Nuclear Consent in Space and Time

Peter Galison (Harvard)

Waste Management 2012

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Two Problems: Problem 1

- Siting: How can nuclear waste facilities be sited in a way that is fair, accepted by the local community, and consistent (in the United States) with federal guidelines of environmental justice, E.O 12898?

Two Problems: Problem 2

- Marking: How can nuclear waste facilities be constructed and marked in a way that we consider fair, does not impose too great a security, safety, or economic burden, and is interpretable to the 10,000 year future?

Nuclear Consent (Space)

- On ethical, political, and practical grounds, communities around waste facilities should consent to the establishment of these sites. Transparent information, deliberation.

Nuclear Consent (Time)

- On ethical, political, and practical grounds, communities around waste facilities should consent to the establishment of these sites. **Transparent information, deliberation.**

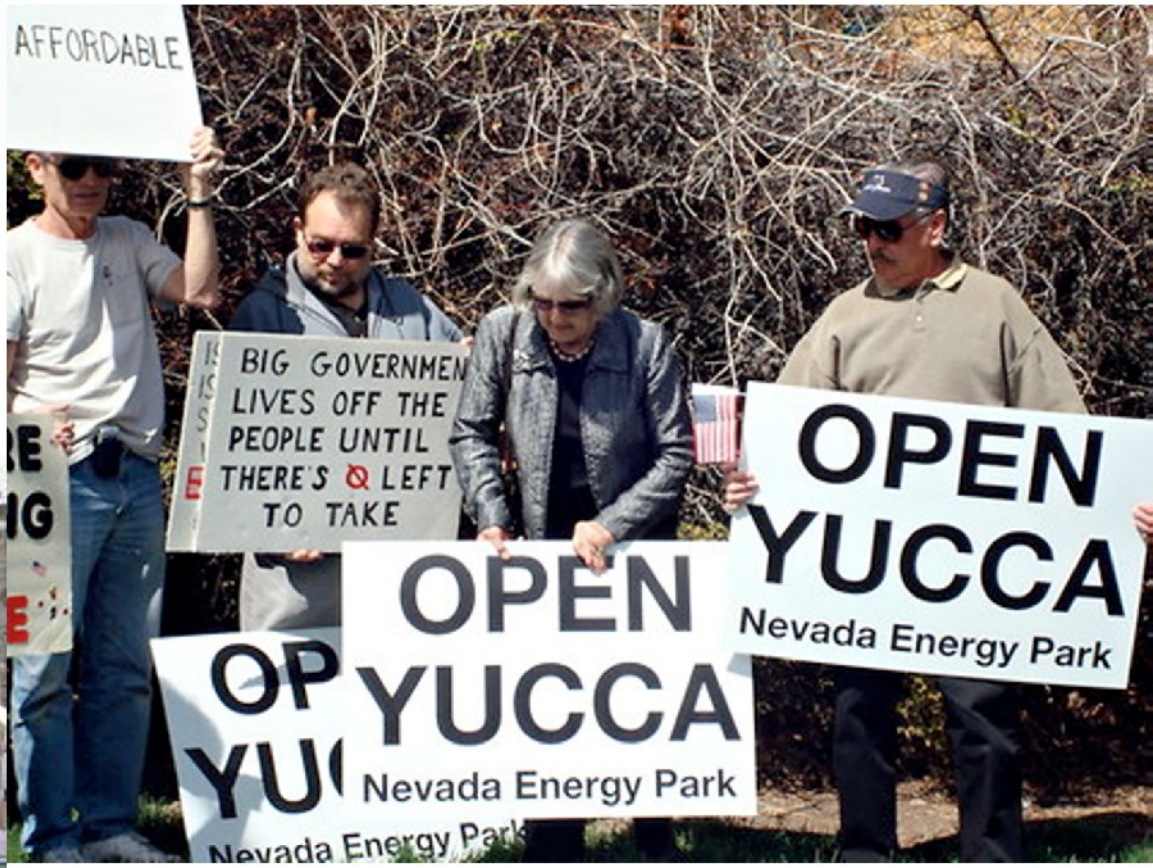
- On ethical, political, and practical grounds, future communities should maintain consent--be able to avoid inadvertent contact with the waste.

Transparent markers, knowledge, and records.

Waste Train, Normandy to Gorleben, November 2010—1977 Choice, Albrecht

Gorleben Protests

Hanford WA, Deaf County TX, Yucca
Congress chooses Yucca 1987; Pres. cancels 2011



WIPP: Transuranic Waste Controversy, Local Acceptance

Swedish Siting Policy

- First SKB (Swedish Energy) identified eight sites—took samples, proposed them as waste sites: all eight refused.

- Second, two towns with nuclear facilities, Östhammar and Oskarshamn, were approached—the one not chosen would get more benefits (education, infrastructure). As of 2011: Östhammar to get 25%, Oskarshamn 75%.

Executive Order 12898

February 11, 1994

EXECUTIVE ORDER

FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

Nuclear Consent in Space

- Transparency: legacy of opacity after Manhattan Project, need for openness, both governmental *and* private.

- Economics needs to be widely considered (Sweden); choice means more than one site.

