# SCIENCE TECHNOLOGY SOCIETY

## HM 216

## AUTUMN 2023

# PREHISTORY OF STS

- What is Science/the scientific method?

- How is it different from other ways of knowing?

- What is Technology?

- How does STS come into this?

# WHAT IS SCIENCE?

**The School Idea:**

"SCIENCE IS A FORMAL ACTIVITY THAT CREATES AND ACCUMULATES KNOWLEDGE BY DIRECTLY CONFRONTING THE NATURAL WORLD. THAT IS, SCIENCE MAKES PROGRESS BECAUSE OF ITS SYSTEMATIC METHOD, AND BECAUSE THAT METHOD ALLOWS THE NATURAL WORLD TO PLAY A ROLE IN THE EVALUATION OF THEORIES"

(SISMONDO, 1)

# TWO THEORIES OF SCIENCE

- SCIENTIFIC THEORY = "SUMMARY OF OBSERVATIONS"

- INDIVIDUAL DATA ⟶ GENERAL CLAIM

o *FALSIFICATIONISM* : (Not really) SCIENTIFIC THEORIES SHOULD JUST BE ABLE TO MAKE PREDICTIONS, TAKE A RISK.

o WRONG PREDICTION = WRONG THEORY (KARL POPPER)

o To be scientific, the theory should be *falsifiable*.
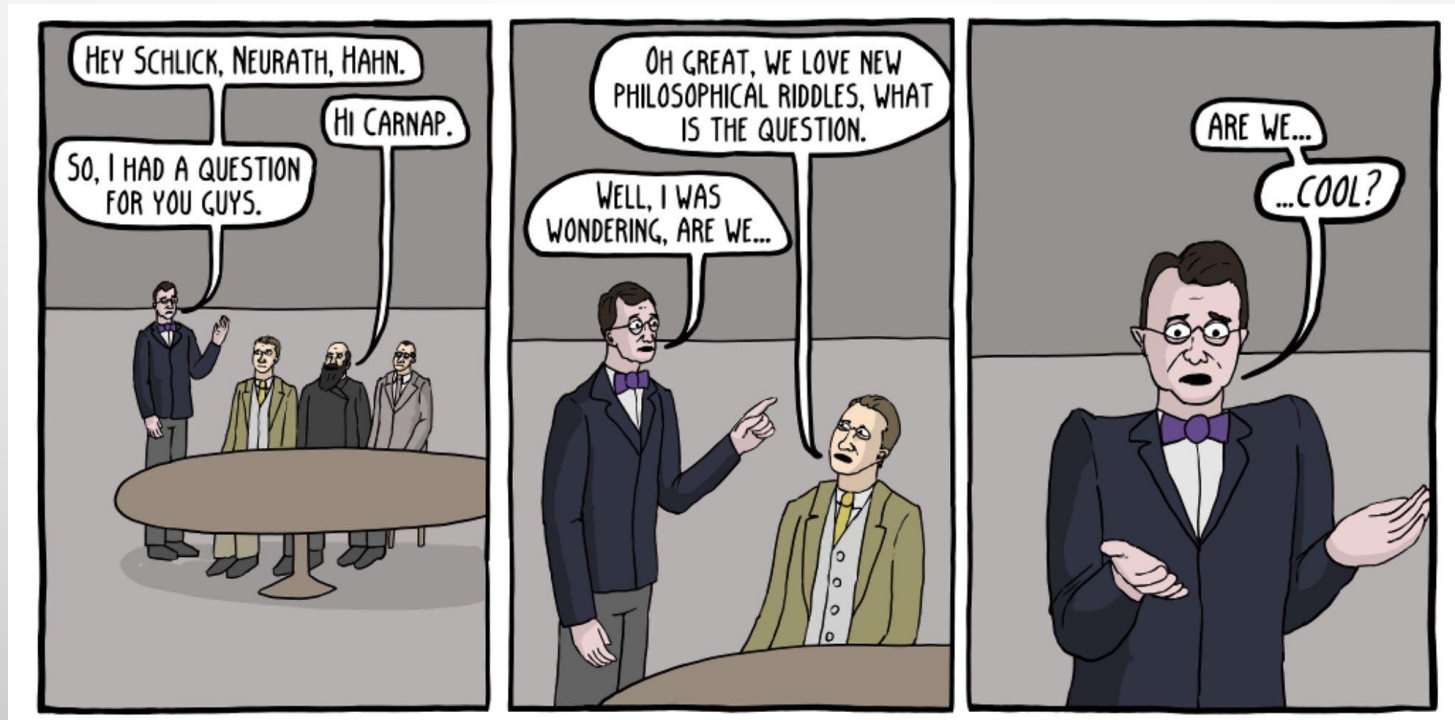
# HUME'S PROBLEM (INDUCTION)

