Science in a Free Society

by Jeu-Jenq, Yuann

Professor of Philosophy,

National Taiwan University

The Contents of the Course: Science in a Free Society (pre-mid-term)

- 1. What is Science?
- 2. M. Nussbaum, “Socratic Self-examination” in *Cultivating Humanity* (Cambridge, Mass.: Harvard University Press, 1997), pp. 15-49.
- 3. K. Popper, “The Aim of Science” in *Realism and the Aim of Science* (London: Rutledge, 1985), pp. 131-158.
- 4. P. Feyerabend, “Science in a Free Society” in *Science in a Free Society* (London: NLB, 1978), pp. 71-122.

The Contents of the Course:
Science in the Free Society (after-mid-term)

- Paul Feyerabend, *The Tyranny of Science*, ed. By Eric Oberheim (unpublished manuscript taped from the series of lectures given by Feyerabend on the eighth of May, 1992 at the University of Trento (Italy).

Topic one:
What is Science?

2010.09.16

Question: What is science? (1)

1. Historical preliminaries:

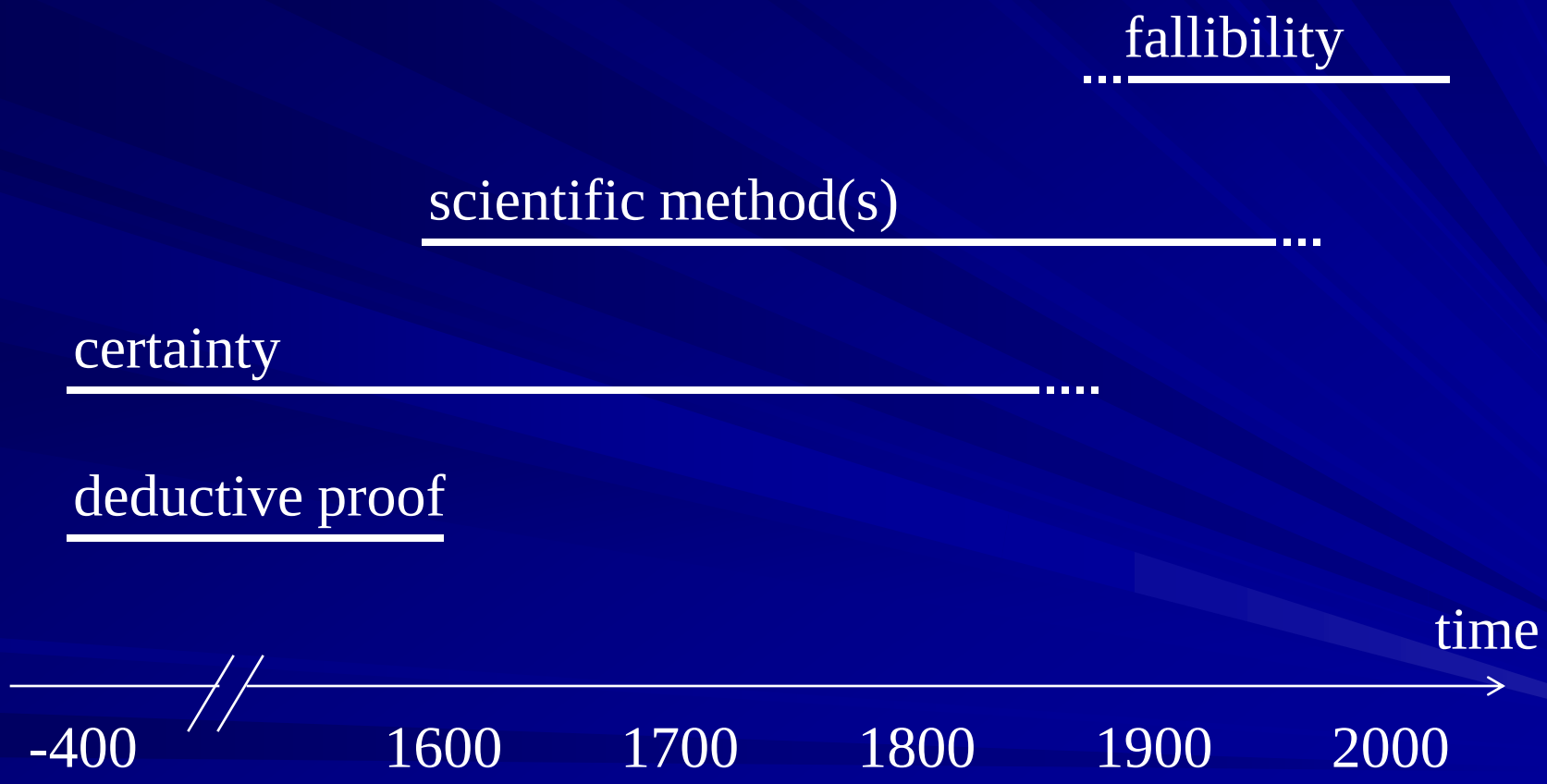
- Antiquity until 17th century: scientific knowledge as certain knowledge, established by proof.
- 17th century until second half of 19th century: scientific knowledge as certain knowledge, established by (the) scientific method(s)