- Recognition of multi-scale nature (close-in, mid-range, regional, national, global)

Nuclear Consent in Time

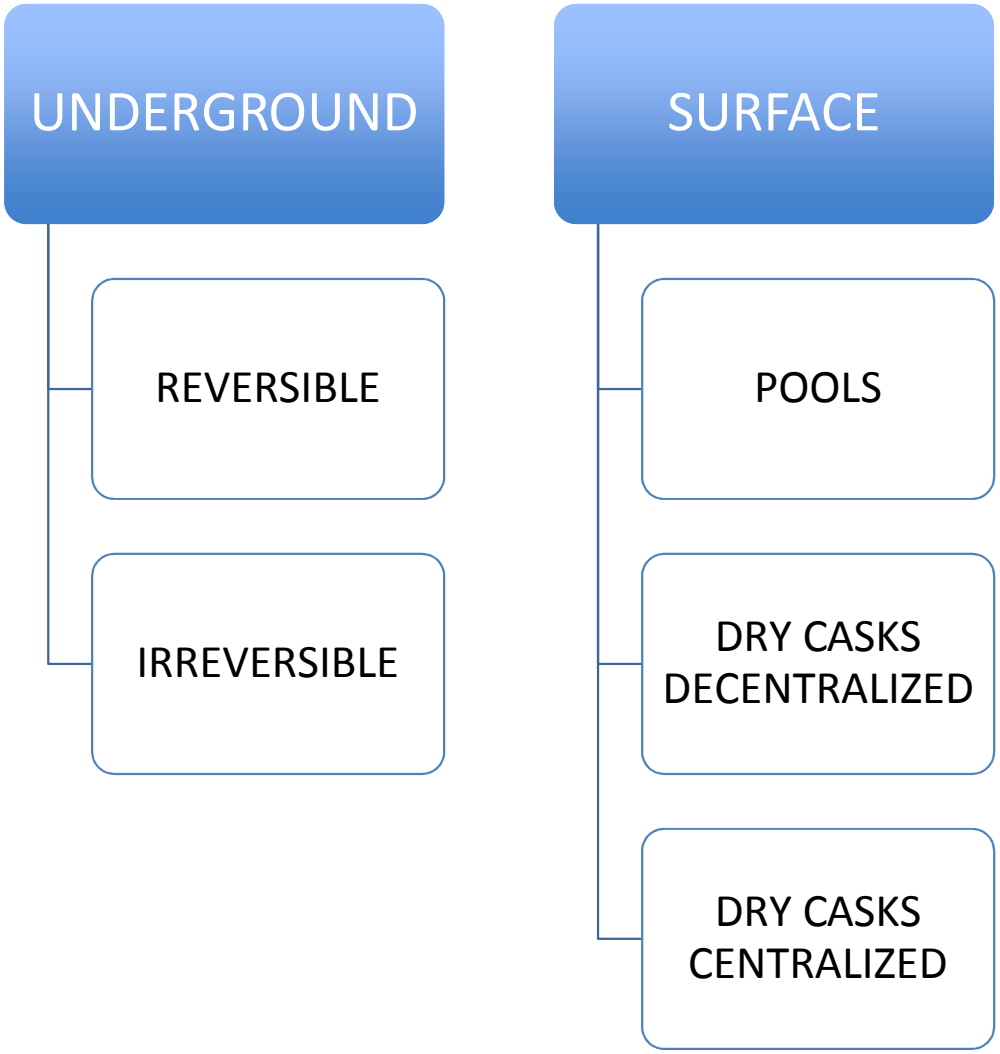
Future should consent before risk of exposure

Irreversibility is an attempt at avoiding non-consensual danger and cost on the future

Reversibility is an attempt at avoiding non-consensual binding decisions on the future

Warning and knowledge against inadvertent intrusion needs to accompany both

A FORCED CHOICE
Status quo not an option



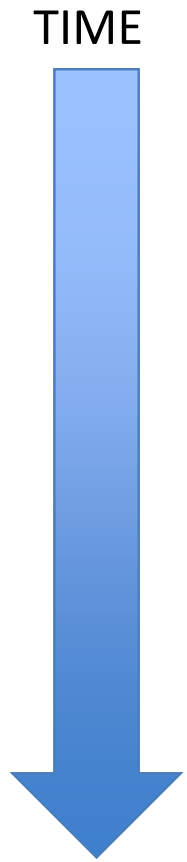
Dominique Strauss-Kahn: Against Reversibility, Against Memory

"If five hundred, one thousand or two thousand years from now, we want to avoid having some terrorist of the time retrieving that waste for criminal purposes, it is no aberration to think that if it is to be buried, it should be irreversibly buried, meaning in such a way that no one would remember exactly where the sites are."