- ✔ **THE SUN ROSE AFTER 24 HOURS TODAY…**

- ✔ **THE SUN ROSE AFTER 24 HOURS ON THE NTH DAY, and so…**

- ✔ **THE SUN ALWAYS RISES EVERY 24 HOURS, AND WILL ALWAYS RISE EVERY 24 HOURS.**

*…but how can you be sure? Can the past predict the future accurately? (No)*

*…And if you can't be sure of a small thing like this, what can you be sure of?*

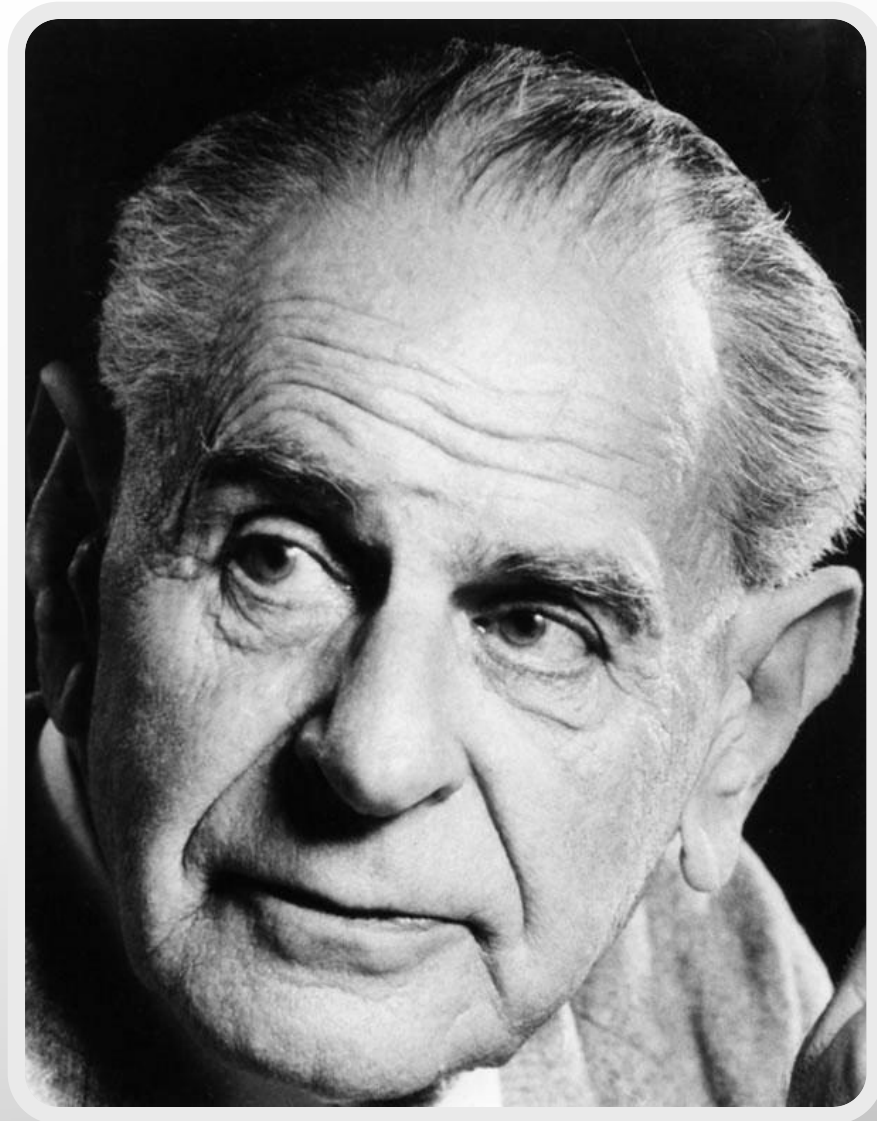# LOGICAL POSITIVISM: THE VIENNA CIRCLE

# DEDUCTION (Successful Testing)

o HYPOTHESIS...

o FORMULA...

o TESTS...

o QED! (Quod Erat Demonstrandum)

