Making Sense of Science and Technology in Contemporary Societies

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Introductory thoughts

- S&T account for many of the signatures characteristics of contemporary societies

    - Uncertainty, unaccountability, speed, skepticism and distrust,visions of doom >< visions of progress

- *Doing* and *being* play out in territories *shaped* by scientific and technological inventions (Jasanoff 2004)

Layout

- 1. Technological determinism and its critiques

- 2. A project in the knowledge of knowledge: the social construction of science and technology (S&T)

- 3. Socio-political consequences of S&T: towards technological democracy?

- 4. Technology Assessment as a tool for socio-political understanding of S&T

1. Technological determinism and its critiques

The critique of technique: a tradition of sci-fi (1)
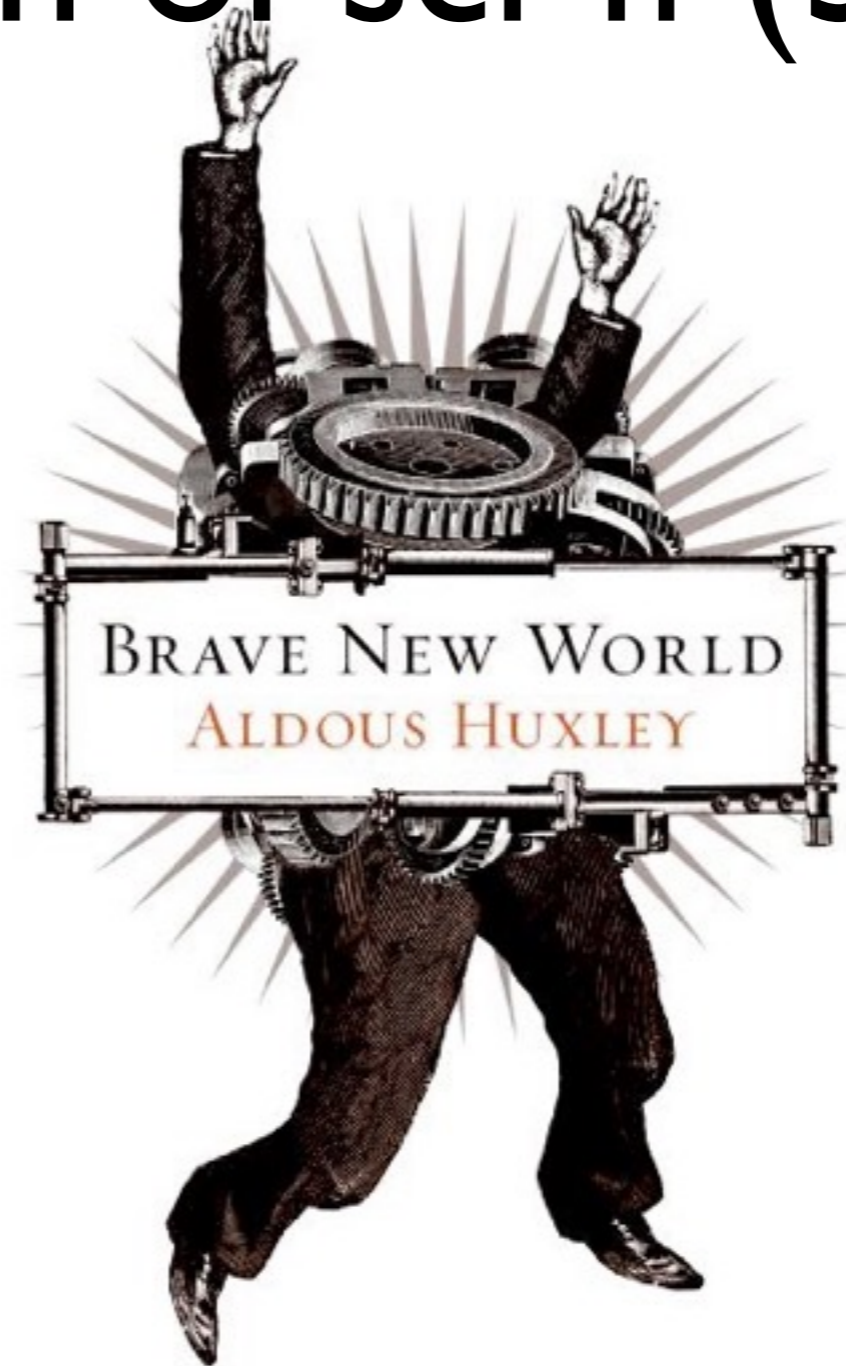
- E. M. Forster (1879-1970): *The Machine Stops*
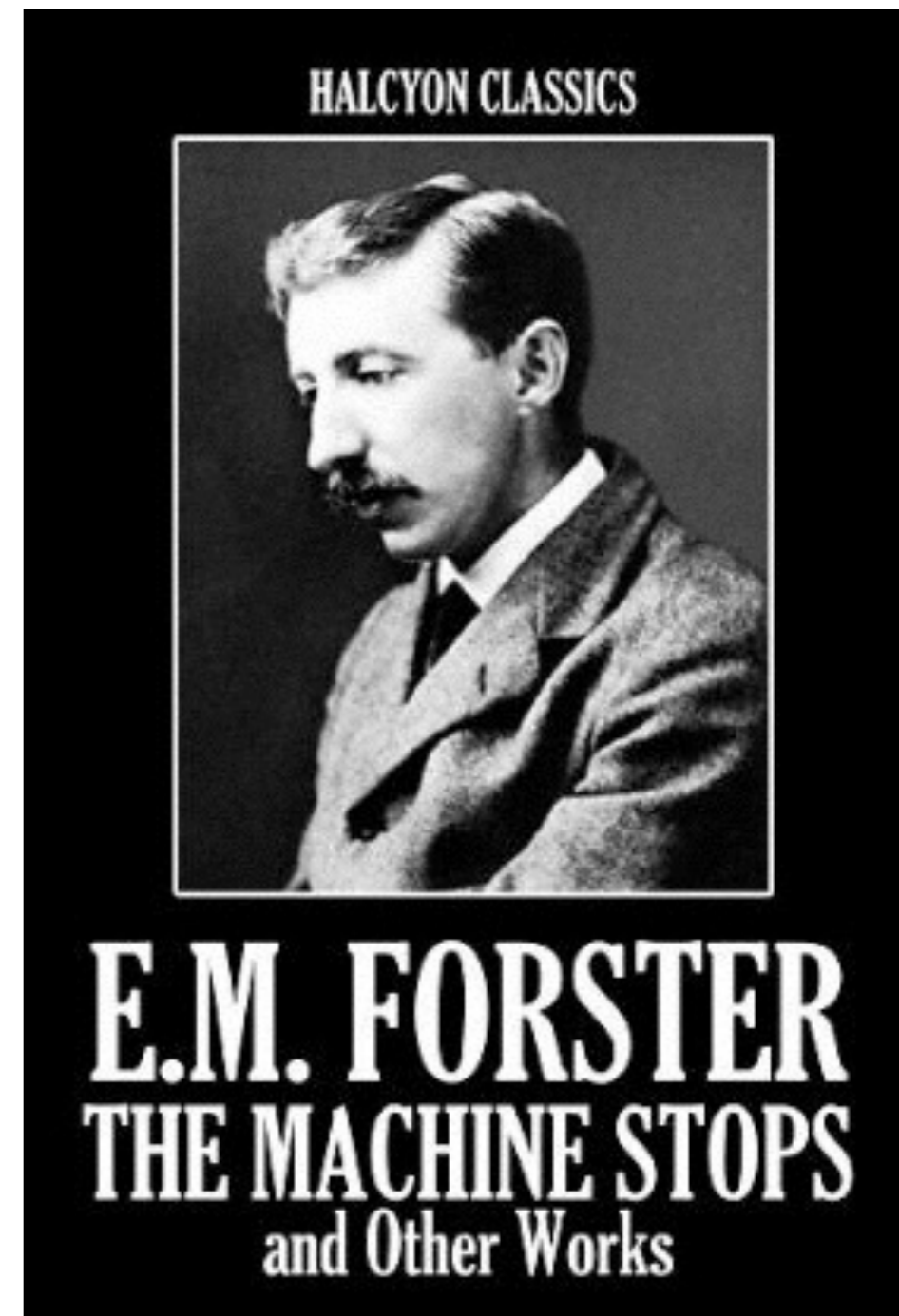
The critique of technique: a tradition of sci-fi (2)

