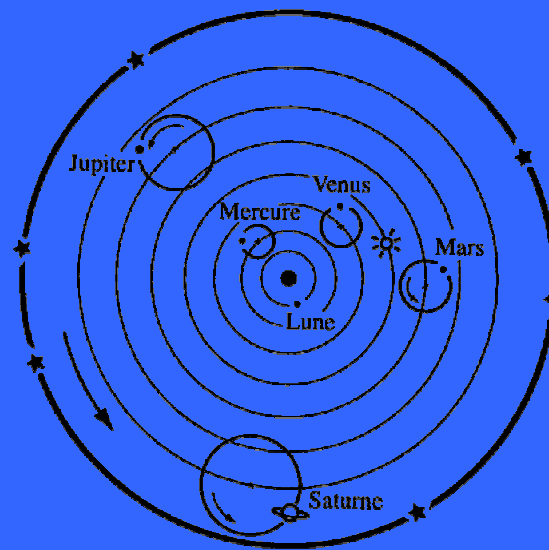
Ptolemy



Dante



le Système géocentrique



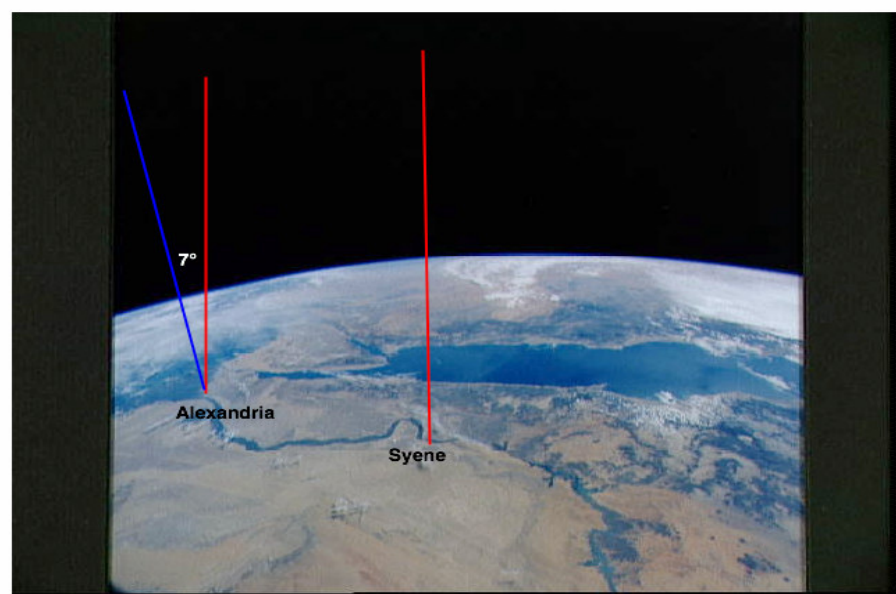
# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