*But do we really throw out hypothesis because of negative test results? Or do we go on testing?*

# THE SECRET OF SCIENCE : STANDARDS & NORMS

## POSITIVIST ET AL

- SCIENCE IS ABOUT SUMMARIZING OBSERVATIONS
- Reaching conclusions based on observations

## REALIST

**SCIENCE IS ABOUT PROGRESS TOWARDS TRUTH**

**and**

**MAKING RISKY (FALSIFIABLE) PREDICTIONS**

## FUNCTIONALIST

- ❑ THE SOCIAL FUNCTION OF SCIENCE IS "THE ACCUMULATION OF CERTIFIABLE KNOWLEDGE"
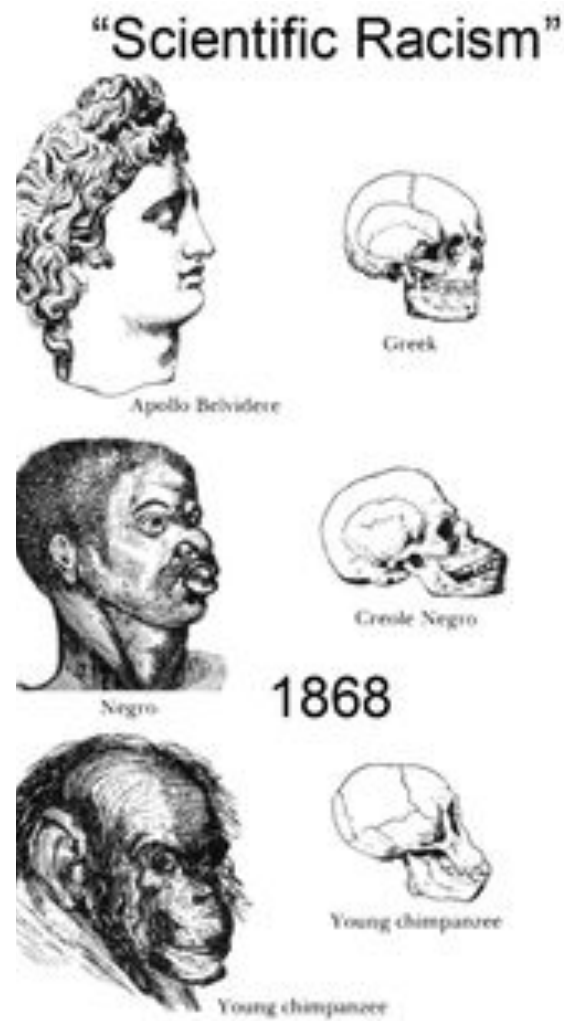- ❑ IT "REWARDS" PEOPLE WHO FOLLOW THIS PRINCIPLE