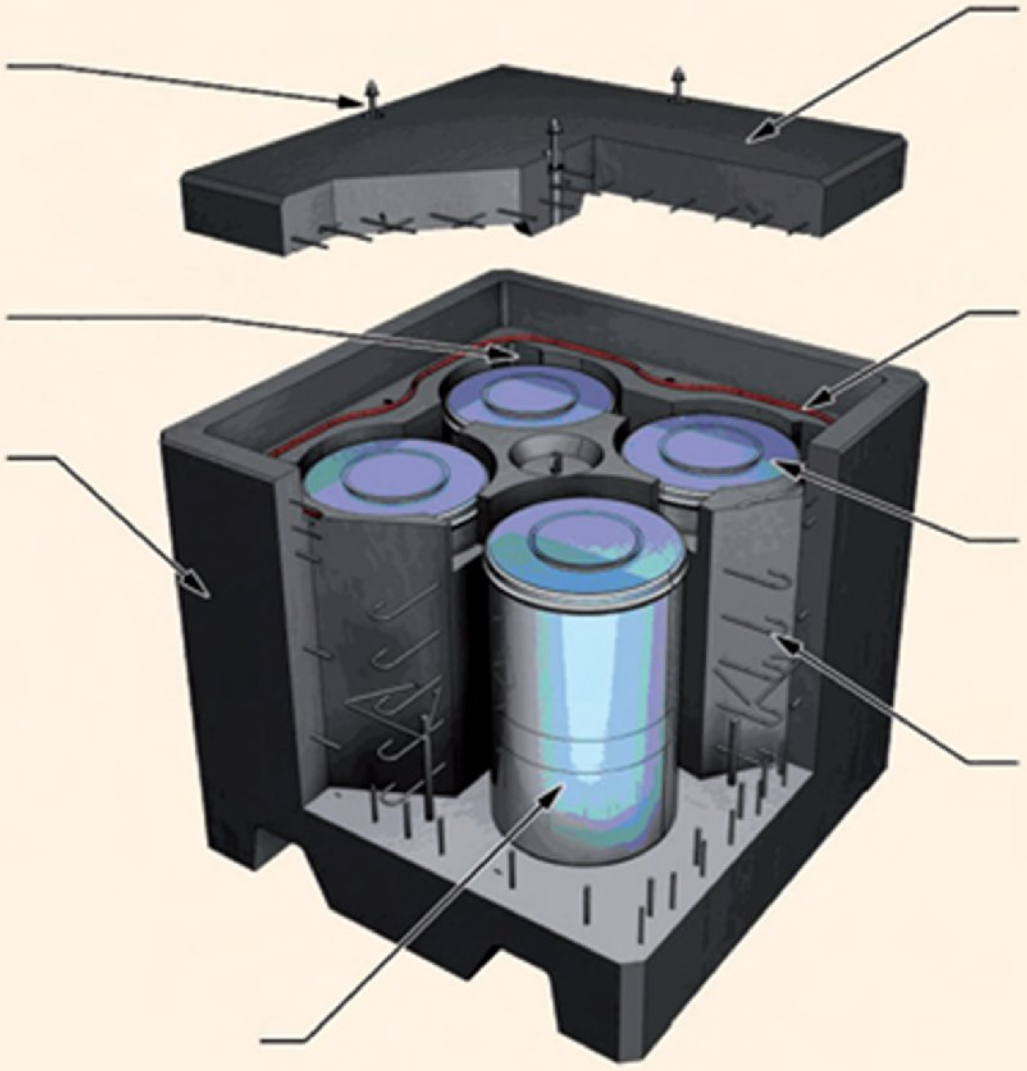
- *Journal officiel des Débats, Sénat, November 6th, 1991, p. 3 555*

For Reversibility: Current Andra

- 1. Active management of storage facilities
- 2. Active cells management
- 3. Maintenance of access ways
- 4. Detailed records and Institutional control
- 5. Maintaining records and Institutional control
- 6. Memory



ANDRA Proposal (Reversible)



LEGACY BURDEN

UNDERGROUND

- REVERSIBLE
  SAFETY, SECURITY, MAINTENANCE (SSM)
- IRREVERSIBLE
  MARKING,MEMORY
  (MM)

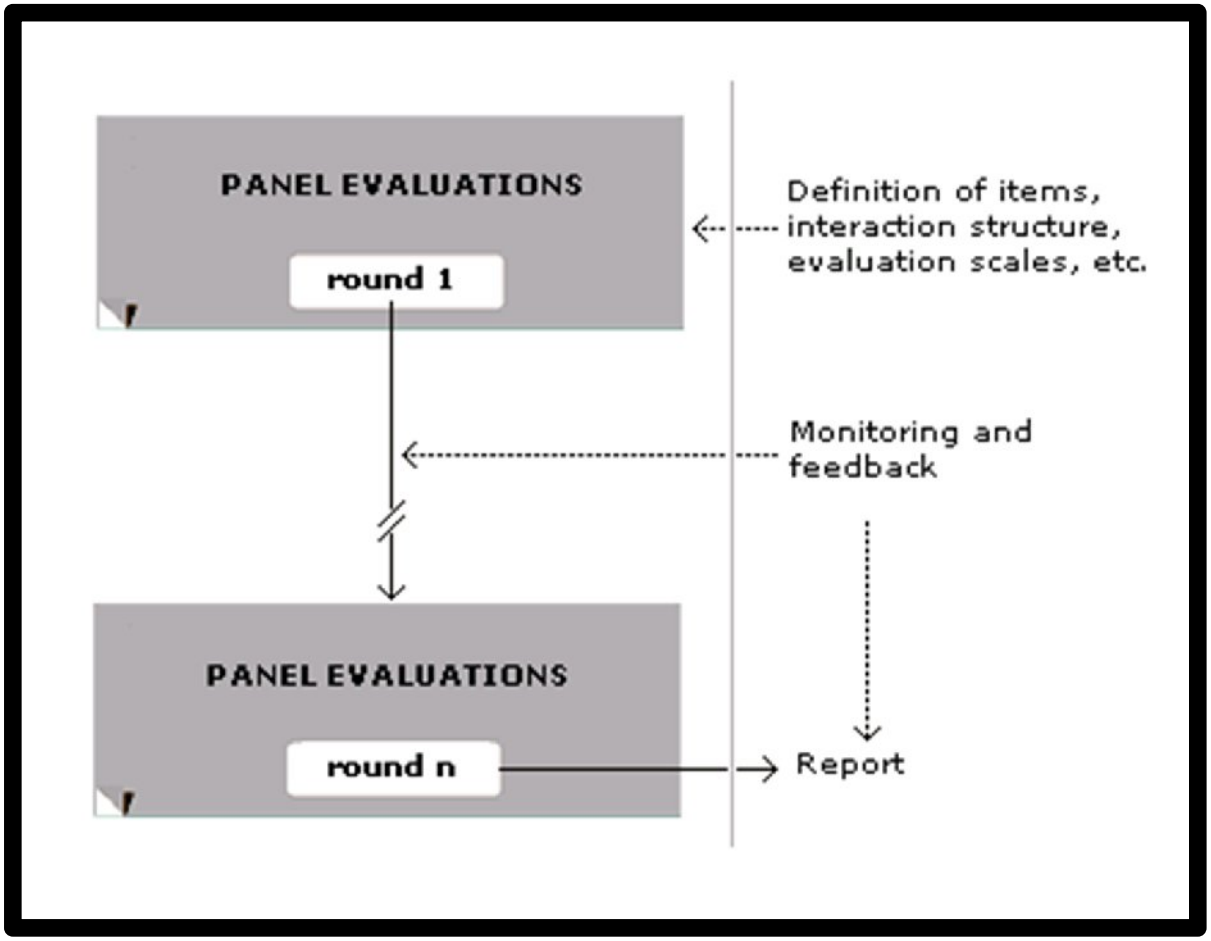
SURFACE

- POOLS
  SSM, MOST VULNERABLE
- DRY CASKS DECENTRALIZED
  SSM, MM, Long-Term?
- DRY CASK CENTRALIZED
  SSM, MM, Becomes Permanent?

