

# THE WORLDS OF TECHNOLOGY

Essential/Not essential for me/us; Non-essential for Family



Mobile Phone

Navigation System

Motor vehicles

ECG machine

Smartphone Internet



AC/Washing Machine

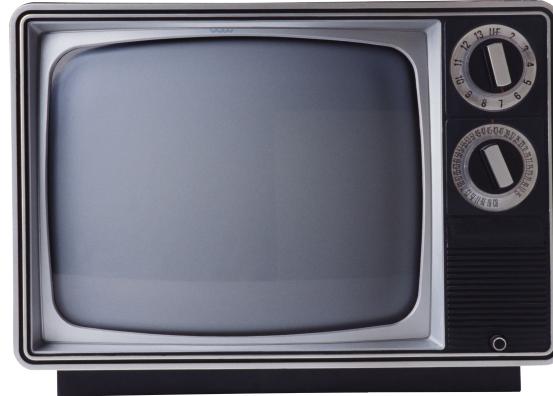
Electric Toothbrush

AI

TV

Wireless Charger

Smartwatch Radio



VR

Earphones

Gaming Tech

Alexa/Virtual Assistants

GPS Smartwatch

UPI Radio

Microwave TV

# THE WORLDS OF TECHNOLOGY

Essential/Not essential for me/us; Non-essential for Family



Wheel



Escalator



Vaccum Cleaner

Glass

AI

Air Conditioner

LED

Gun

Landline Phone

CT Scan/MRI machine

Smartwatch

Geyser

Smartphone Internet

Radio VR/AR

Typewriter TV

Operating System

Fax Machine

Gaming Console

# TWO QUESTIONS CONCERNING TECHNOLOGY

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# MAIN POINTS

- Conventional Views on Technology
- Questions:
  - Does Science Drive Technology, or the Other Way Around?
  - Does Technology Drive History, or...?