Question: What is science? (1)

1. Historical preliminaries:

- Second half of 19th century until last third of 20th century: scientific knowledge as fallible knowledge, established by (the) scientific method(s)
- Last third of 20th century until now: dissolution of the persuasion of science as a strictly rule-bound enterprise induced by historical studies. Provokes the question: Is science special?

Question: What is science? (2)



Question: What is science? (3)

2. Systematic preliminaries:

- Concept of science with largest possible disciplinary extension ("fields of research" – *Wissenschaft*)
- Focus: mainly, but not only, scientific knowledge
- Main contrast to everyday knowledge, not, e.g., to pseudo science or metaphysics (Popper)

Question: What is science? (3)

2. Systematic preliminaries:

- No metaphysical presuppositions (essences, e.g.)
- Don’t expect sharp boundaries of science: transition areas to scientific procedures for non-scientific purposes, and in R&D (e.g., fusion reactor, earthquake engineering, chocolate science)

The short answer

Answer, to be explicated and defended:

Scientific knowledge differs from other kinds of knowledge, from everyday knowledge in particular, primarily by being more systematic

Program for the rest of the talk:

- A little history
- Qualifications of the answer
- The concept of systematicity
- How to argue for the answer

Comparison with the position of Kant

Kant already appears to be a defender of systematicity:

„The systematic unity is what transforms common knowledge into science“ (KrV A832/B860)

Here, systematicity concerns only the structure and representation of knowledge and is understood in the restricted sense of axiomatization

The answer: History (1)

John Dewey, 1903:

> "The familiar notion that science is a body of systematized knowledge will serve to introduce consideration of the term "scientific" as it is employed in this article. The phrase "body of systematized knowledge" may be taken in different senses.

The answer: History (1)

John Dewey, 1903:

> It may designate a property which resides inherently in arranged facts […]. Or, it may mean the intellectual activities of observing, describing, comparing, inferring, experimenting, and testing, which are necessary in obtaining facts and in putting them into coherent form. The term should include both of these meanings."

The short answer: History (2)

Charles Morris, 1960, echoing Neurath about the plan for the *Encyclopedia of Unified Science*:

"Section 2 was to deal with *methodological* problems involved in the special sciences and in the systematization of science […]. Section 3 was to concern itself with *actual state of systematization* within the special sciences and the connections which obtained between them, with the hope that this might help toward further systematization."

The short answer: History (3)

Carl Gustav Hempel (from 1958 onwards)

1965: “All scientific explanation […] seeks to provide a systematic understanding of empirical phenomena by showing that they fit into a nomic nexus”

1983: “Science is widely conceived as seeking to formulate an increasingly comprehensive, systematically organized, world view that is explanatory and predictive.”

The short answer: History (4)

Ernest Nagel, 1961:

"It is the desire for explanations which are at once systematic and controllable that generates science".

"A number of further differences between common sense and scientific knowledge are almost direct consequences of the systematic character of the latter".