Regulating 10,000 Years

- “Subpart B of 40 CFR Part 191.13; EPA, 195,” for example, specified a regulatory period of 10,000 years. Such legal scope is entirely unprecedented in the history of the law–from the Roman Corpus Iuris to the present. WIPP: Waste Isolation Pilot Plant

Delphi Method (1964)

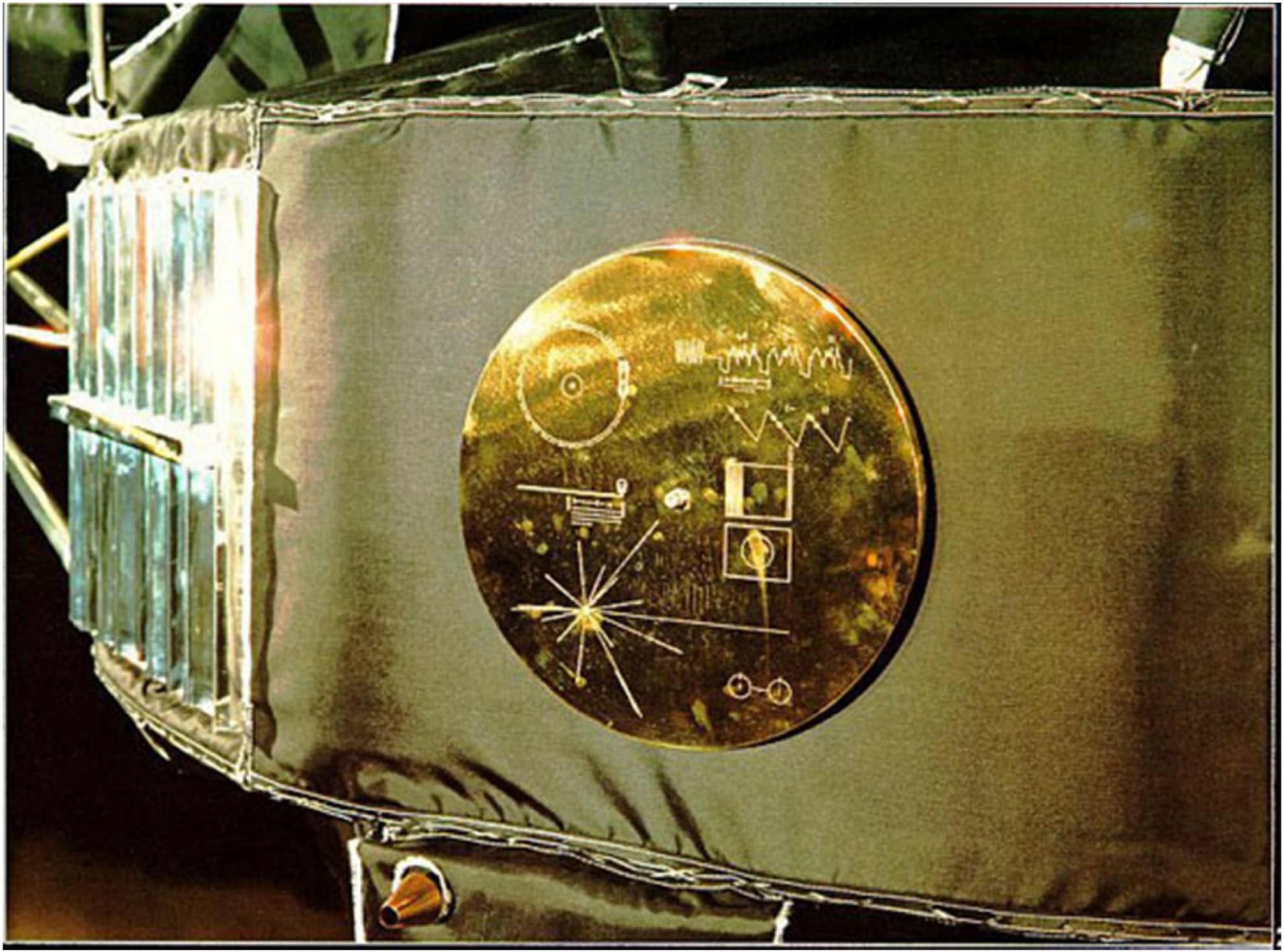


Delphi Method
(Gordon, Helmer 1964)