- George Orwell (1903-1950): *1984*
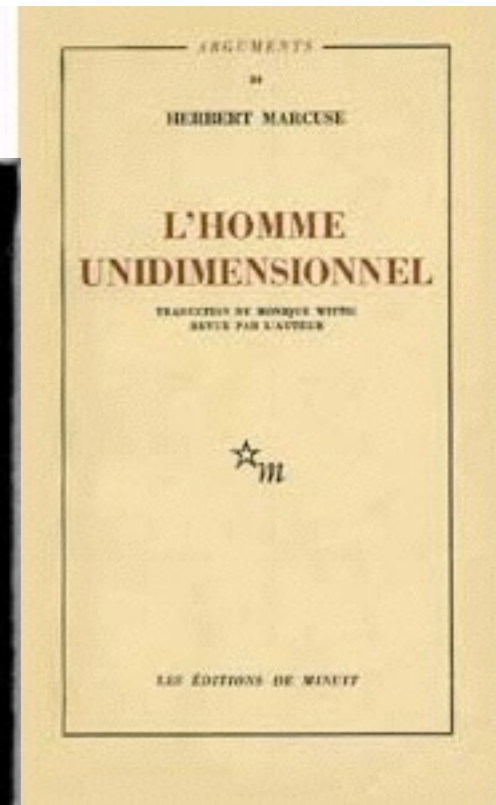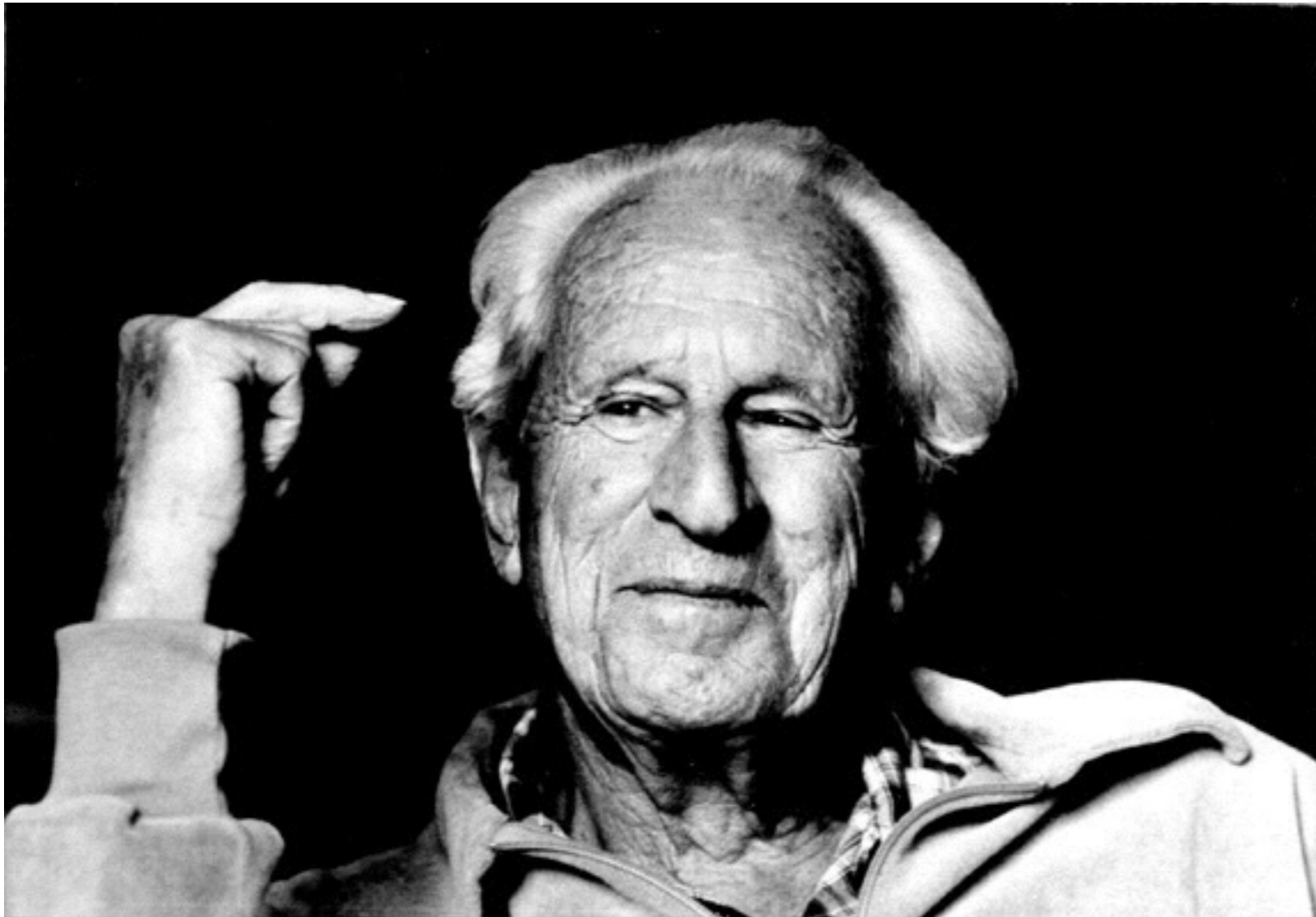
The critique of technique: a tradition of sci-fi (3)

BRAVE NEW WORLD
ALDOUS HUXLEY

HARPER**PERENNIAL** MODERN**CLASSICS**

- Aldous Huxley
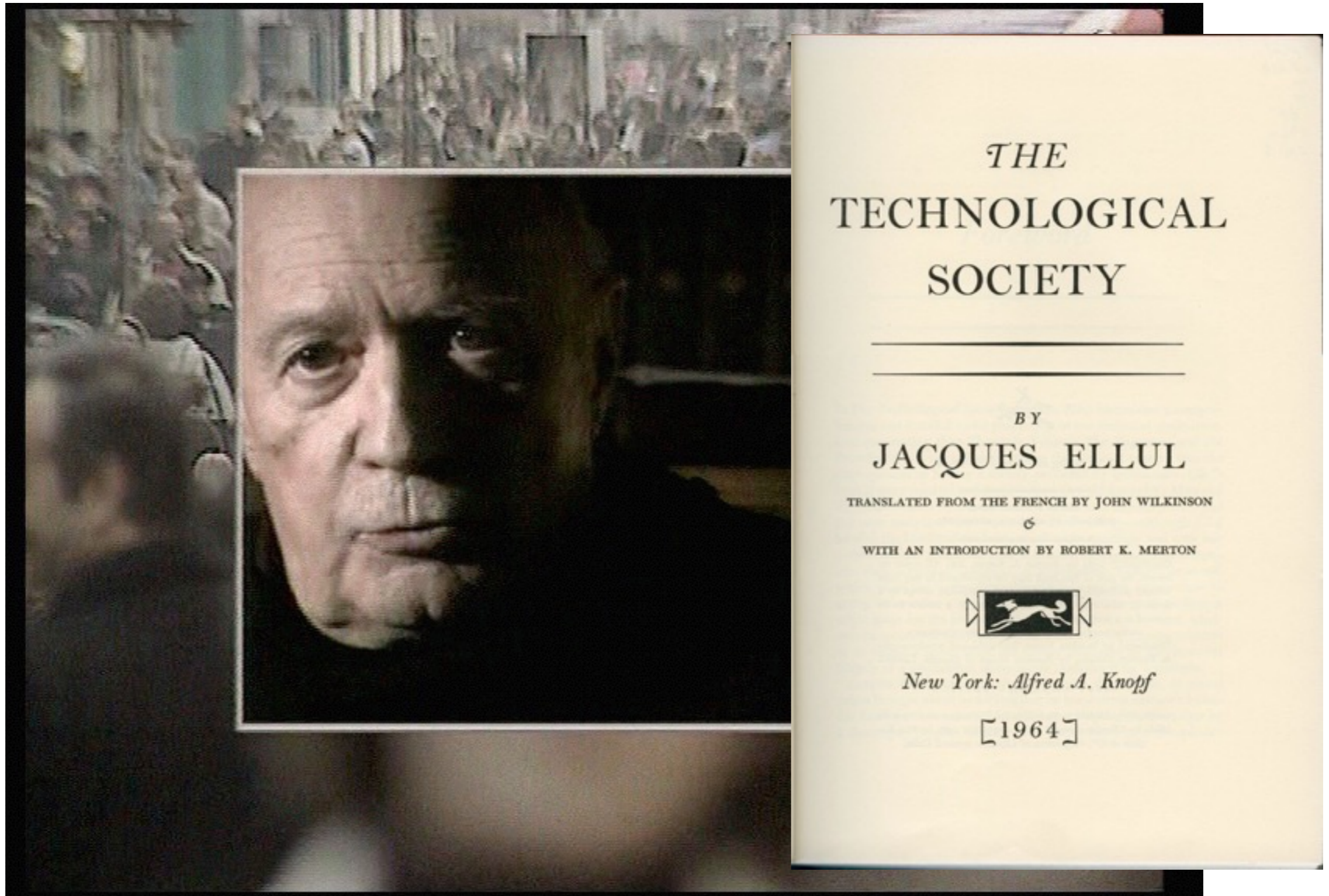 (1894-1963):
  Brave New World