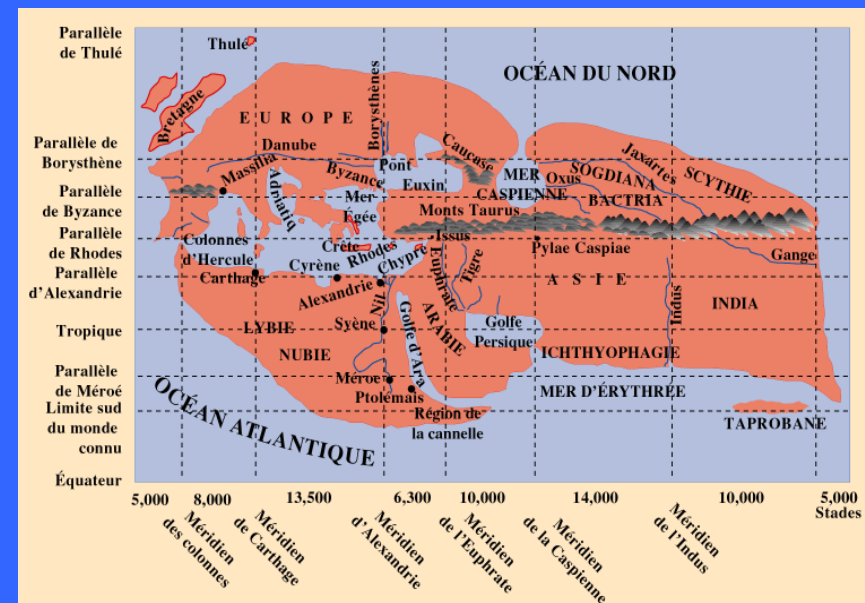
Eratosthenes



Experiment



Ancient world





# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

### Arabian astronomy



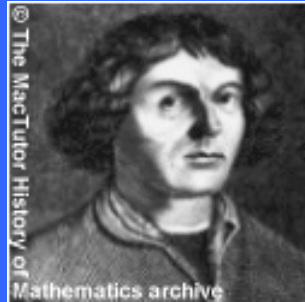
Ibn Rushd





# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

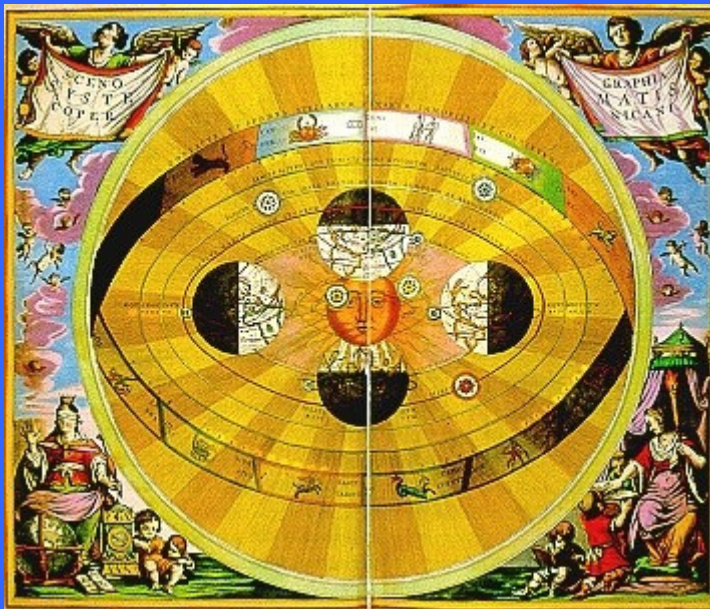


Copernicus

## Heliocentrism



Kepler





# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

Renunciation





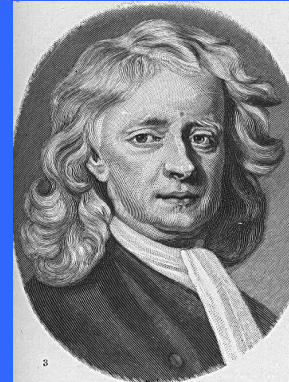
# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy



Galileo

View  
Renewal



Newton



# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

Astrology



Clarification

Astronomy





# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy



Dumbell Nebula



Kant



Andromeda

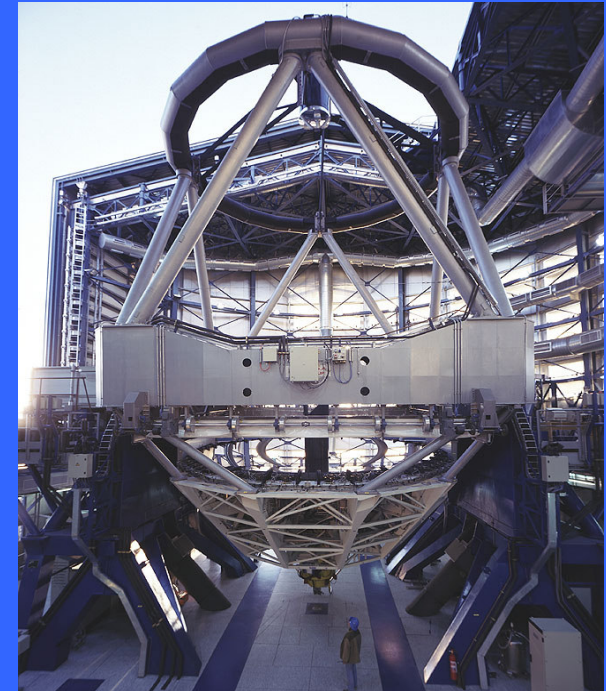




# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

### Giants



### Very Large Telescope

# SCIENTIFIC CULTURE AND EMANCIPATION

## The importance of astronomy

Cobe (Radio)



Chandra (X)