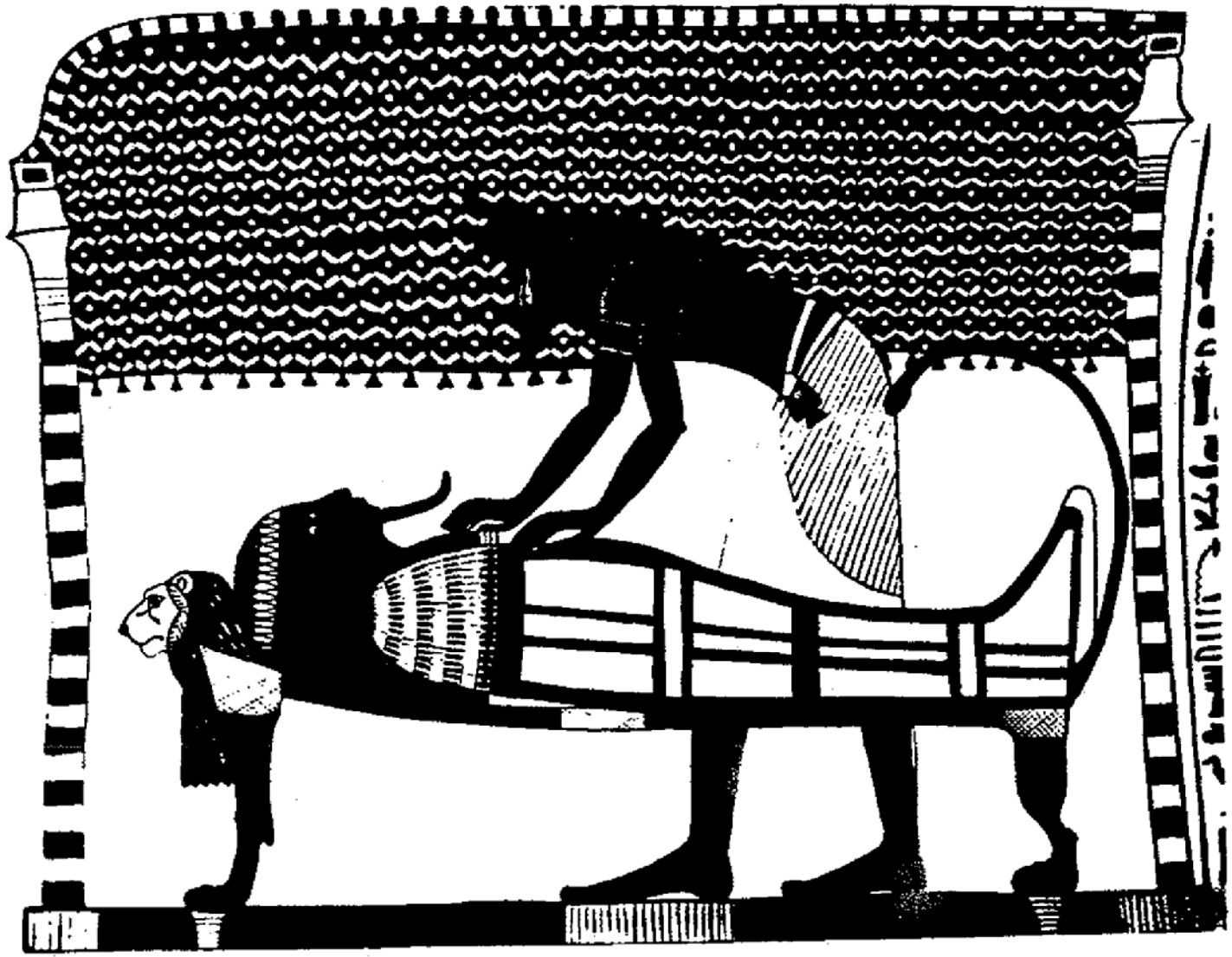
- economically useful desalination of sea water
- oral contraceptives
- advent of ultra light materials
- automated language translation
- transplanting organs
- more reliable weather forecasts
- centralized data banks
- artificial organs
- X Ray lasers
- psychotropic drugs
- self replicating molecules
- synthetic protein
- feasibility of control over hereditary defects

Gordon, Helmer (Delphi 1964)

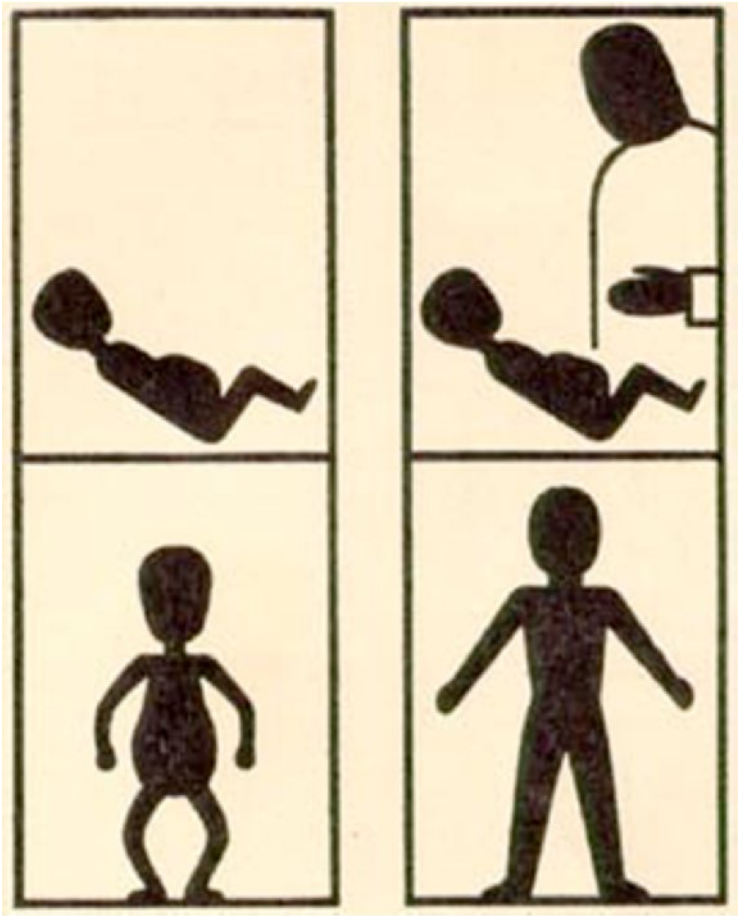
Item	Panel	Predicted time of availability		Possible implication for weapon systems
		Median	Quartiles	
Establishment of a global satellite communication system	4	1968	1967–1970	Improvement in the security of command–and–control
Unmanned inspection and capability for destruction of satellites	4	1967	1967–1970	Potentially important defense against unauthorized reconnaissance or against satellites suspected of carrying bomb loads
Manned co–orbital inspection of satellites	4	1970	1970–1974	