# I. TECHNOLOGY = APPLIED SCIENCE?



**Basic Research**



**'R&D'**



**Product**

The Linear Model of Tech



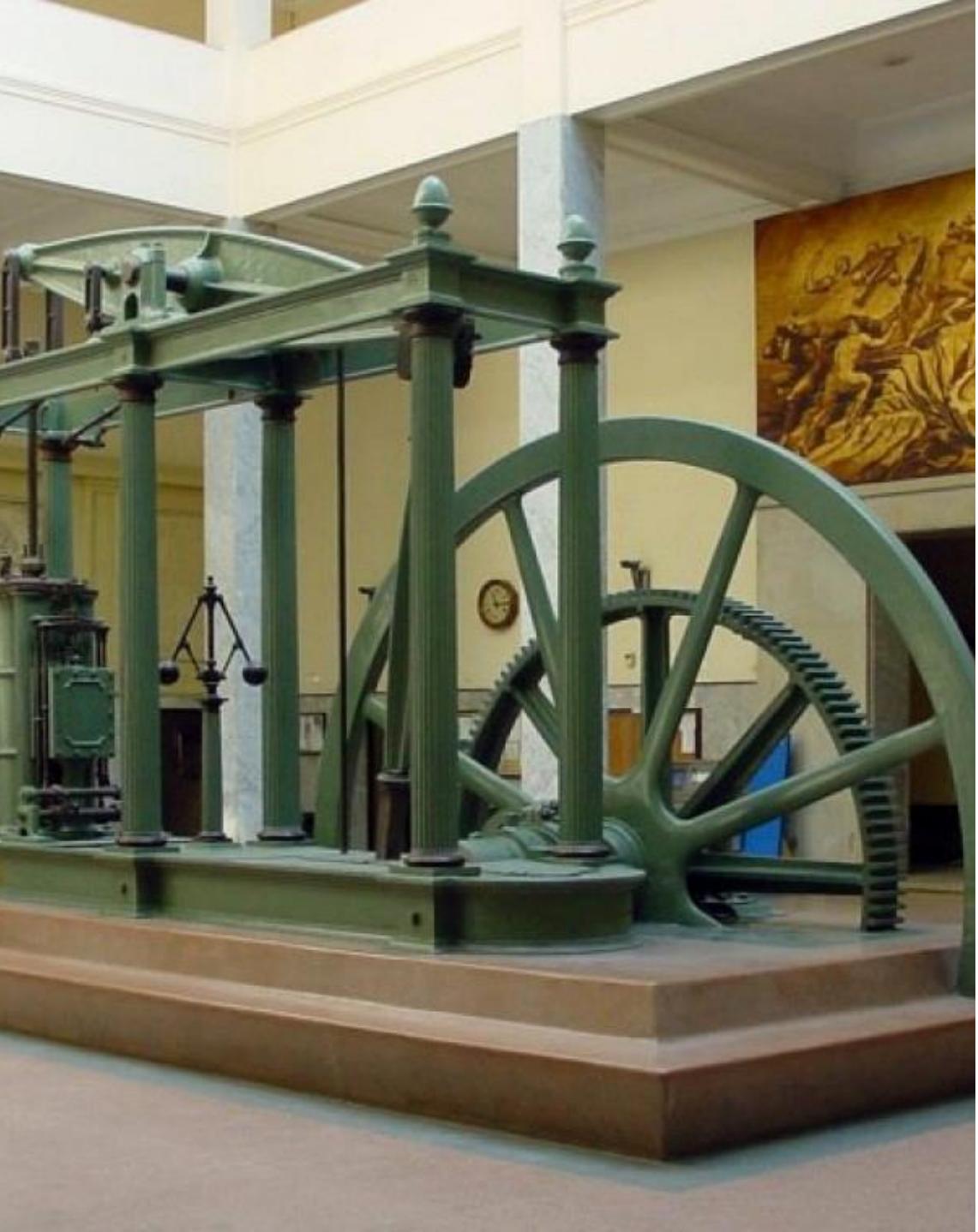
## 2. SCIENCE = LEARNING FROM TECH?

Is Technology *independent* of Science?

- “science owes more to the steam engine than the steam engine owes to science.”

OR

- Science is applied technology more than technology is applied science. (Sismondo 94)



## 2. SCIENCE // TECHNOLOGY

Is Technology *independent* of Science?

“The detailed history of the steam engine, the railroad, the textile mill, the iron ship, could be written without more than a passing reference to the scientific work of the period.”

(Mumford, 1936: 215)

# TECHNOSCIENCE

INTERDEPENDENCE



# INTERDEPENDENCE

“...technological development is a complex process that integrates different kinds of knowledge – including its own knowledge traditions – and different kinds of material resources. At the same time, science draws on technology for its instruments, and perhaps also for some of its models of knowledge, just as some engineers may draw on science for their models of engineering knowledge. There are multiple relations of science and technology, rather than a single monolithic relation.”

(Sismondo, 96)



# TECHNOLOGICAL DETERMINISM

DOES TECH DRIVE HISTORY?