# 'Social Darwinism'

- **Phrenology**

- **Eugenics**

Source:

https://www.sahistory.org.za/sites/default/files/4184365.png
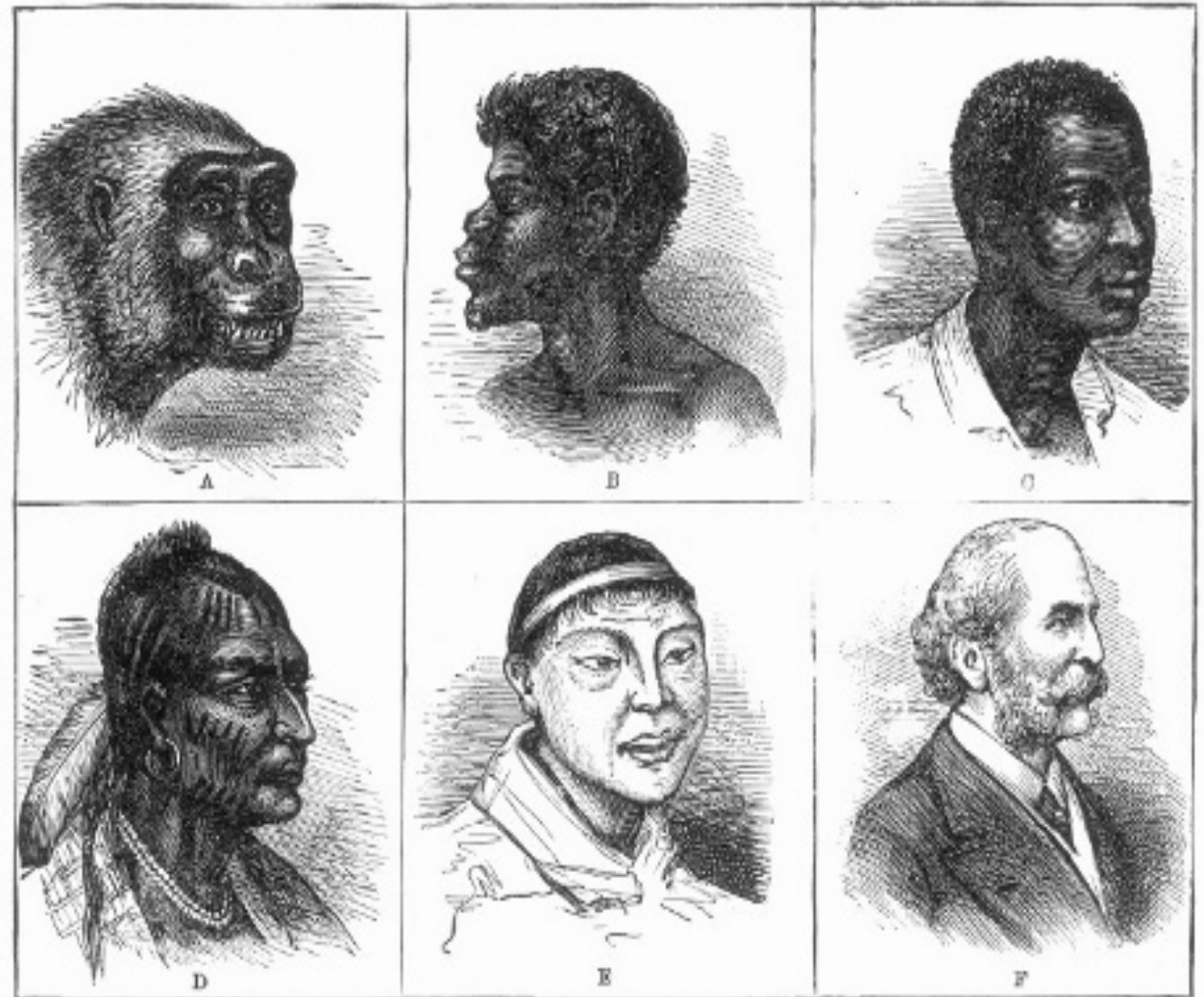
# The Science of Race

- **Example**: a 19<sup>th</sup> century American chart linking evolution and race

- **Contributors**: Natural scientists, Anthropologists, Administrators/Policy-makers

Source:

https://www.facinghistory.org/resource-library/image/nineteenth-century-evolution-chart

# Science and Race

- **The image is from a 1902 book published in the US, titled *Vaught's Practical Character Reader* (by L.A Vaught)**

- *An Organ of Murder: Crime, Violence, and Phrenology in Nineteenth-Century America* by a historian of science, Courtney E. Thompson