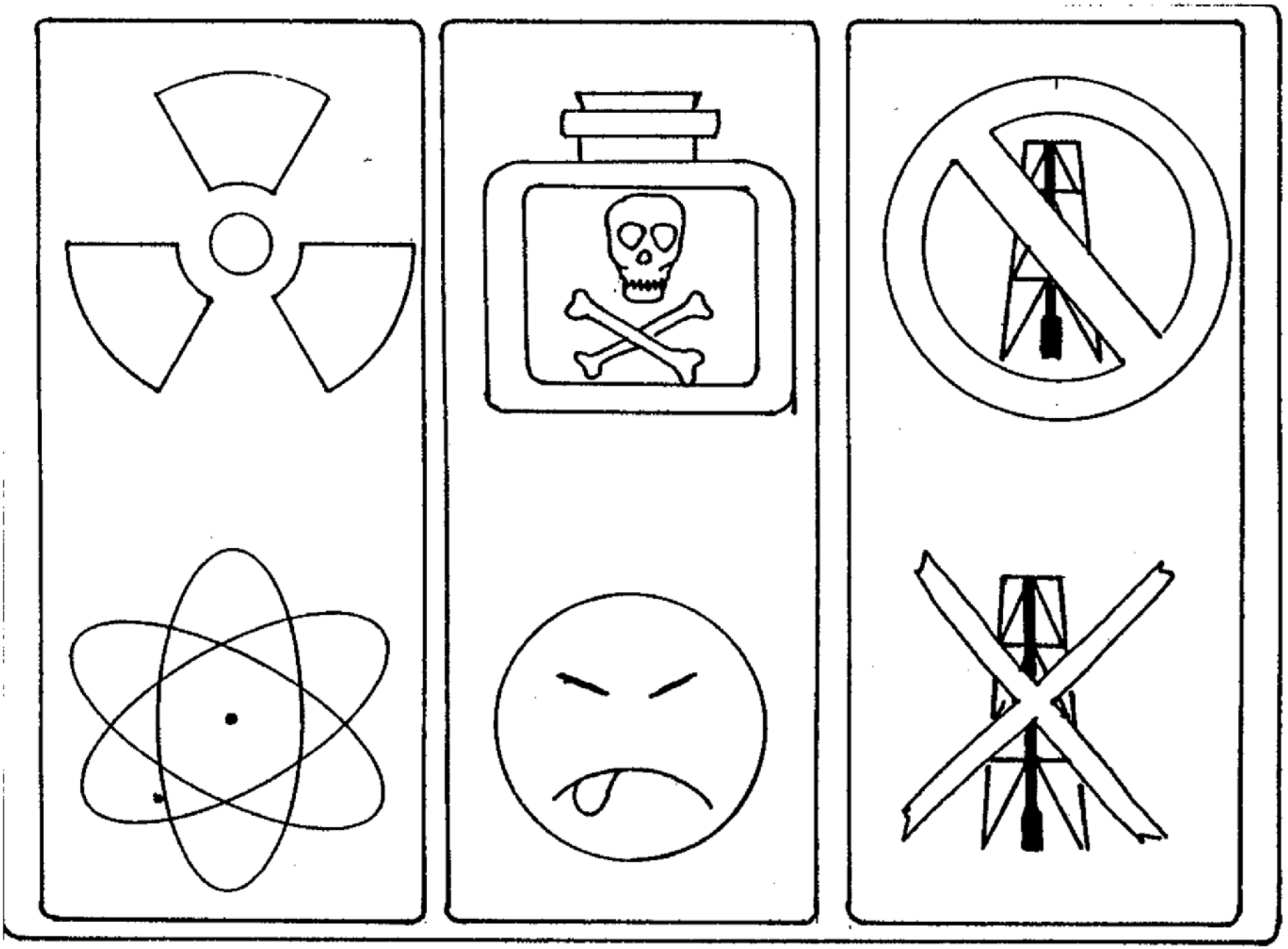


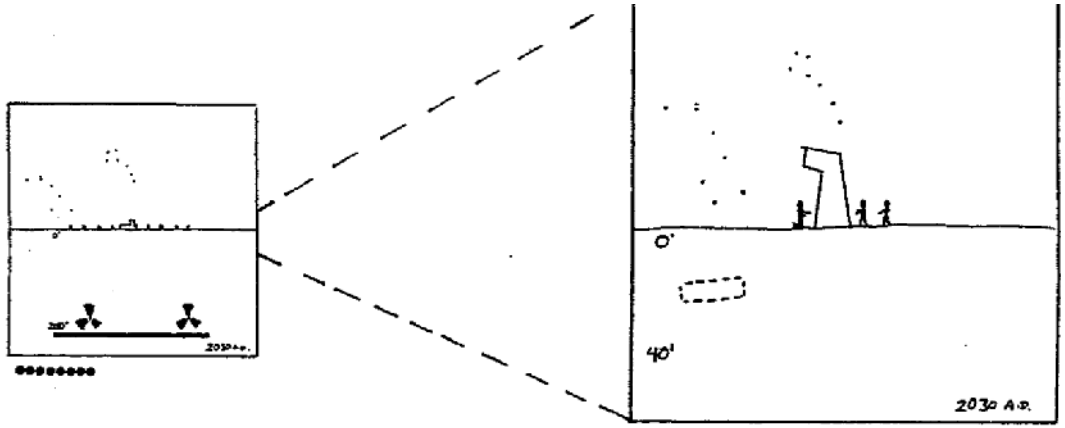
Egyptian Funerary Art



Neurath Picture Language
(child develops with and without care)