The answer: Qualifications (1)

The short answer: Scientific knowledge differs from other kinds of knowledge, from everyday knowledge in particular, primarily by being more systematic

- Terminology: I use “knowledge” loosely ≈ good belief; “more systematic” (or “higher degree of systematicity”) is not meant quantitatively
- Answer is *descriptive*, not normative
- Answer is *comparative* in character: other kinds of knowledge need not be entirely unsystematic

The answer: Qualifications (2)

- "being more systematic": refers to knowledge about the *same* domain:

  There is non-scientific knowledge that is immensely more systematic than some pieces of scientific knowledge

  Example: ViCLAS: Violent Crime Linkage Analysis System (introduced by the Royal Canadian Mounted Police, RCMP)

  Aim: Identification of serial violent crimes/criminals.

  Each potential serial crime is catalogued by 262 questions; the database contains several hundred thousand cases of many countries

The answer: Qualifications (3)

- Answer is not immediately applicable to areas where science is the only game in town, i.e. where no comparison with other kinds of knowledge can be made

What does systematicity mean? (1)

The concept of systematicity is very vague and needs to be made 1. more precise and 2. more concrete

1. Contrasting concepts to “systematic”:

- purely random or accidental
- arbitrary
- unmethodical
- unplanned
- unordered

Being systematic is to embody some kind of order

What does systematicity mean? (2)

2. The concept of systematicity will be made more concrete in nine dimensions, namely those in which scientific knowledge is more systematic than other forms of knowledge:

- Descriptions
- Explanations
- Predictions
- Defense of knowledge claims
- Critical Discourse
- Epistemic connectedness
- Ideal of completeness
- Knowledge generation
- Structure and representation of knowledge

What does systematicity mean? (3)

Remarks:

- The more concrete concepts of systematicity, corresponding to the nine dimensions, are different from each other and exhibit only family resemblance among each other
- But also within one single dimension, there are different concepts of systematicity, co-varying with different disciplines and even sub-disciplines, exhibiting family resemblance only
- Furthermore, concepts of systematicity vary historically
- Thus, systematicity as a hallmark of science does not claim a rigid, unique structure of the sciences

How to argue for the answer (1)

By now, we know—to some degree—what the short answer means

"to some degree": the concept of systematicity must be more concrete in the different contexts, i.e., in the nine dimensions and in the different disciplines and subdisciplines

Now we have to show that *all* sciences are more systematic than everyday knowledge in *all* nine dimensions

How many sciences are there?

How to argue for the answer (2)

According to Thomson Reuters, there are

170 categories in the sciences (Acoustics – Zoology)

54 categories in the social sciences (Anthropology – Woman's Studies)

15 categories in the formal sciences (Automation & Control Systems – Statistics & Probability)

26 categories in the humanities (Archeology – Theater)

Altogether: 265 disciplines

How to argue for the answer (3)

However, we have to break up the individual disciplines into smaller units because disciplines are not homogeneous regarding their systematicity

Example: Compare economic history and the history of mentalities

How many of these smaller units are there?

How to argue for the answer (3)

- One source counts 8,530 ‘fields’ (in 1987)
- We thus have something like 70,000 theses for which to argue
- This is the price of a descriptive thesis about all the sciences

How to argue for the answer (4)

In order to argue for the higher degree of systematicity of science in the nine dimensions, I will have to use examples

I will have to show that scientific knowledge is more systematic than other kinds of knowledge with respect to descriptions, explanations, predictions, the defense of knowledge claims, critical discourse, epistemic connectedness, an ideal of completeness, knowledge generation, and the structure and representation of knowledge.

Furthermore, I will compare my position with other positions

This will be the content of …

Comparison with other positions: Feyerabend

Apparently with *Against Method* and his slogan „Anything goes“ an opponent of systematicity and methodicity

Even more clearly:

„Science has no common structure“ (1993)

„Science [...] is a collage, not a system“ (1995)

Feyerabend opposes a common structure of science in terms of necessary and sufficient conditions

Here, however, the unity of science is constituted by a net of family resemblance relations among different concepts of systematicity and it is therefore very weak

Summary

Albert Einstein (1936):

The whole of science is nothing but a refinement of everyday thinking.

What does “refinement” mean in this context?

- We will see …