ANY ONE WITH A HEAD LIKE THIS WILL BE POSITIVELY SELFISH, TRICKY AND DECEITFUL

Here is an outline of a head that we want all men, women and children to perfectly fix in their minds. Make use of every opportunity you have of looking at heads from a back view.
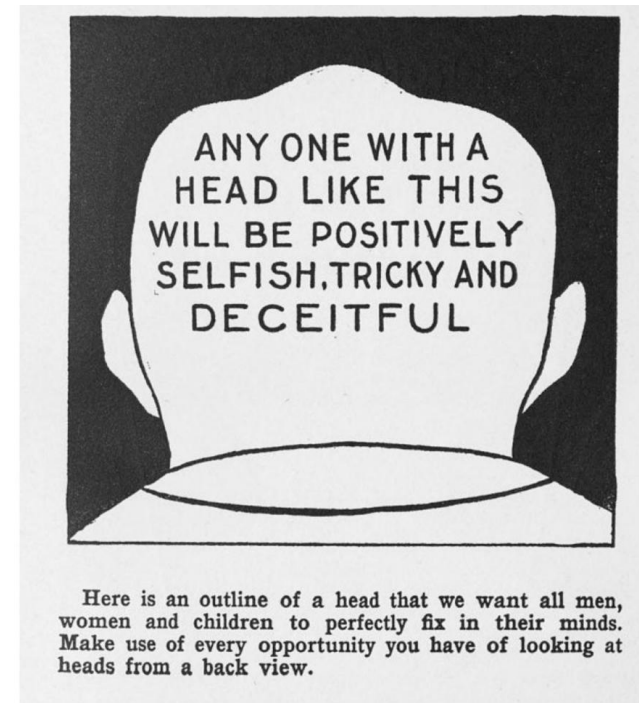
**Figure 16.** A selfish, tricky, and deceitful head, from L. A. Vaught, *Vaught's Practical Character Reader* (Chicago: L. A. Vaught, Publisher, 1902), 11. Harvard Medical Library at the Francis A. Countway Library of Medicine.

In the last decades of the nineteenth century, other criminal sciences emerged to take up the mantle of perfect prediction that practical phrenologists had attempted to claim for their science. In the last third of the nineteenth century, Cesare Lombroso's positivist criminology in Italy, Francis Galton's efforts toward fingerprinting in Great Britain, and Alphonse Bertillon's anthropometric systems of identification in France were all introduced as new, scientific forms of predictive policing. While phrenological science would persist in popular culture and usage throughout the century, the leaders of science had moved on. Phrenology would continue to be a popular diversion as well as a serious enterprise for some, even as new forms of criminal science were developed in the final third of the century which offered new ways of thinking about crime, supplanting this vernacular criminal science.