RADIATION
POISON
" DON'T DRILL "



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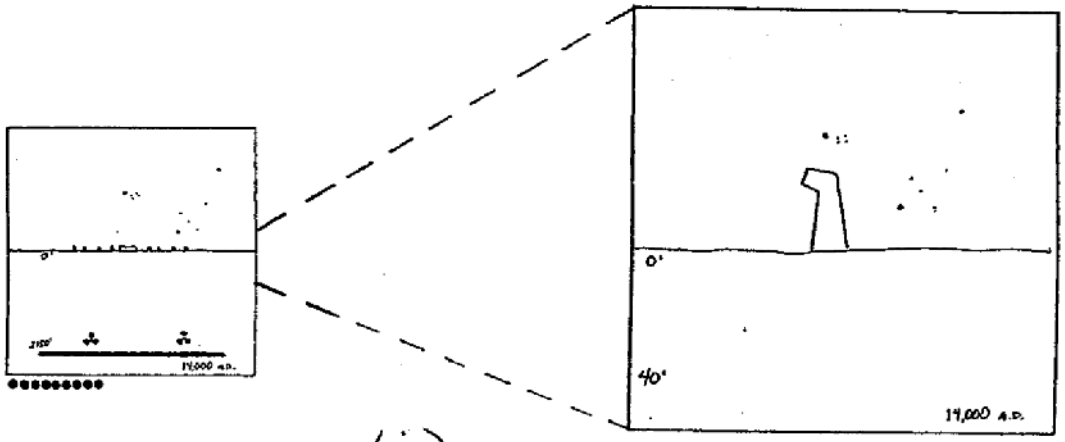

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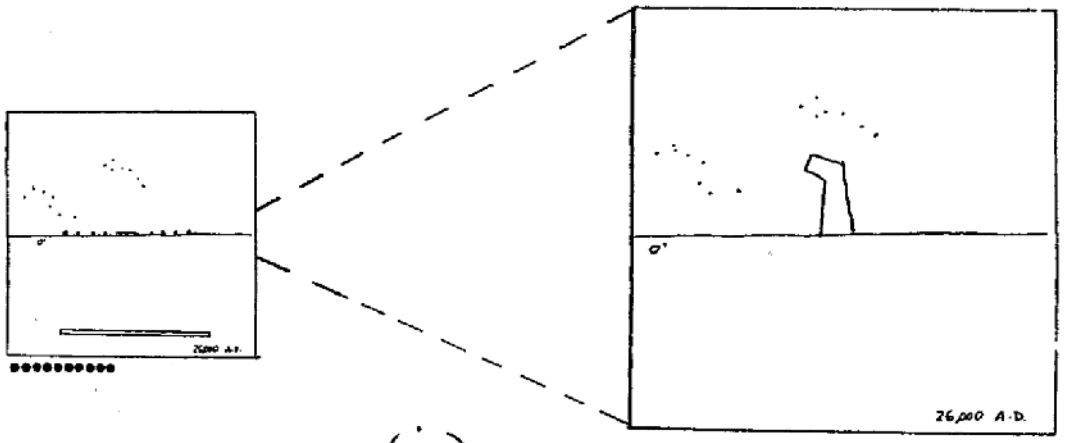