Hubble





# SCIENTIFIC CULTURE AND EMANCIPATION

## The importance of astronomy

### Borders

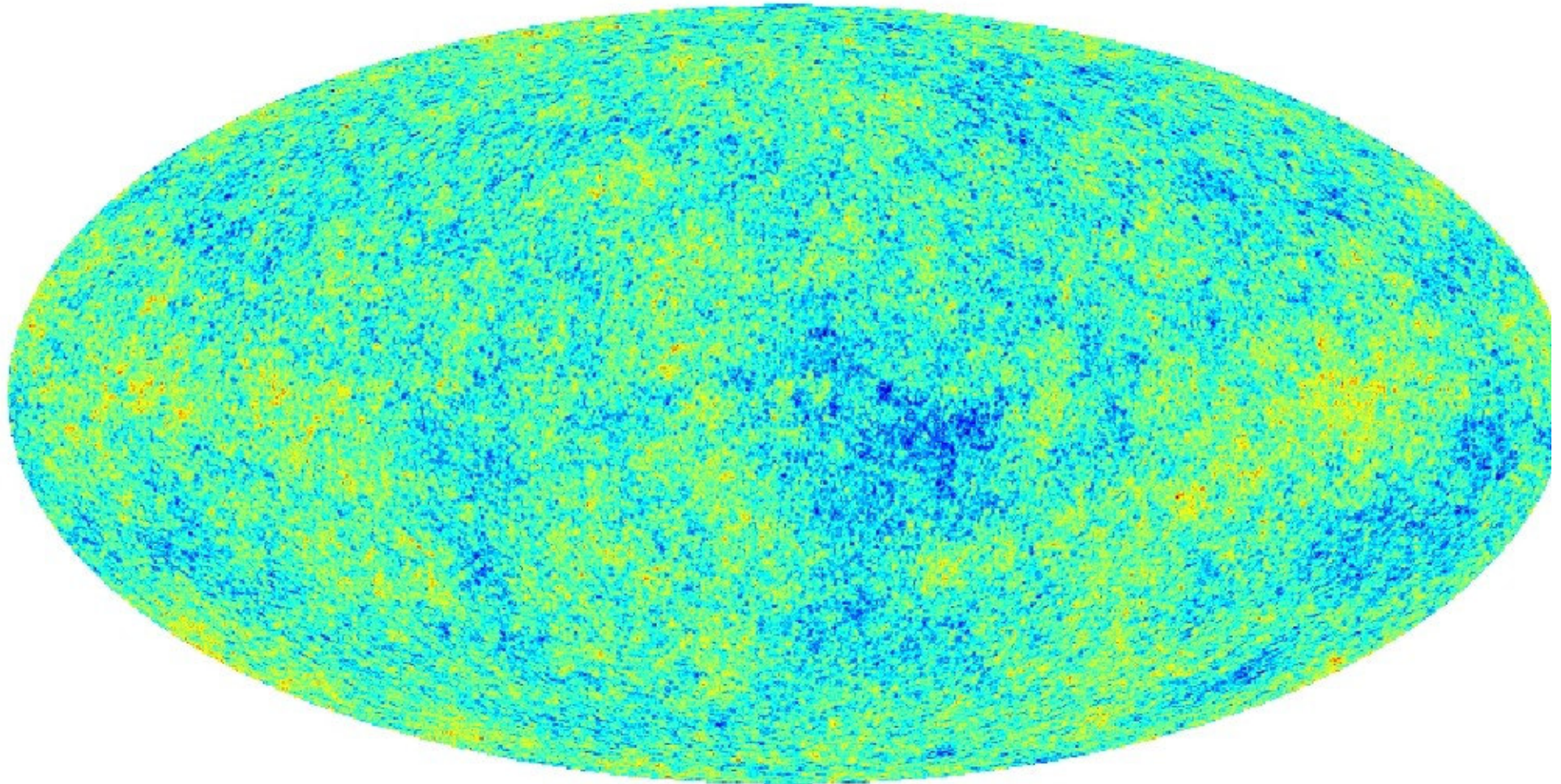




# SCIENTIFIC CULTURE AND EMANCIPATION

Importance of astronomy

Oldest image - First light



Cold Microwave Background

# SCIENTIFIC CULTURE AND EMANCIPATION

## The importance of astronomy

Apollo



Rocky





# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

### Eratosthenes' experiment



Metz (France)



Yako (Niger)



# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

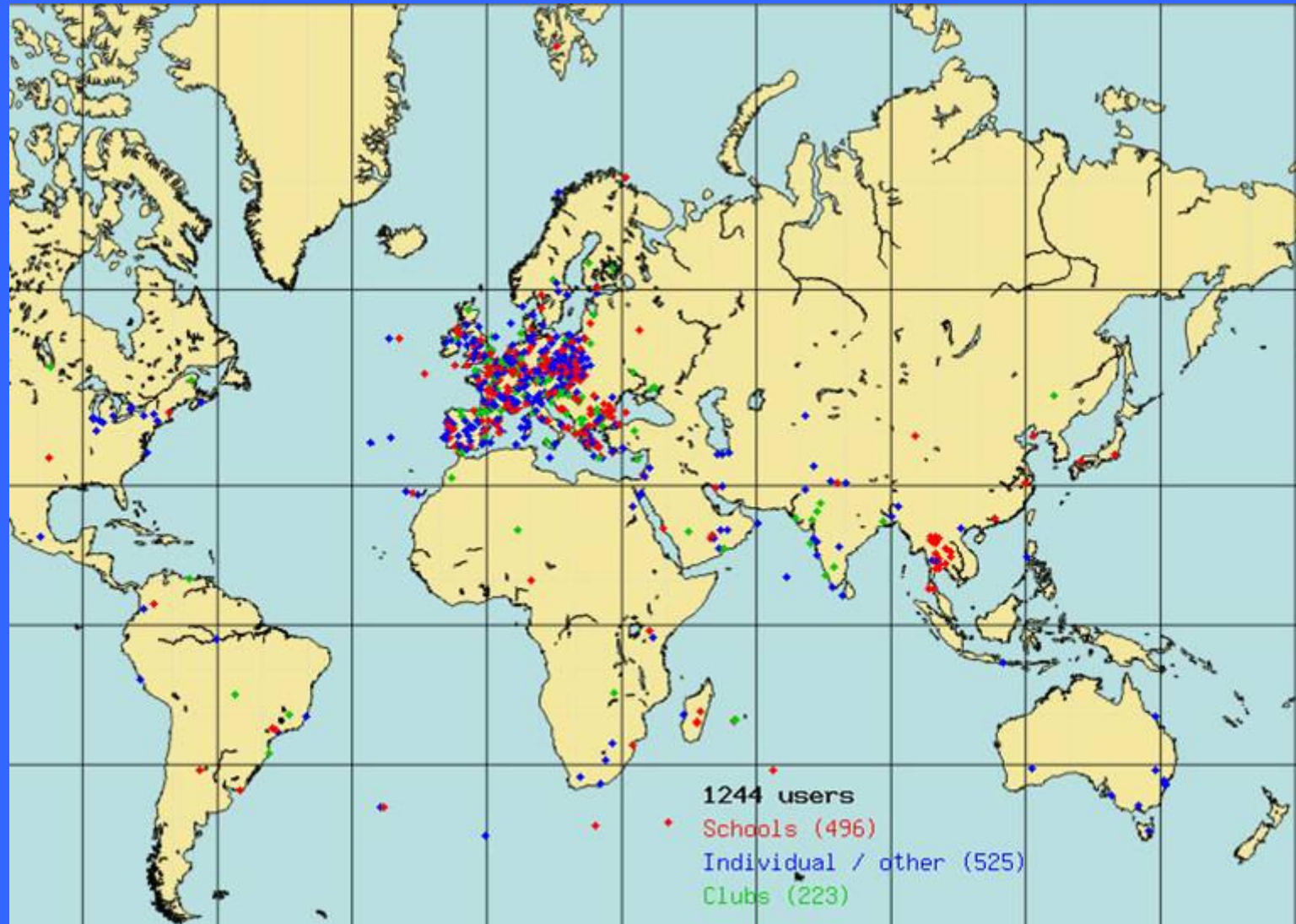
### Transit of Vénus



# SCIENTIFIC CULTURE AND EMANCIPATION

Importance of astronomy

Transit of Venus



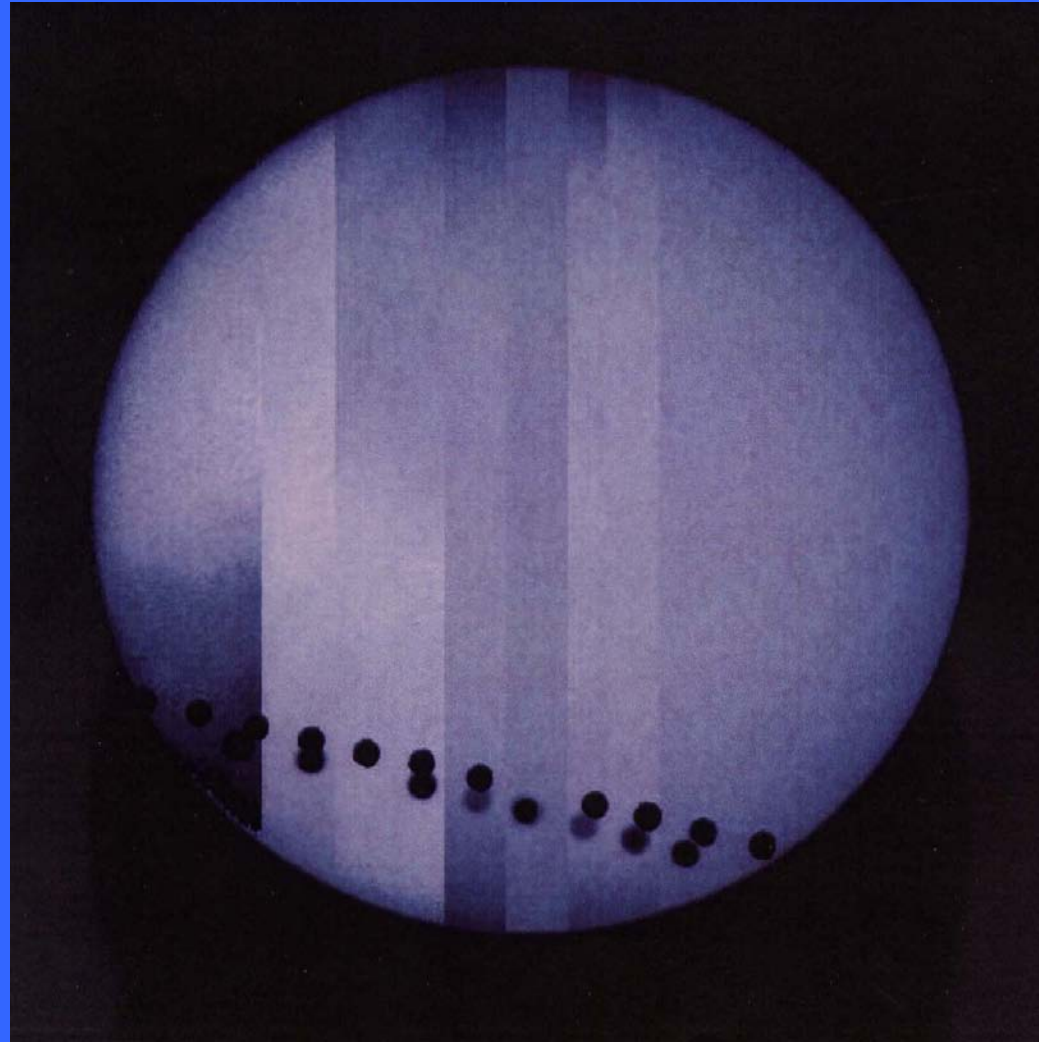
# SCIENTIFIC CULTURE AND EMANCIPATION

importance of astronomy

Transit of Venus

Spitzberg

La Réunion



# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

### Life

#### Stromatolites



Colonnes stromatolitiques dans la zone intertidale, Shark Bay, nord-ouest de l'Australie.



# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

Life

Ediacaria fauna



# SCIENTIFIC CULTURE AND EMANCIPATION

Importance of astronomy

Life

Extinctions



# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

Life

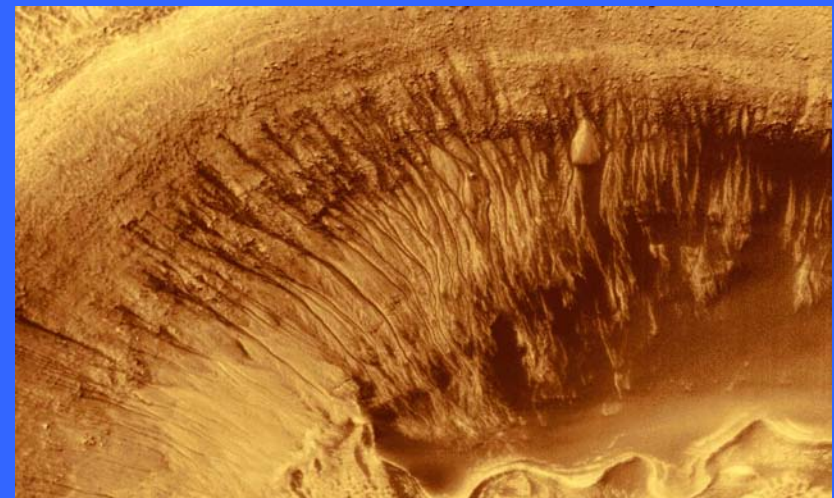
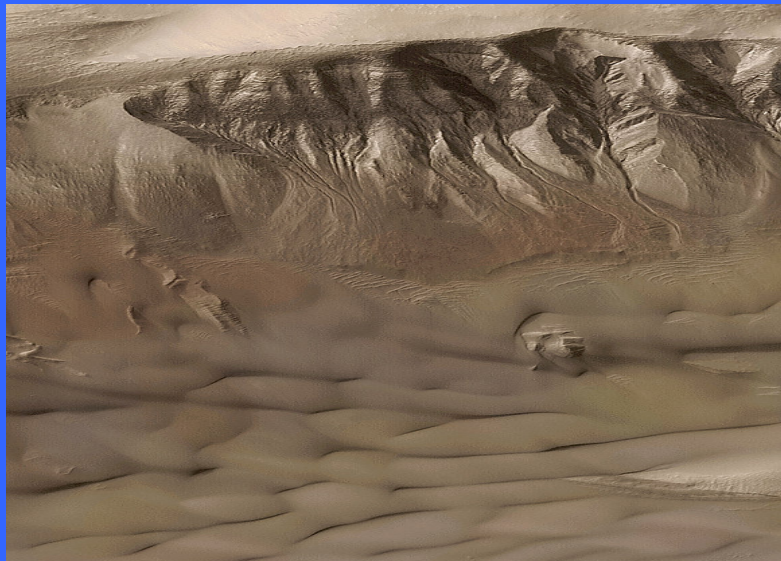
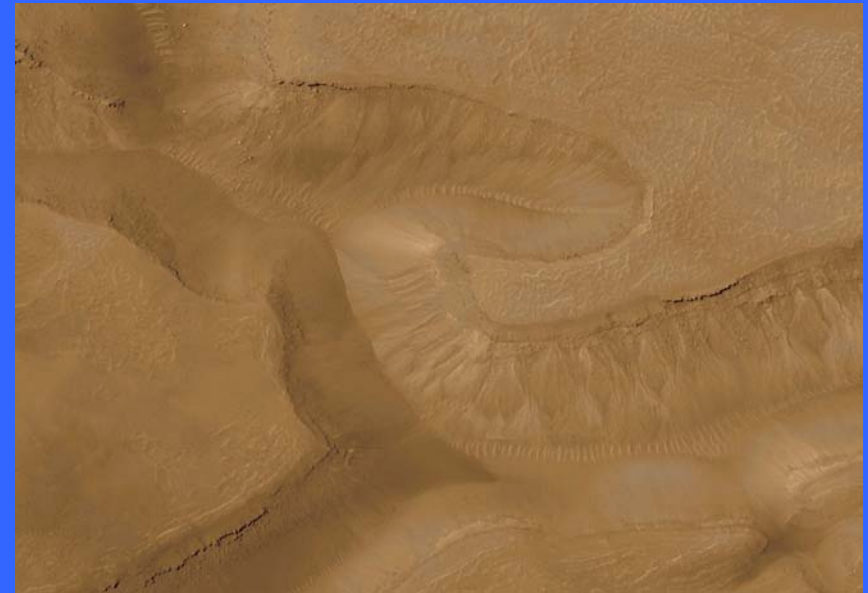
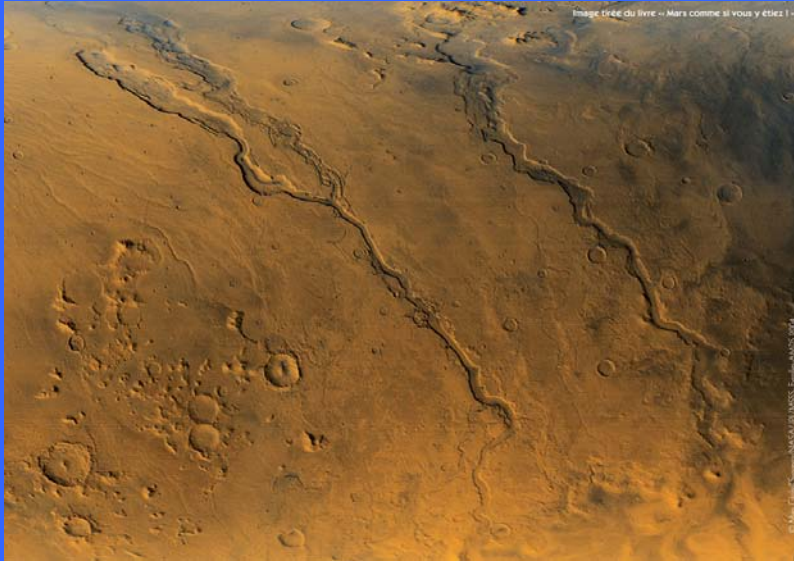




# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

### Life?



# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

Life



Viking



Opportunity

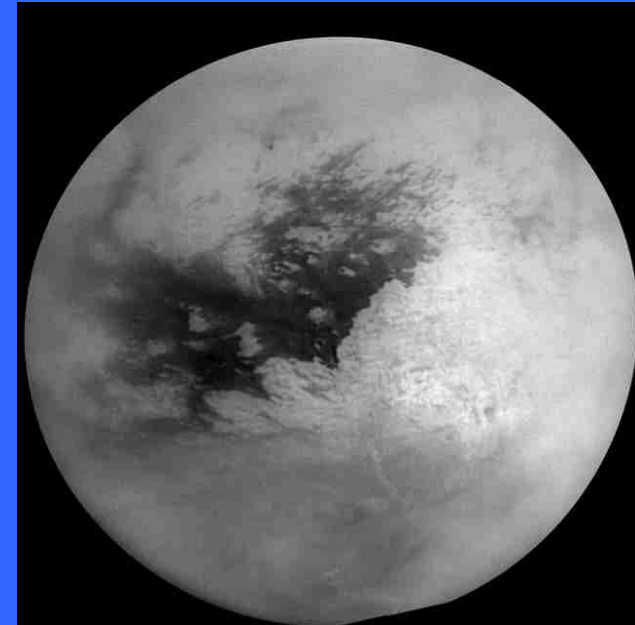


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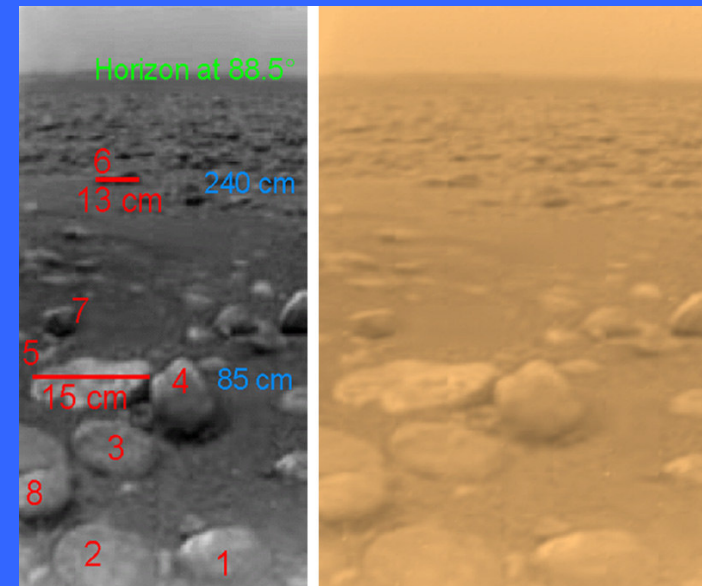
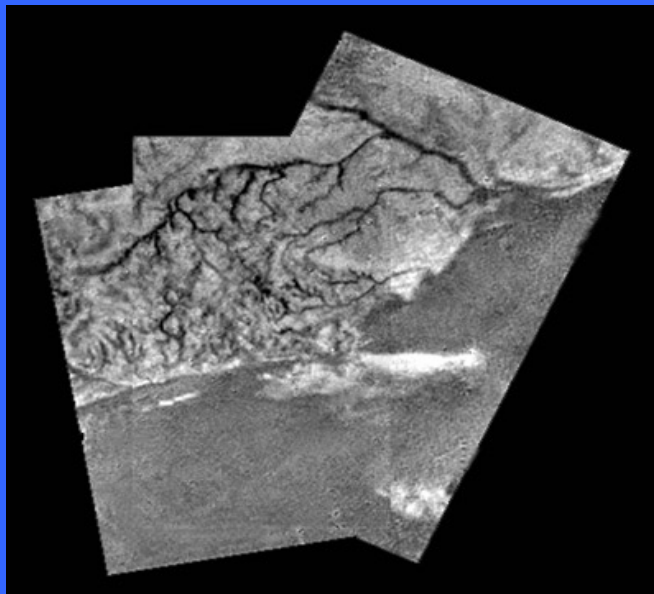
## Importance of astronomy