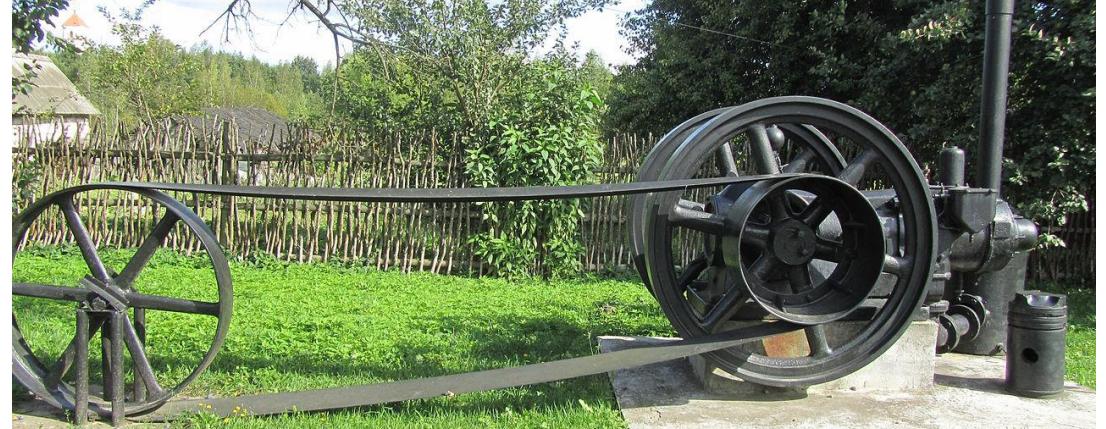
# TECHNOLOGIES OF POWER



## The Hand-Mill

Marx: “Society with the feudal lord”

- A ‘**household**’ technology
- **Inexpensive**, could be used by women + children, ‘skilled, semi-skilled *craftsmen*’ on their own time (Heilbroner, cited by Sismondo, pp 97; my emphasis)
- Takes **less space, more time**



## The Steam-Mill

Marx: “Society with the industrial capitalist”

- **Industrial Technology**: mass production
- **Expensive**: could be owned only by a few
- Worked by ‘semi-skilled or unskilled *operatives*’ as a ‘workforce’ in a set time\*
- More and **specialized space (factory)**, less time

# VIEWS ON TECHNOLOGY



Technology  
**indicates** and, to  
some extent, **drives**  
social relations



Technology is about  
**distributing power:**  
deskilling,  
centralizing

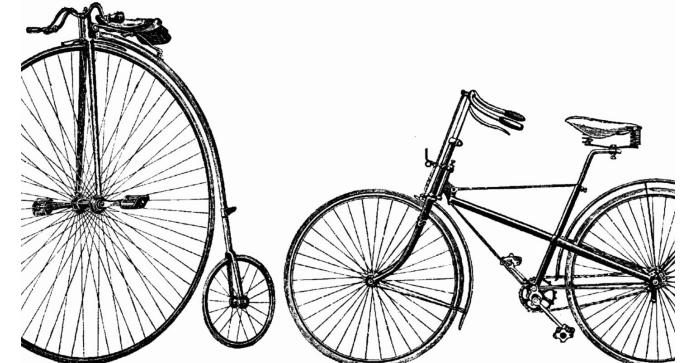


Fig. 2. Bicycle (Hochrad) von 1880.

Fig. 3. Rover (Niederrad) von 1886.

- Technology is **not systematic** – it can go either way; several factors in the process
- It is ‘socially constructed’



Society                      Technology



**“King of the Road: The Social  
Construction of the Safety Bike”**

In Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs:  
Toward a Theory of Sociotechnical Change* (1995)



# *The relevant social groups in the social construction of technology*



EFFIE ELLSLER.  
Copyright, 1895, by R. J. Falk.



DAISY FITZGERALD.  
Copyright, 1896, by Elmer Chickering.



ANNA HELD.  
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**Users and non-users of the ‘Ordinary’ Cycle:**

- ‘Users’: Rich, ‘athletic young men’, using the bike for sport and showing skill
- ‘Non-users’/Potential users: Women, Older people, working class, irritated pedestrians...
- Transition to the *Safety* bicycle.

Bijker, 44-77



# Society

# Technological Artifact



**“For many young male riders, the safety bicycle sacrificed style for a claim to stability, even though new riders did not find it very stable. Young male riders formed one relevant social group that was not appeased by the new design. Their goals were not met by the safety bicycle, as its meaning (to them) did not correspond well to their understanding of a quality bicycle. There is, then, interpretive flexibility in the understanding of technologies and in their designs.”**

(Sismondo, 98)

**Interpretive Flexibility** is a necessary feature of artifacts, because what an artifact does and how well it performs are the results of a competition of different groups' claims.

**Configuring the User** is the work of a successful technology— so again, it works both ways.

SISMONDO, 100- 101