Technological determinism

- Core idea: technology develops itself (quasi-)autonomously

Marcuse (1898 - 1979)

Jacques Ellul (1912 - 1994)

THE
TECHNOLOGICAL
SOCIETY

BY
JACQUES ELLUL

TRANSLATED FROM THE FRENCH BY JOHN WILKINSON
&
WITH AN INTRODUCTION BY ROBERT K. MERTON

New York: Alfred A. Knopf
[1964]

To recapitulate

- Main concern: science and technology (S&T) must serve human beings as broadly as possible

- If technology is autonomous, then there is no politics of technology - it becomes a matter of resignation

- Leaves aside the question of how could societies handle scientific and technological change?

Determinism: A unbearable position

- The *Manhattan Project* (1942): a political enterprise

- Weinberg (1966): nuclear weapons to drive peace on earth

- Weinberg's '**Technological fix**': a technological solution to a social problem

- Contribution to the imaginary of the «mad scientist»

- *«A technological fix is a means for resolving a societal problem by adroit use of technology and with little or no alteration of social behavior. The problem may itself have arisen from a misused or a deficient technology - for example, highway deaths are a social problem stemming from widespread use of automobiles. Or the social problem may have little to do with technology - for example, war or crime in the streets or overpopulation. Thus for the first of these - highway deaths - we have adopted seat belts and may adopt air-bags; for war, **technology offers the H-bomb and missile delivery systems which have imposed a peace of mutual deterrence**; for crime, better street lighting, as a partial resolution; for overpopulation, the "pill".»*

Alvin M. Weinberg, «Beyond the Technological Fix», 1978

Today illustration

- «Technological fix ideology» is still pervasive and widespread

- Some «one-size-fits-all» geoengineering solutions
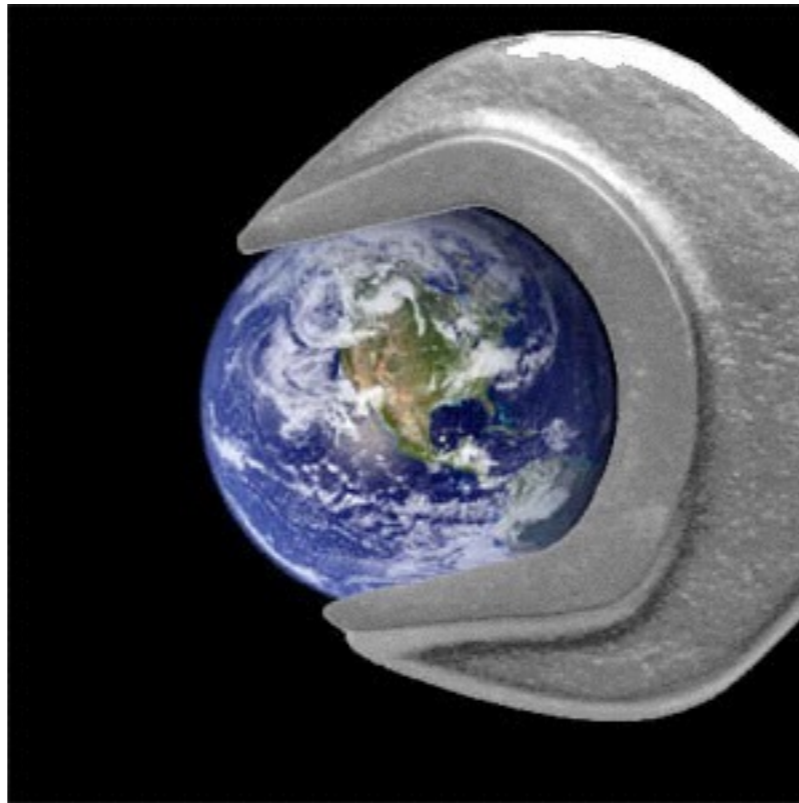
2. Social construction of science and technology and its critiques

Constructivism

- A new «epistemology» - a new knowledge of knowledge, a new understanding of how knowledge is *produced*

- Scientific knowledge does not «exist» out there, it is shaped through a series of instruments and practices in a local setting

- This new epistemology has driven some critiques

The social construction of scientific facts

- Bruno Latour &
  Steve Woolgar
  (1979): *Laboratory Life*

- **How scientific facts
  are being
  established**

lab ethnography
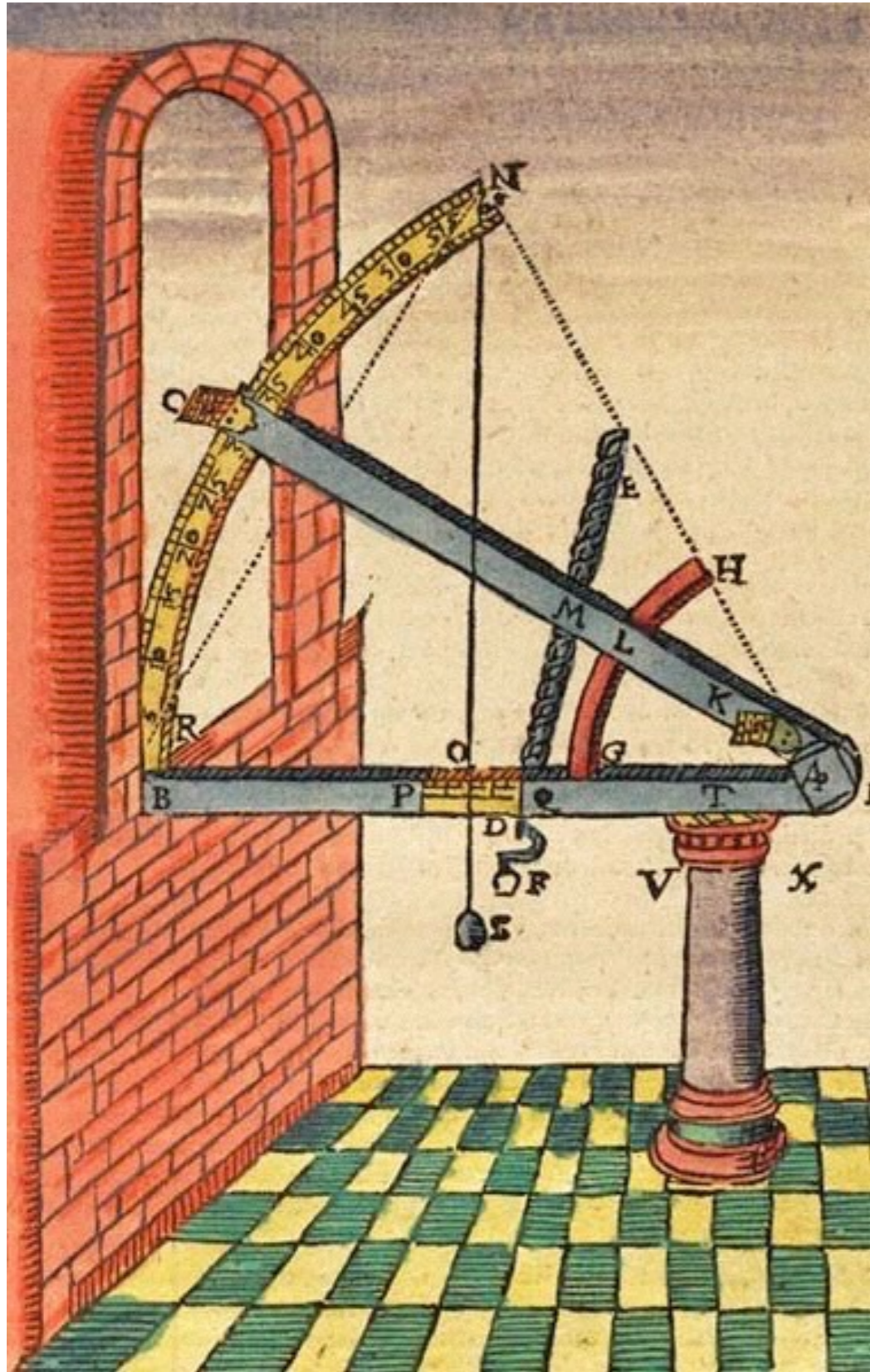
- 2-years study in a laboratory: highlights a series of translation, behaviors (i.e. of photons), handled through instruments, and translated into graphs, diagrams, images, publications...

