Science, Technology, and Democracy: Distinctions and Connections

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Distinguishing Science and Technology

- Cold Fusion: both science and technology
- Technology *not* an application of science
- Technology mostly independent of science
- Science dependent on technology
- The term “technoscience” reflects this
- Examples in biology of technoscience

The distinction still holds!

- Scientists and technical workers know the difference
- But often truth and utility are combined
- How to make the distinction?
- Two Criteria

1. Decision Procedures

- Scientists decide scientific controversies
- Social and other factors marginal
- Epistemic tests primary
- Organizations choose technologies
- Social and economic factors relevant
- The cold fusion case illustrates this

2. Underdetermination

- Duhem introduced the concept
- Experiment and observation not decisive
- They must be interpreted theoretically
- Scientific decisions require “good sense’
- Technological underdetermination
- Multiplicity of similar design options
- Technological “good sense” is social

The Science-Technology-Society Relationships I

- Different activities, different relationships
- Bridgman: “The assumption of the right of society to impose a responsibility on the scientist which he does not desire obviously involves the acceptance of the right of the stupid to exploit the bright.”
- The end of the “ivory tower”
- Growing openness of science to society

The Science-Technology-Society Relationships II

- Three approaches to the relationships
  - Democratizing science in America
  - Differences between the democratization of science and technology
  - The Paradox of technology and society

1. Democratizing Science I

- The Manhattan Project
- Scientists as citizens
- The plea for non-use
- The Post-War Scientists' Movement
- Technocracy and paternalism

1. Democratizing Science II

- Early environmentalists imitate physicists
- But they can’t agree
- From Paternalism to Politics
- Science loses authority
- A new pattern emerges
- Ordinary people have knowledge too
- Science can share that knowledge
- Activists and scientists collaborate
- Love Canal and AIDS activism

2. Differences between the Democratization of Science and Technology I

- Examples: bombs, toxic wastes, diseases
- Scientists involved in making technologies
- But technologies emerge from industry
- Truth is not the issue
- Industry-society relations concern harm
- Science more autonomous than technology

2. Differences between the Democratization of Science and Technology II

- Public funding of science and truth
- Neo-liberalism and business influence
- The importance of basic and non-commercial research
- Despite problems, science retains its autonomy

2. Differences between the Democratization of Science and Technology III

- Technology creates environments
- Ordinary people live in these environments
- Science and technology have traditions
- Public interventions update traditions
- Example of obstetrics
- Forgetfulness of public contributions

2. Differences between the Democratization of Science and Technology IV

- Potential for conflict of interest
- Democratic interventions and regulation
- Scientists decide on the truth
- The public decides on the useful

3. The Paradox of Technology I

- We live in technological worlds
- Experience rather than knowledge
- Craft: experience and knowledge combine
- Capitalism splits experience from knowledge
- This makes formal disciplines possible

3. The Paradox of Technology II

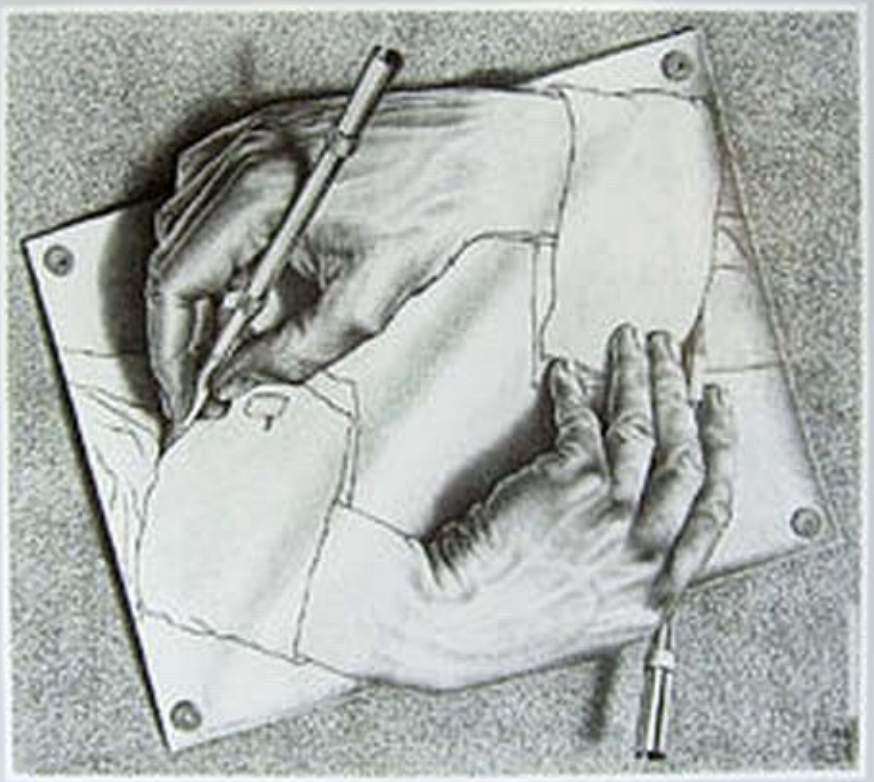
- “Pure” rationality a product of the split
- A theological notion
- God acts on the world without feedback
- Human beings can only act on a system to which they belong
- Finitude: the reciprocity of action and reaction

3. The Paradox of Technology III

- Technical action defies finitude
- Dissipating and deferring feedback
- But feedback always occurs in some form
- Oppenheimer: "I am become death, the shatterer of worlds."
- But he soon sought international control

3. The Paradox of Technology IV

- Progress and the silencing of the victims
- The return of experience as a factor
- Side effects lead to technological change
- The concept of co-construction
- Escher’s Drawing Hands



M. C. E S C H E R

3. The Paradox of Technology V

- Hostadter's "Strange Loop" or "Entangled Hierarchy"
- Moving up a logical hierarchy leads down
- The "Liar's Paradox"
- "This sentence is false"
- Escher's drawing hands draw each other

3. The Paradox of Technology VI

- Social groups form in technological worlds
- They suffer undesirable effects
- Feedback transforms the technology
- Society and technology as entangled
- But Hofstadter retains “inviolate level”
- Escher draws but is not himself drawn
- No such inviolate level in the social world
- This is the logic of finitude

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Texts in Japanese

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