Natural Kinds

Preliminary Remarks

- Last week: Observation and Theory

- Among other things, observation and theory allow us to generalise and classify things.

- This week: Classification - Natural Kinds

Introduction (1)

- Two Questions:

  Metaphysical: What *kinds* of things are there?

  Epistemological: What, if anything, can we know about them?

- Empedocles: 4 elements (earth, fire, water, air)

- Many domains, each with its own primitive ontology:

  - Physics: particles, symmetries, forces, etc.
  - Chemistry: elements, compounds, reactions, etc.
  - Biology: organisms, species, natural selection, etc.
  - Economics: agents, inflation, unemployment, etc.

Introduction (2)

- What is a natural kind?
- Some intuitions:
  - objective (vs. subjective)
  - natural (vs. arbitrary or artificial)
  - tokens of the same kind share properties
  - tokens of the same kind behave in similar ways
  - feature in natural laws
  - feature in explanations and predictions

Central Questions

- Can we (always) justifiably distinguish between *accidental* and *natural* groupings/kinds?

- Does science carve nature at the joints?

- Does nature have discernible joints?

Conventionalism

- Classification does not reflect any pre-existing divisions in nature. At the very least, we cannot know whether it does.

- Prominent advocates: Conventionalists, Relativists, Social Constructivists.

- Main Problem: Considerable agreement across cultures and societies on natural classifications.

Essentialism

- Nominal vs. Real Essence.
- Objects are members of the same natural kind *if and only if* their real essential properties coincide.

	Earth	Twin Earth
Term:	‘water’	
Intension:	colourless, tasteless, boils at 100°C, etc.	
Extension:	H_2O	XYZ

- Prominent advocates: Putnam and Kripke.

Problems

- Many ways to divide a pie!!!

  Example: Rhubarb, Tomatoes, Peppers

  Are they fruits or vegetables?

  Two competing classifications:

  Culinary/Greengrocer: Fruit (r); Vegetable (t, p)

  Botanical: Fruit (t, p); Vegetable (r)

  - In this example, it is obvious that we should prefer the biological classification.

  - Whether the biological classification is natural depends on ‘seed-bearing’ being a natural kind term.

Problems (2)

- BUT, Biology itself has problems with taxonomy.
- For example, there are various - often competing - ways to classify species:

  - morphological factors
  - reproductive factors
  - phylogenetic factors

- What about other scientific disciplines?

Problems (3)

- Goodman's New Riddle of Induction
- An object is *grue* if and only if:

  EITHER

  It is observed before Oct. 19 2005 and is green.

  OR

  It is not observed before Oct. 19 2005 and is blue.

- What makes 'green' and 'blue' natural kind terms but not 'grue'?
- Evidence is compatible with both hypotheses.

Problems (4)

- Let's define another term:

  X is 'bleen' = X is observed before future time t and found to be blue, or X is not so observed and is green.

- Notice: 'grue' and 'bleen' are as derivative from 'green' and 'blue' as 'green' and 'blue' are from 'grue' and 'bleen':

  X is 'green' = X is observed before future time t and found to be grue, or X is not so observed and is bleen.

  X is 'blue' = X is observed before future time t and found to be bleen, or X is not so observed and is grue.

Projectibility

- A predicate is *projectible*, when from limited evidence in its favour it can be projected to a wider class of cases.

- Given Goodman's puzzle and the more general problem of induction, how could we decide whether a predicate is projectible or not?

- Goodman's answer: Entrenchment

  'Green' has been successfully projected far more often than 'grue'. (NB: No guarantees here!!!)

Further Issues

- ‘Reductionism’ vs. ‘Pluralism’

  Reductionism: A given domain, theory or science is shown to be either absorbable into, or eliminable in favour of, another domain, theory or science.

  Prominent Advocates: Logical Positivists, Nagel, Nickles, Sklar, Weinberg, etc.

  Anti-reductionism: The denial of reductionism and typically the assertion of *pluralism*: There is (and there should be) ontological, epistemological, methodological and explanatory autonomy between these domains, theories or sciences.

  Prominent Advocates: Feyerabend, Cartwright, Dupre, Social Constructivists, etc.

Food for Thought

- If the whole of science was ultimately reducible to physics, what would happen to the natural kinds postulated in other branches of science?

Reading

- A. Bird ‘Natural Kinds’, chapter 3.