Is science undermined?

- In a way, **yes**: scientific facts are not «given» anymore, but rather the fruit of a patient elaboration and complex practices

- In a way, **no**: unfolding the complex practices through which science is produced could only make it stronger: one has to reinforce the rigor of the process

The «science wars» (1990s)

- The «constructivist» epistemology heavily criticized for being anti-rationalist, against science

- **Entrenched debate: relativism vs. rationalism**

The Sokal case

- The «Sokal case»: a 'pastiche' text published in *Social Text* (using postmodern vocabulary): «*Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity* »

- Original excerpt (from *Social Text*):
  «It has thus become increasingly apparent that physical "reality", no less than social "reality", is at bottom a social and linguistic construct; that scientific "knowledge", far from being objective, reflects and encodes the dominant ideologies and power relations of the culture that produced it»

- Simultaneous critique (published in *Lingua Franca*):
  «The parody was a pastiche of left-wing cant, fawning references, grandiose quotations, and outright nonsense, centered on the claim that physical reality is merely a social construct.»

- **In defense of a strict rationalism, Sokal and his allies tend to radically deny any intellectual merits to constructivism**

The SCOT approach

- The social construction of facts and artifacts: Bijker, Hughes & Pinch, 1984, MIT
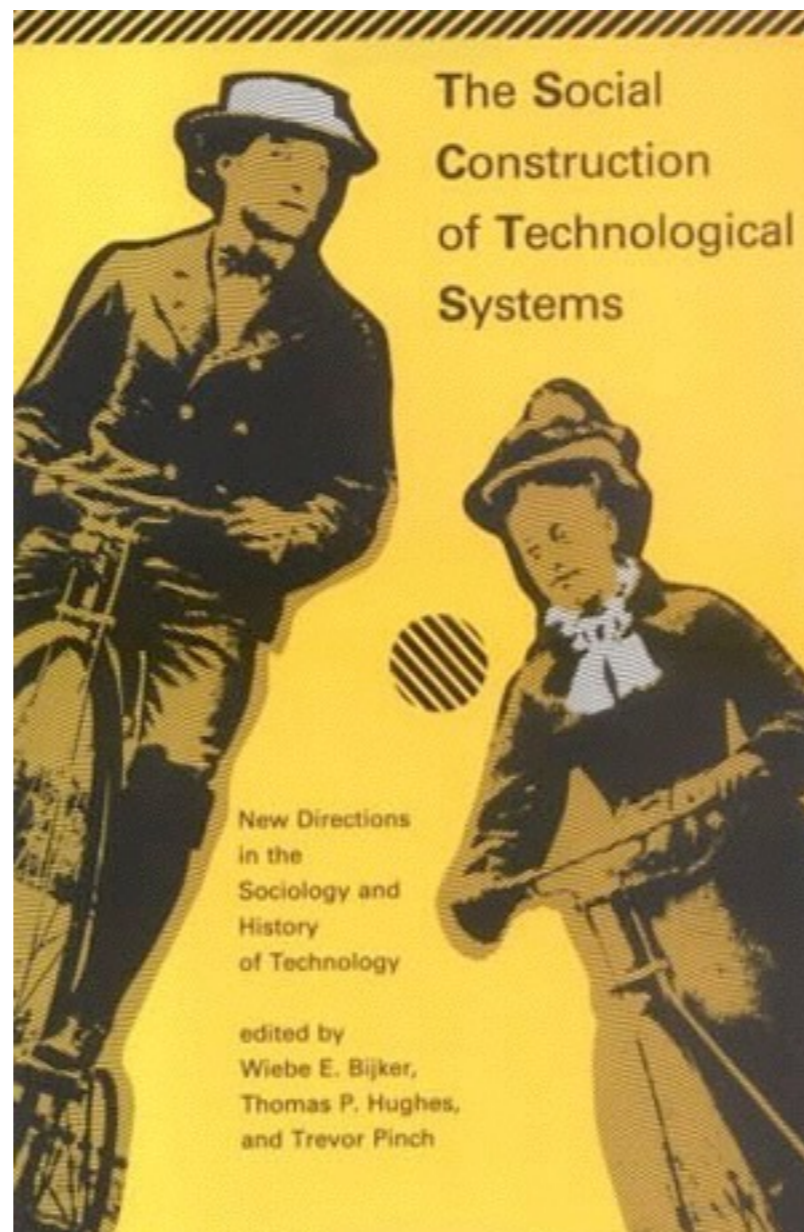
The Bicycle

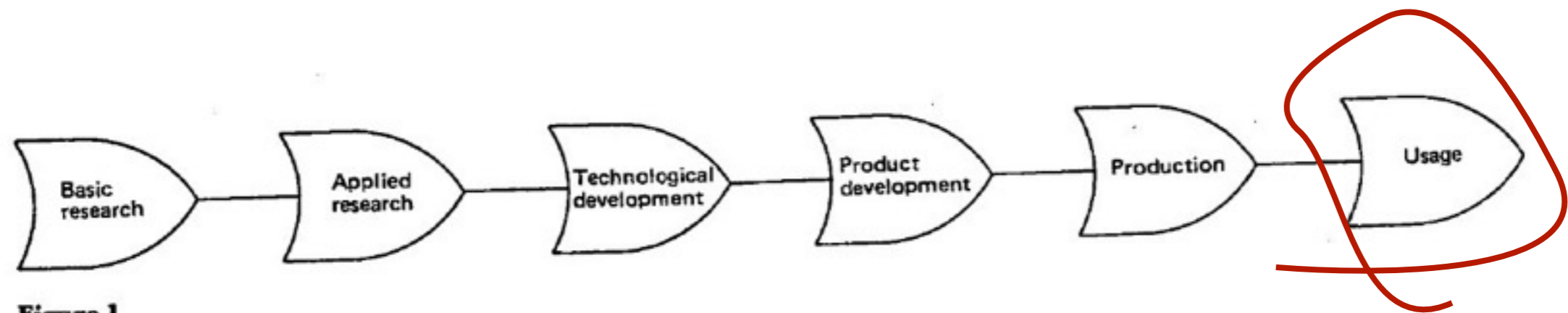- The bicycle: social preferences (for speed, security) contribute a great deal to shape technological devices

Figure 1
A six-stage model of the innovation process.

- The 'bulb': not entirely fitting the heroique figure of the glorious inventor, Edison was just as well a social and economic entrepreneur