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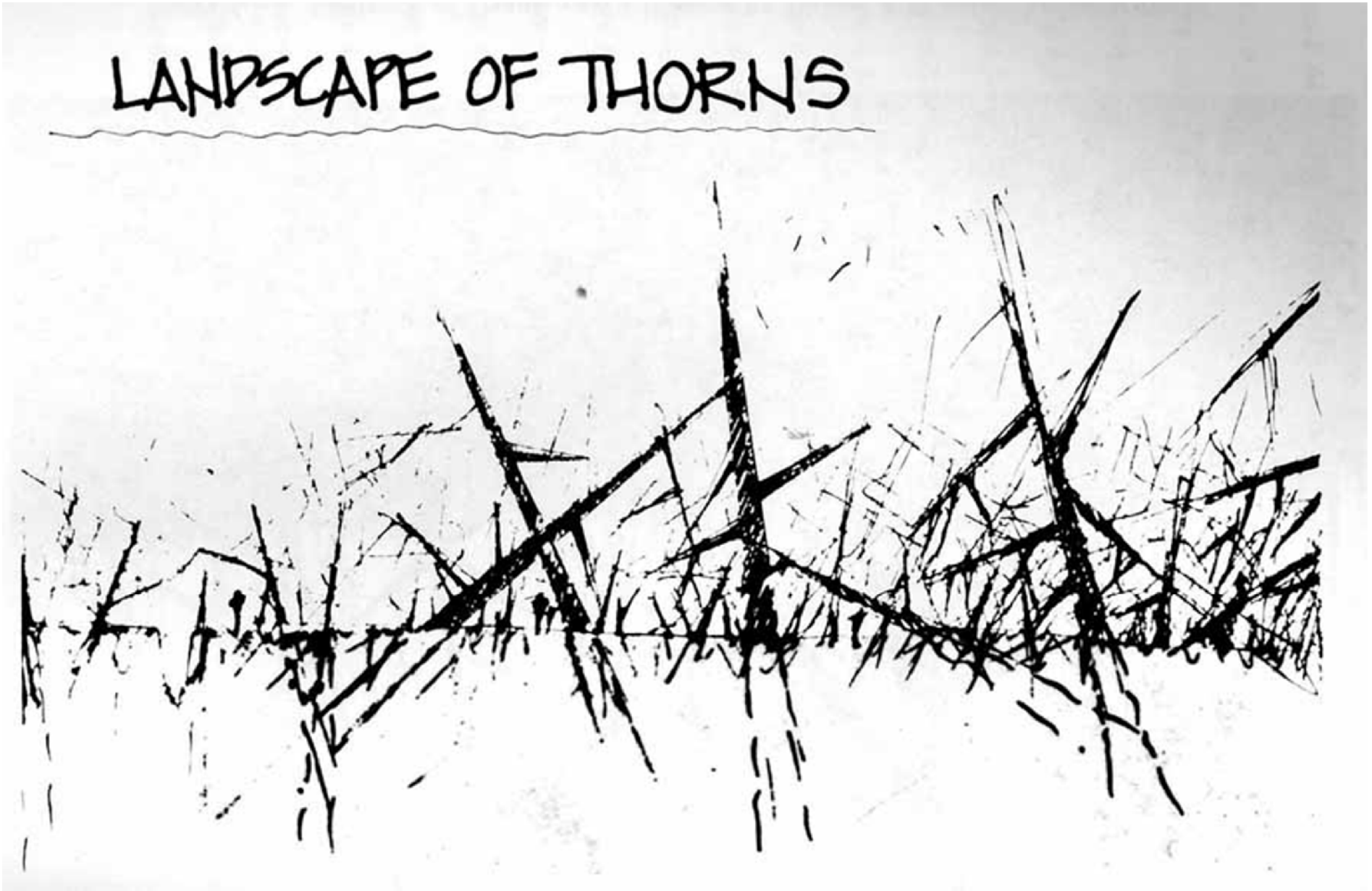
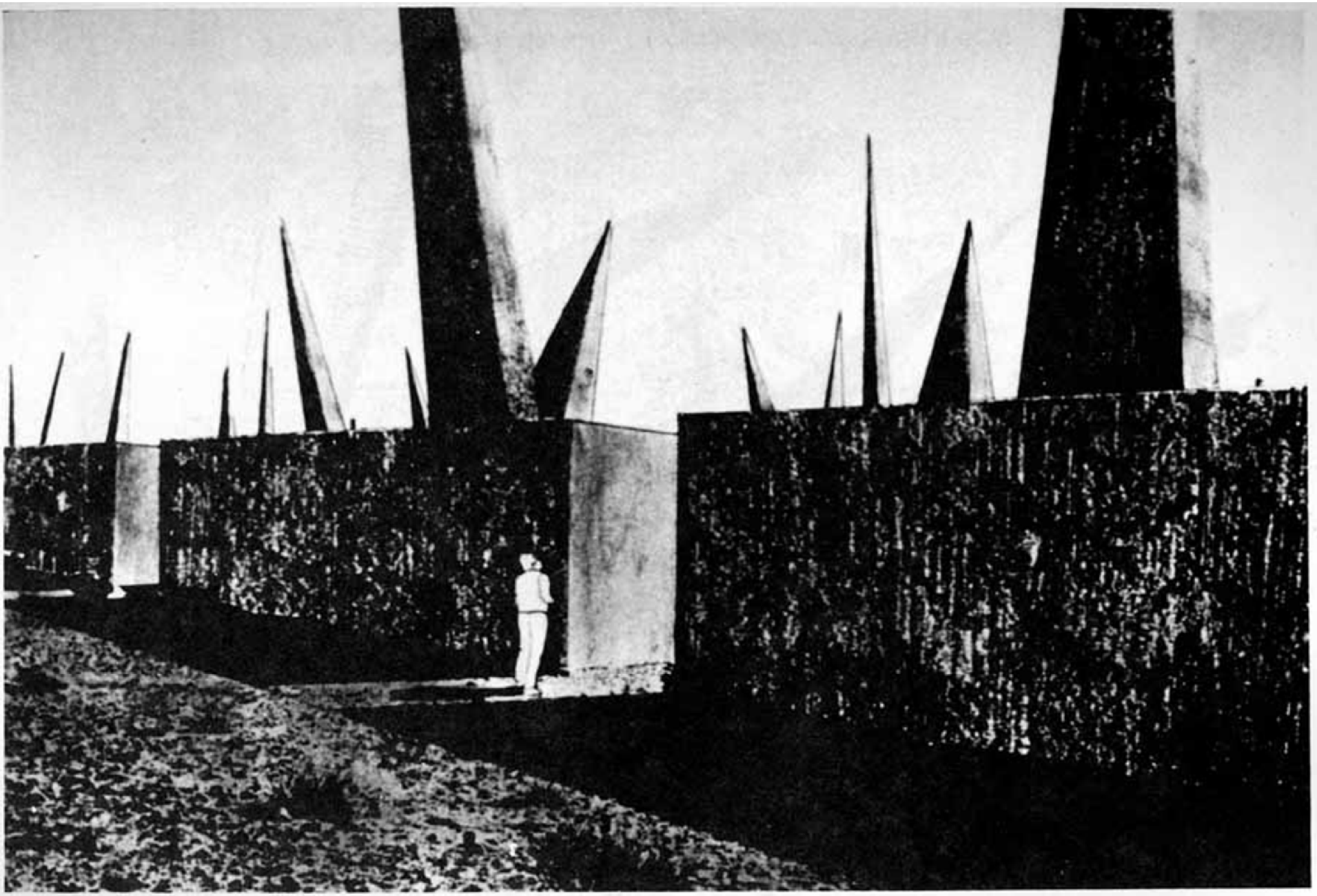
Levels of Information

- Human built
- Danger
- Radioactive Waste
- Detailed Science

LANDSCAPE OF THORNS





Nuclear Consent

We have learned one big lesson from the last 70 years of nuclear work: only through distributed knowledge and transparency have we been able to successfully address the cleanup and waste disposal problem.

We now need to figure out how to apply that understanding to the far-future legacy of nuclear waste.