Life



Titan





# SCIENTIFIC CULTURE AND EMANCIPATION

## Importance of astronomy

Our world

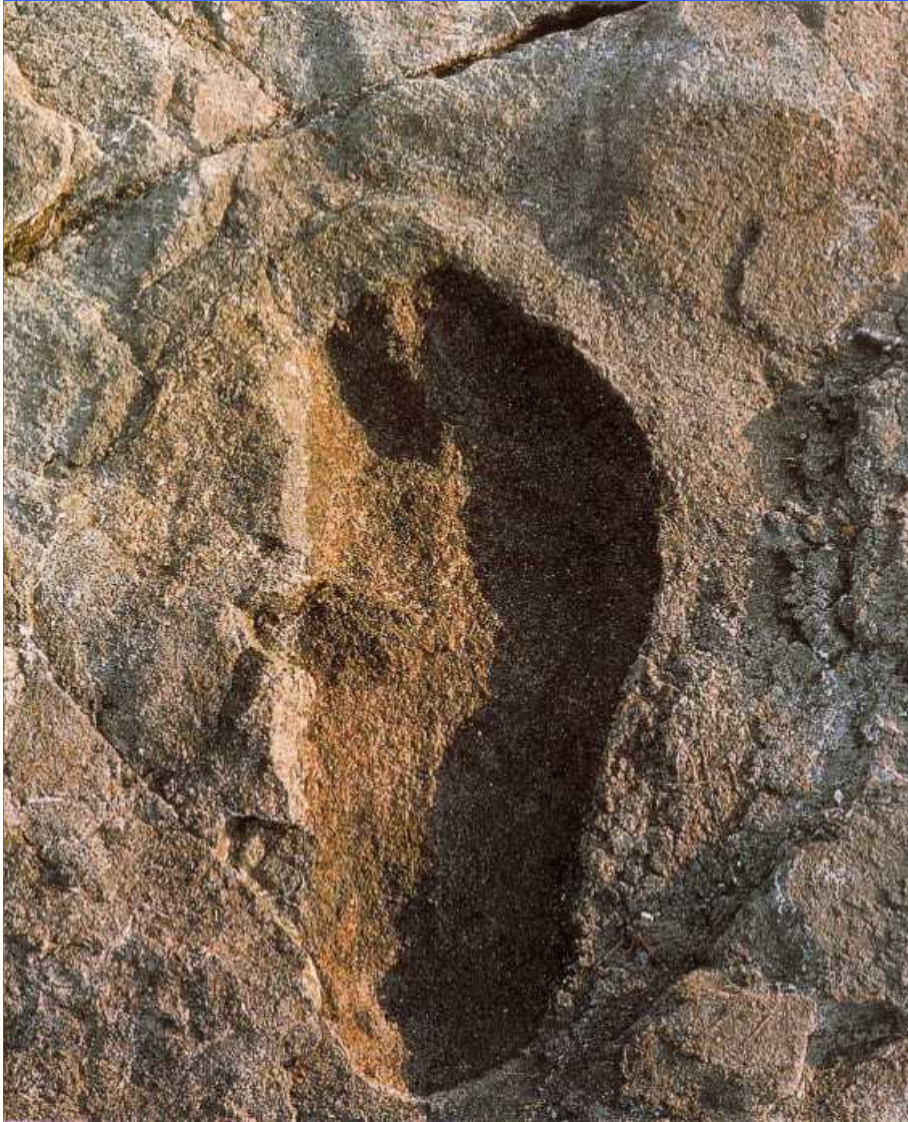




# SCIENTIFIC CULTURE AND EMANCIPATION

## The importance of astronomy

Laetoli



Moon





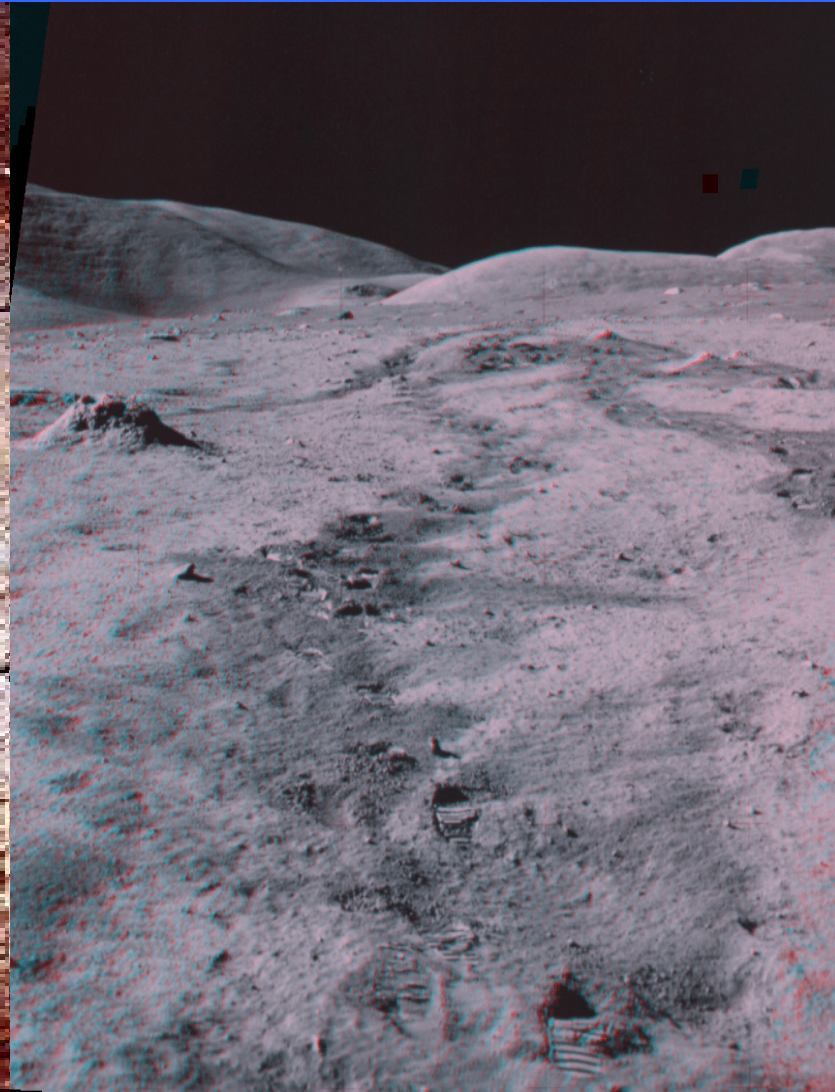
# SCIENTIFIC CULTURE AND EMANCIPATION

## The importance of astronomy

Laetoli



Moon





# SCIENTIFIC CULTURE AND EMANCIPATION

Truth is like water that takes the shape of the vase

*Ibn Rushd*

الحقيقة مثل الماء الذي يشكله الإناء

ابن رشد القرطبي

For science, the the vase is the same for all

في العلم ، الإناء واحد