Why are streets enlightened by electricity and not gas, as it used to be the case?
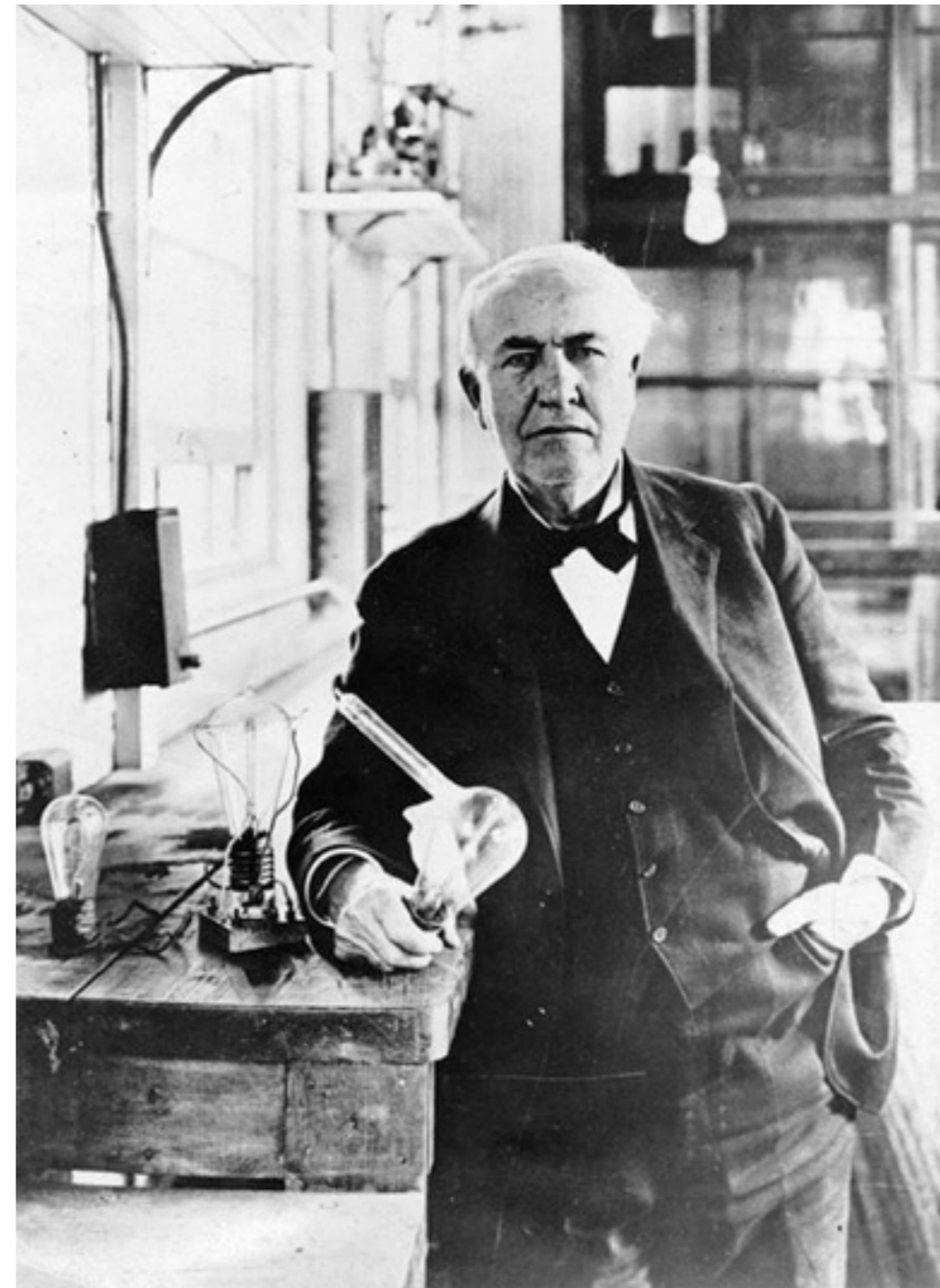
- So was Pasteur (how literaly «sold» the concept of vaccination)

Social shaping of science used to be explicit, performed in front of crowds of gentlemen - or future consumers - to demonstrate the validity of a scientific experimentation

Social worlds are literally performed so as to demonstrate that vaccination works

Actor-Network Theory

- ANT explains how **human** and **non-human** interactions actually work and are entangled

- Looks at stategies for relating elements together into a network

- *Michel Callon (1986). «Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay».*

- *John Law and John Hassard (eds) (1999). Actor Network Theory and After (Oxford and Keele: Blackwell and the Sociological Review).*

3. On socio-political implications of technologies

Technology in daily life

- Many examples of how problematic / questionable technologies can get as they pervade their daily life
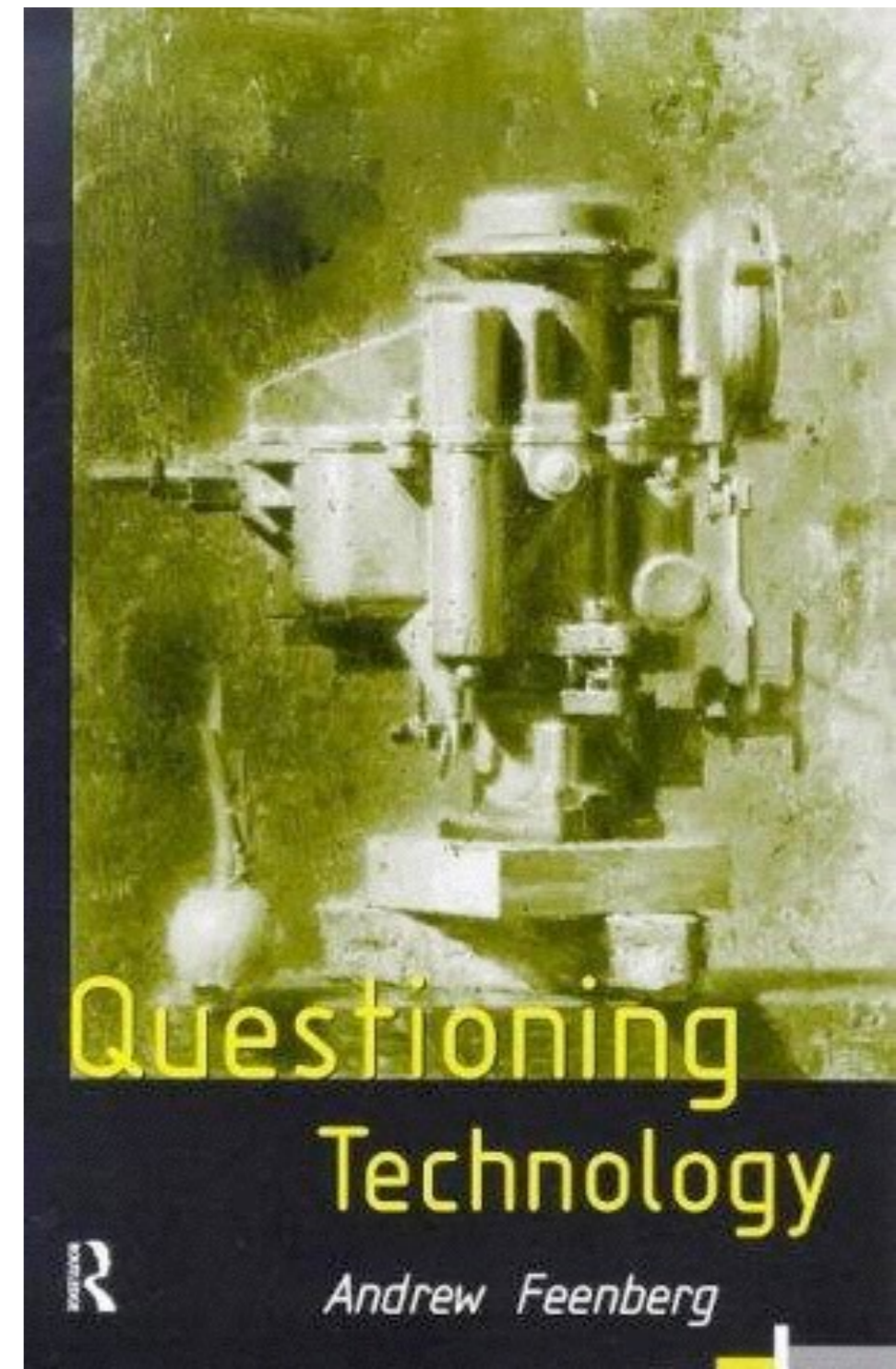
Converging technologies

Civil society's responses

The need to put technologies in democracy

- Feenberg: technologies shall be democratically debated (*Questioning Technology* 1999)

- «Technology is not good, or bad, nor is it neutral»

- A constructivist approach is **necessary** for such a questioning

- But is **not sufficient**: need to question the ends of technological development.

  Why do we develop new technologies? For what purposes? How can we ensure they reach the targets they are assigned with?