# TECHNOLOGY?



**"…A RELATIVELY STRAIGHTFORWARD APPLICATION OF SCIENCE" (?)**

- **How do we think about 'Technology' itself?**

- **What is the relationship between 'Science' and 'Technology'?**

**\*STS: SCIENCE AND TECHNOLOGY STUDIES *AND* SCIENCE, TECHNOLOGY AND SOCIETY**
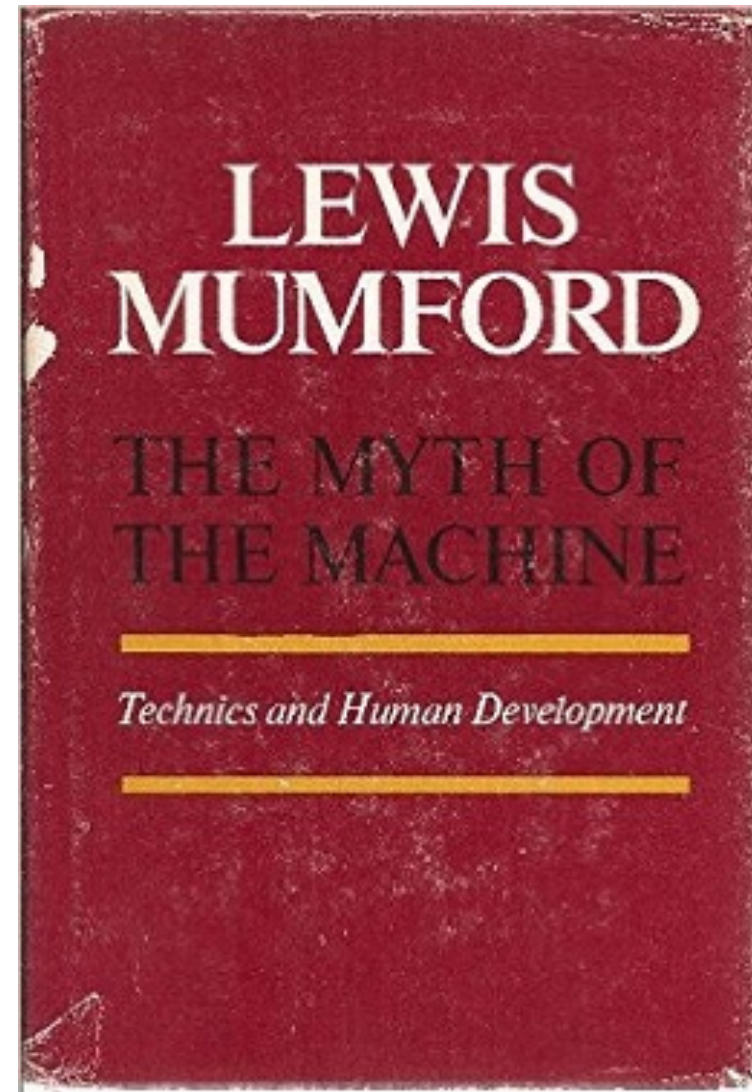
**(SISMONDO, 8- 9)**

# LEWIS MUMFORD
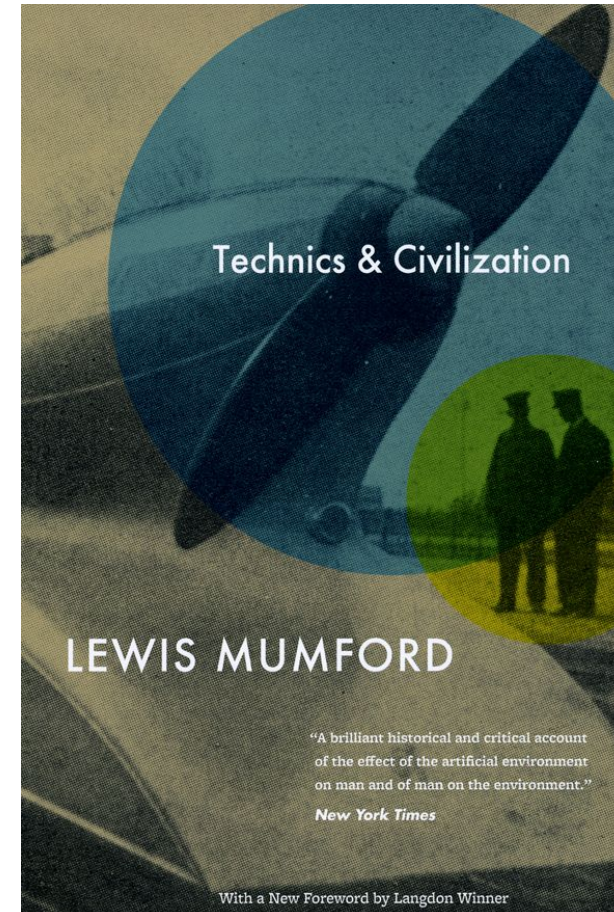**(1895-1990)**
**Urban Studies, History of Technology**

- **POLYTECHNICS vs. MONOTECHNICS**
- **"TOOLS OF LIFE" vs. "MEGA MACHINES"**
- **ENABLE HUMAN LIFE vs. "DEHUMANIZING" TECH**