Acting in an uncertain world

- Callon, Lascoumes & Barthes (2001)

- Support and strenghten citizen intervention in policy-making processes
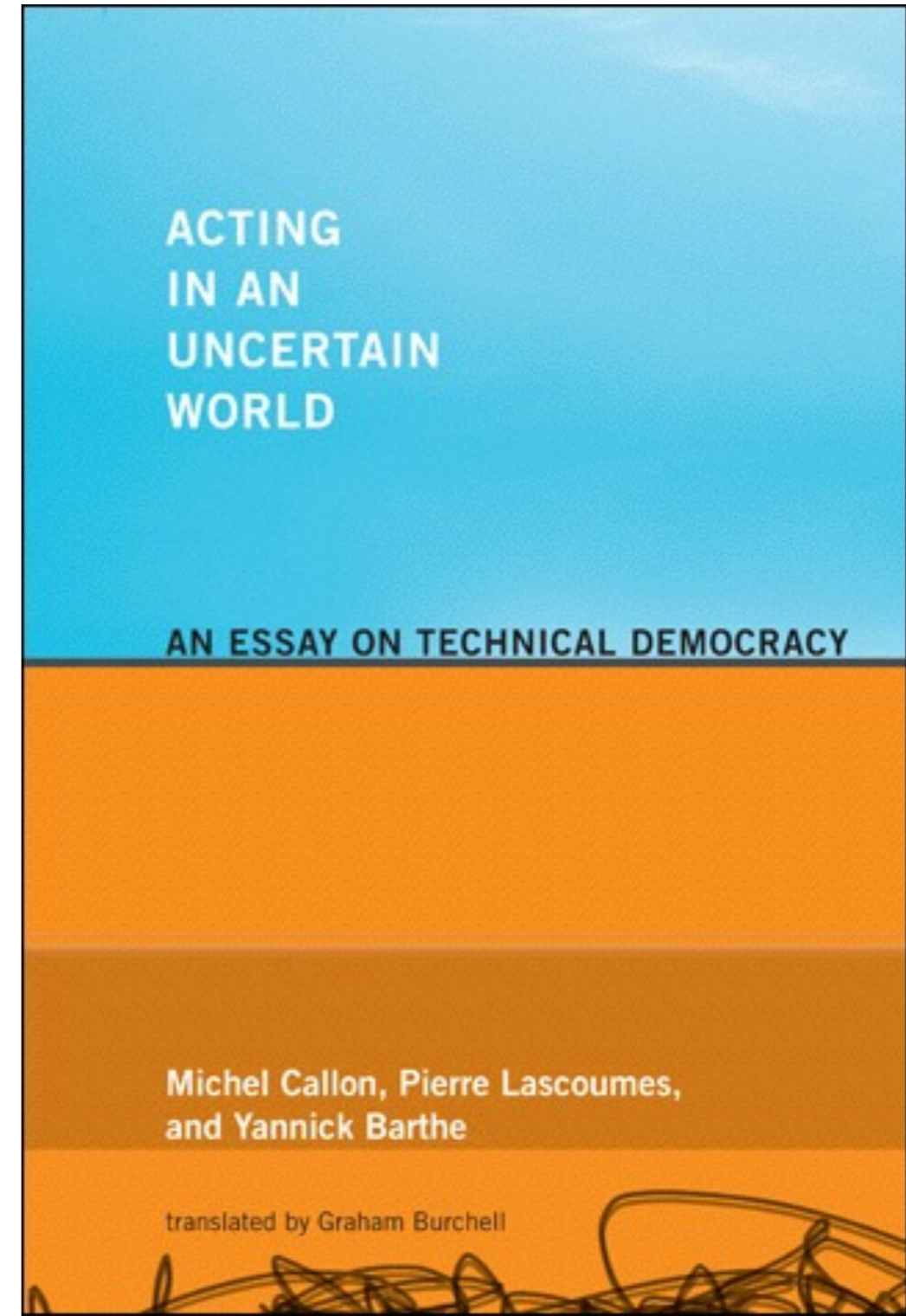
- ESB, GMOs, contamined blood, nuclear waste disposal, global warming: high uncertainties

- A «technical democracy» can be achieved through the constitution of «**hybrid forums**»
  an open space whereas social actors have the ability to mobilize themselves so as to debate sociotechnical choices

The political core of STS

- Long-standing interest in policy-related issues

- Investigating the knowledge societies in all their complexities (Jasanoff 2004)

- From science as key to the welfare state to *economization*

- Growing engagement with policy-making in S&T(**grand challenges**)

A policy approach to STS

- In a framework of a Knowledge society (Lisbon agenda 2001, Europe 2020)
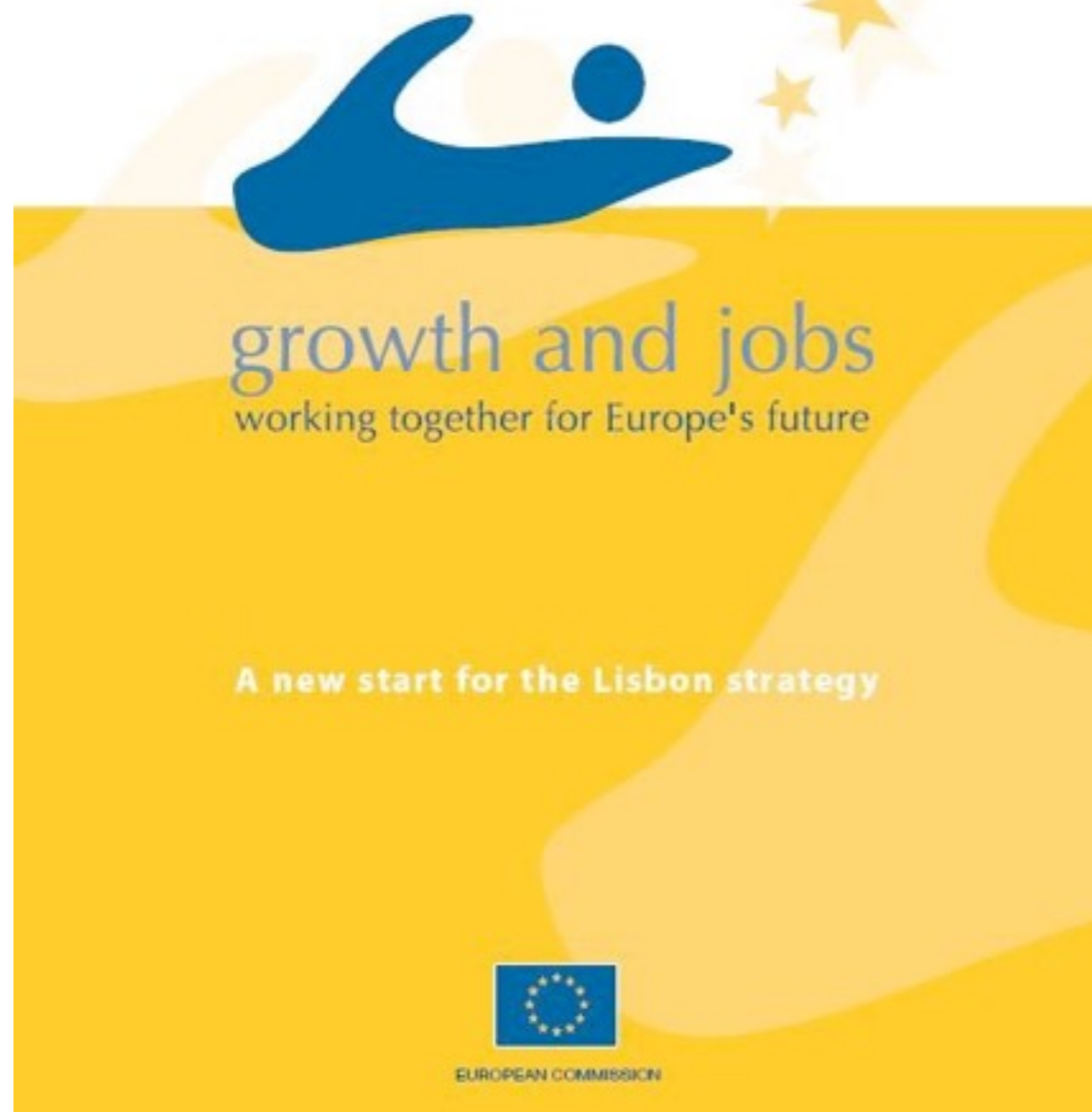
- Science **in** Society program (EC in FP7): make science and technology socially relevant. Now H2020: science **with and for** society.
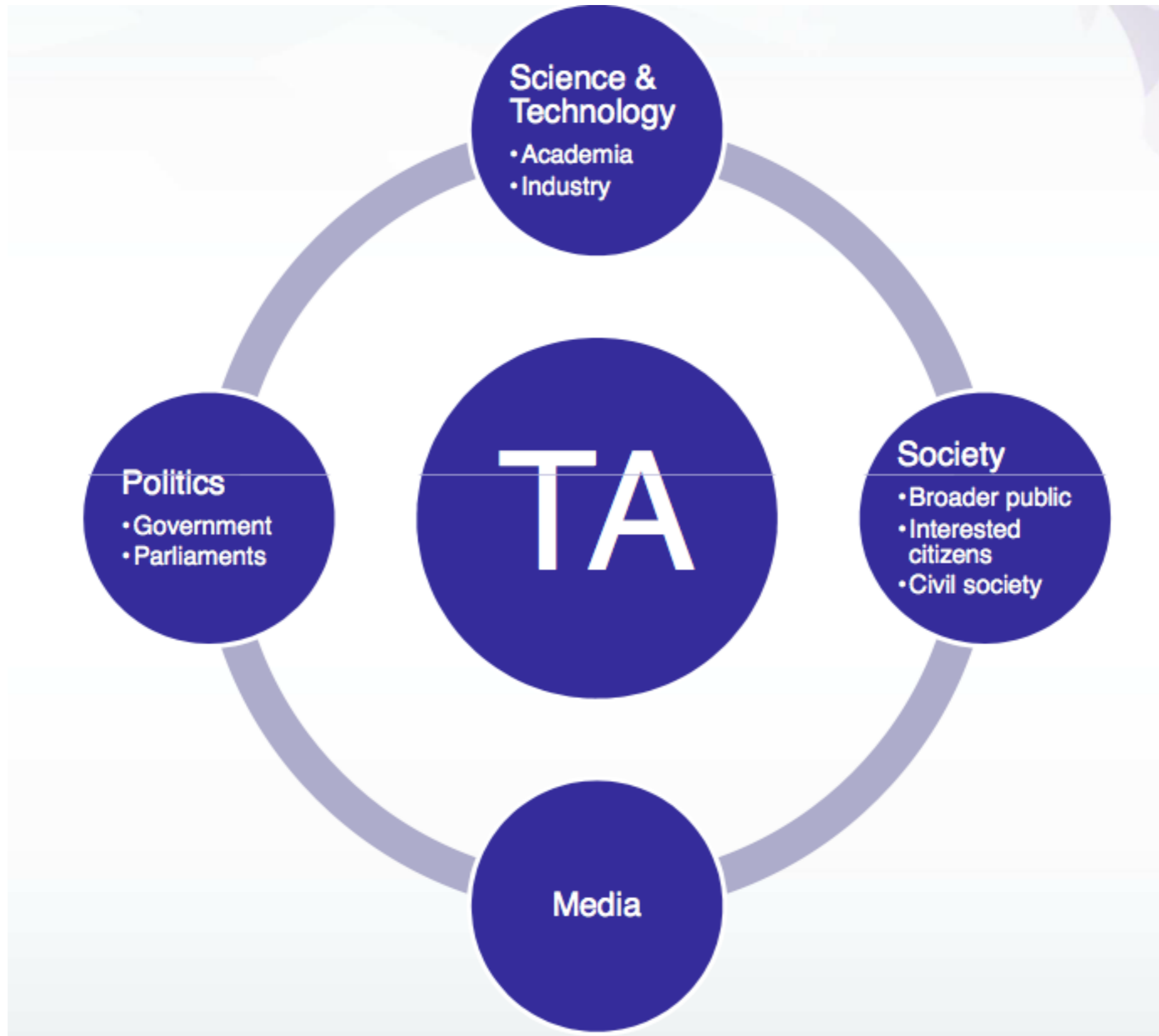

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- Broadening knowledge-based policy-making, e.g. through Technology Assessment

4. Technology Assessment as a tool for socio-political understanding of S&T

TA as an institutional boundary space

Institutionalized TA

- A concept imported from the US to Europe

- Link with the political world

- Multiple missions of anticipation and evaluation of S&T…

- Focus on impacts on society, political agenda and connection with decisional processes
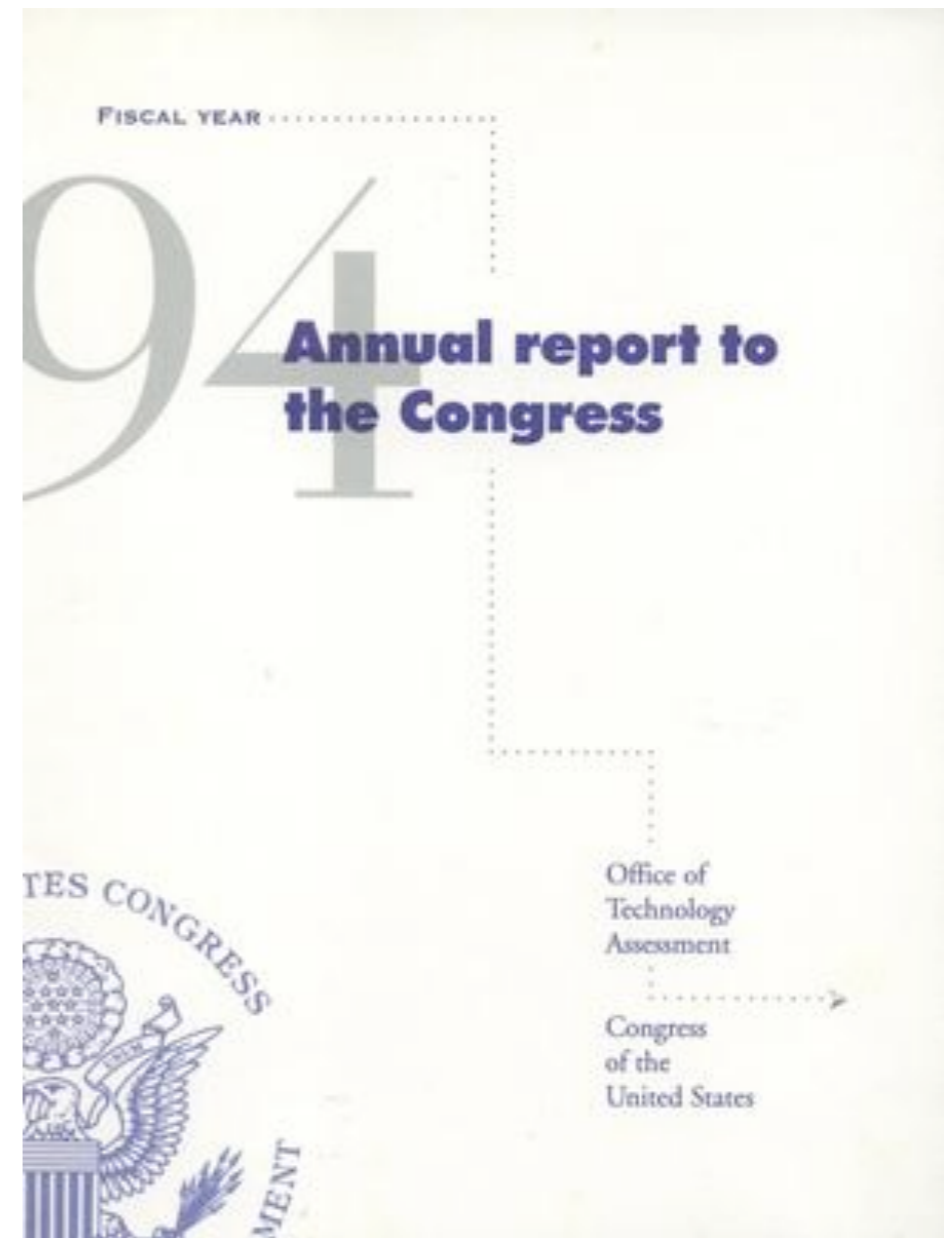
1972: A « proud reaction »
(Mironesco 1997)

- Context of environmental and pacific movements

- Rebalance executive and legislative powers

- Provide Congress with their own experts on STI issues

1st generation

- Early warning TA: providing information about possible side effects of S&T at the earliest possible stage

- Scientific report to support decision-making

- Adopting a neutral, non partisan perspective

FISCAL YEAR
94
Annual report to the Congress

Office of
Technology
Assessment

Congress
of the
United States

1995: OTA's dismantling

« OTA was politically biased, we need to save public money »

European wave of TA institutionalization

- 1983: Creation of OPECST, France, followed by DBT (85), RI (1986), STOA (87), POST (89), TAB (90), TA-SWISS (92), ITA (94), NBT (99), IST (00)