LEWIS MUMFORD

THE MYTH OF THE MACHINE

Technics and Human Development

# Time and/of Technology

'**When one thinks of time, not as <span style="color:red">a sequence of experiences,</span> but as a collection of hours, minutes, and seconds, the habits of <span style="color:red">adding time and saving time</span> come into existence.**'
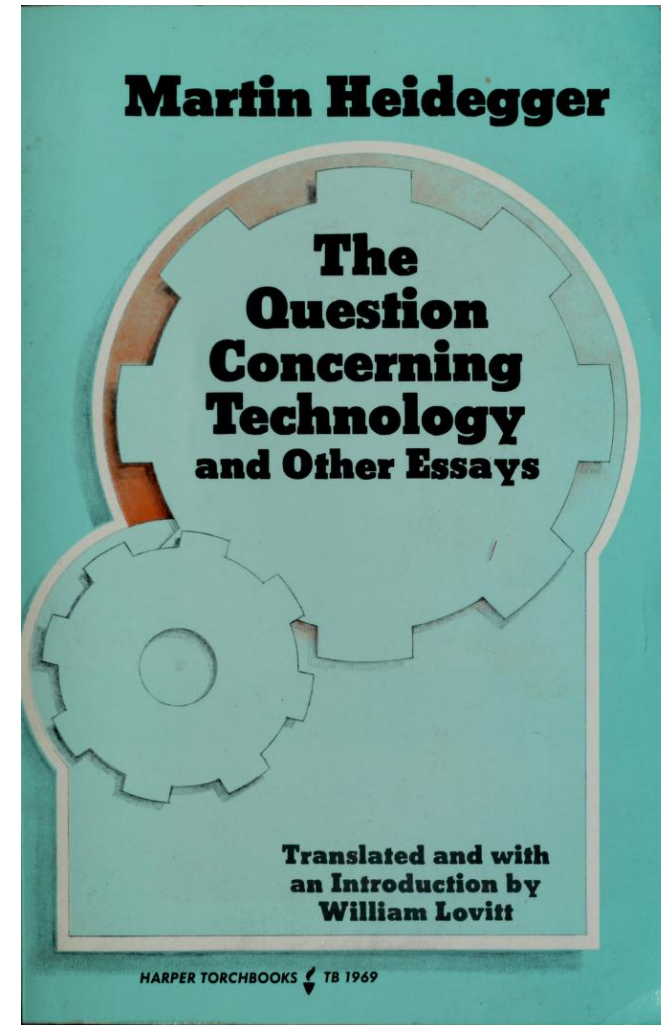
*(Technics & Civilization, 17)*

# MARTIN HEIDEGGER
## Philosopher
## (1889-1976)

- MODERN TECHNOLOGY VS TRADITIONAL CRAFT

- "OBJECTIFYING" VS "INDIVIDUALIZING"

- OBJECTS VS THINGS

# TECHNOLOGY = 'DISENCHANTMENT'

## MUMFORD

- POLYTECHNICS VS MONOTECHNICS
- "TOOLS OF LIFE" VS "MEGA MACHINES"
- ENABLE HUMAN LIFE VS "DEHUMANIZING" TECH

## HEIDEGGER

- MODERN TECHNOLOGY VS TRADITIONAL CRAFT
- "OBJECTIFYING" VS "INDIVIDUALIZING"
- OBJECTS VS THINGS

**SCIENCE AND TECHNOLOGY STUDIES (STS) STARTS FROM AN ASSUMPTION THAT SCIENCE AND TECHNOLOGY ARE THOROUGHLY SOCIAL ACTIVITIES. THEY ARE SOCIAL IN THAT SCIENTISTS AND ENGINEERS ARE ALWAYS MEMBERS OF COMMUNITIES…**

**IN ADDITION, SCIENCE AND TECHNOLOGY ARE ARENAS IN WHICH RHETORICAL WORK IS CRUCIAL.**
**(10- 11)**

# KEYWORDS

ANTI-ESSENTIALIST

ARTIFACT

PROCESS

SOCIAL CONSTRUCTION OF KNOWLEDGE

MATERIAL WORLD