- OTA as a model, leading to different institutional configurations
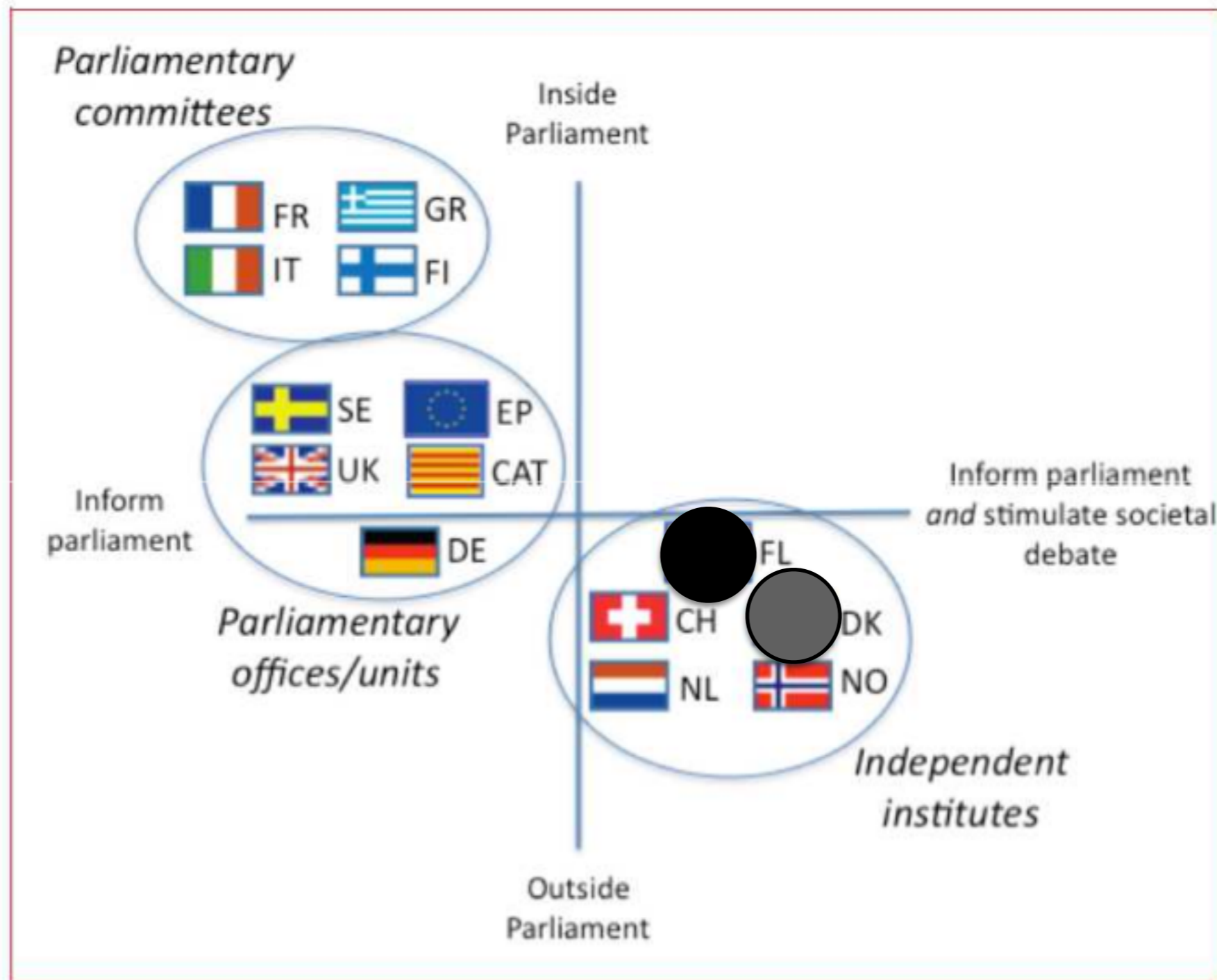
- EPTA network

A second generation of TA

Process-oriented TA (Van Eijndhoven 1997)

TA in Europe today

Figure 2 Classification of PTA organisations

Source: Technopolis Group

Legend: CAT=Catalonia, CH=Switzerland, DE=Germany, DK=Denmark, EP=European Parliament, FI=Finland, FL=Flanders, FR=France, GR=Greece, IT=Italy, NL=The Netherlands, NO=Norway, SE=Sweden, UK=United Kingdom. Source: Technopolis Group.

↑ this side up ↑

fragile

HANDLE *with* CARE

S&T institutions under pressure

- **Universities** need to be excellent while addressing a third mission (orientation to society)

- **Research funding agencies** cannot just continue in their original role (Rip, 2000)

- **High-Tech firms and industries** have to address their impact on health and the environment

- **TA** have to consider their strategies of how to survive under changing circumstances (OTA, DBT, IST)

What's the future of institutionalized TA in the 21st century?

4. Let's take a step back!

Some concluding thoughts...

What does STS *stands for?*

- A critique of 20th century **modernization**: as new technologies are being produced and emerge into society, so do the problems and questions they raise
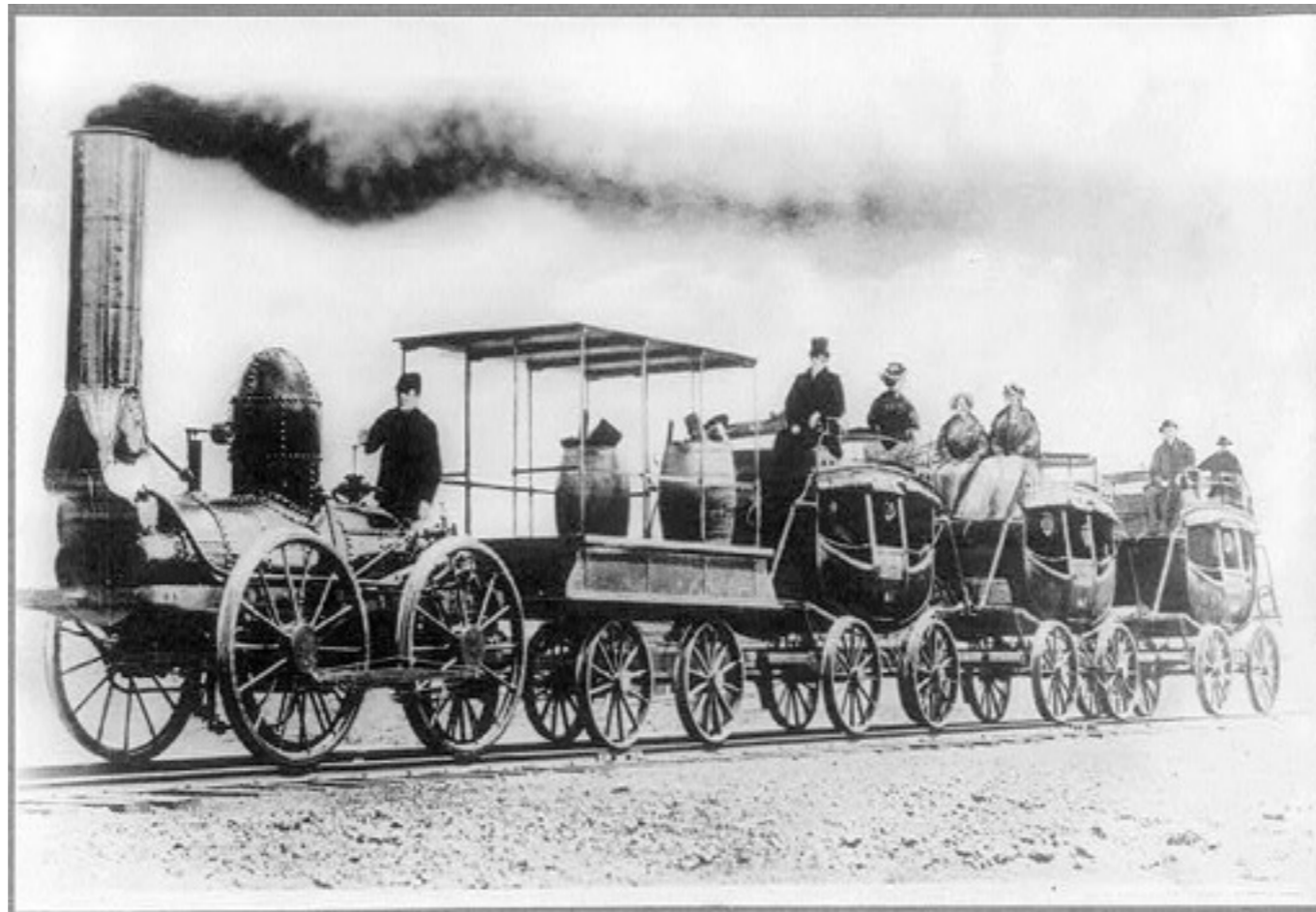
The conditions for fruitful dialogue

- Ethical, legal, social aspects of S&T since the 1980s, now responsible research and innovation

- Take stock of the major changes, e.g. commercialization of science

- STS can address social acceptability, which is not acceptance, nor marketing

- TA assessment is a space for such dialogue, but not the only one

Thank you!

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