LECTURE 9

How we come to postulate the entities that are used in our scientific laws in order to explain what we observe at the empirical/observational level?

Modal logic is a non-classic logic:

* Admits thar it is necessary that
* It is possible that
* Not cantered on truth functions

It can be of many types:

* Epistemic - it is known that
* Deontic – it is ought to be the case that
* Temporal – it has been the case that

**ARISTOTLE**

Used modal logic for his metaphysical assumptions:

In the context of syllogism, propositions can have many properties

* Plain or assertory (A applies to every B)
* Necessary (A necessarily applies to every B)
* Possible (A possibly applies to every B)
* Contingent (two-way possibility: A possibly applies and possibly does not apply to every B)

He plays around with them in the premises and see the conclusion.

Modal logic can have more than one reading: it is necessary that and it is possible that. However, Aristotle doesn’t specify which one he gives.

**BECKER**

Aristotle’s work on modal logic was very criticised because it was defined as inconsistent. Becker tries to give a reason for Aristotle inconsistency.

He thinks there is a misunderstanding in the readings of modal logic:

Two types of modalities in Aristotle:

* “All lions are necessarily animals”

I can say that:

“it is a necessary truth that all lions are animals”

* “Everything lying down in a particular place is in fact a lion’

I can say that:

“It is true that each and everything that lies down there, that being a lion applies to it”

**ARISTOTLE FALLACY**

Modal logic gives two different readings:

* De dicto – modalities concern entire statements: necessity is a property of what is expressed by a proposition (the ‘dicta’)
* De re - modalities are properties of the things of which the propositions (the dicta) assert something
* Whatever Is true de dicto is not necessarily true de re

EXAMPLE

Socrates (X) is necessarily rational

There is no necessity in the fact that Socrates is rational

* Once we give some property to X, then X necessarily has a property
* However, there is no necessity in the attribution itself

**ESSENTIALISM**

Essentialism aims at describing the necessity in the attribution of some properties onto something.

Saying:

* ‘It is necessary that water is H20’
* Becomes it is the essence of water to have the chemical structure H2O.

**TYPES OF NECESSITY**

* Logical necessity à rules of logical form and deductive reasoning, strong necessity
* Natural necessity à relation between a particular entity and its properties, weak necessity

SEE SLIDE – QUICK SUMMARY

**LEWIS**

More often than not, modal logic is however associated with Lewis.

He was American and graduated at Hardwar. He is the father of modal logic.

**NATURAL KINDS**

Natural kinds do not just belong to philosophy of science but also to different type of philosophy, etc.

Firstly:

* We can classify entities by grouping them into classes
* All the entities that belong to a class they have all the same properties
* The properties assigned are not accidental but they identify entities to be of that kind necessarily

IN SCIENCE

Natural kinds:

* Grounding for predictions
* Role in scientific laws and scientific explanations

**PROBLEMS**

There are some matters to address:

1. what makes us pick certain properties as being those that identify a kind
2. what makes certain entities appear sufficiently similar in relevant respects to rightly belong to a kind

**COUNTERAGRUMENT**

**KRIPLE VS PUTNAM**

**THE SEMANTICS OF NATURAL KIND TERMS**

Both Kriple and Putnam:

* against descriptivism
* are against definite description

EXAMPLE - the term water is described as liquid, transparent and so on. it has a fixed meaning.

They object:

1. To the fact the meaning is necessary in order to refer to a kind
2. They state that isn’t a necessary and sufficient condition because we might have the meaning and refer to the wrong kind

**PUTNAM**

**TWIN EARTH THOUGHT EXPERIMENT**

Imagine there is a planet that is exactly like earth, except for the fact that there is something in the planet that looks like water and it is called water, but it has actually a different chemical composition.

* + Do they refer to the same thing when they refer to water?
  + There is more than the meaning in this case

MODAL ARGUMENT

1. ∀x(x is an instance of the kind K Dx). (A) is necessary/apriori
   * It is possible that there are instances of K that do not possess D
   * It is possible that there are items that share D but are not instances of K

EXAMPLES OF NATURAL KINDS:

**CHEMISTRY**

CHEMICAL ELEMENTS - the world can therefore be divided in essences

**HENDRY**

**MICROSTRUCTURALISM**

Microstructuralism

* Identifies microstructural properties of each element such as the atomic number of the nuclear structure

**OPEN ISSUES**

* There is no just one microstructure but there is a complex interaction
  + Interaction may change and are not fixed
  + Different aspects can be taken into account
  + The function rather than the properties is what matters

ESSENTIALISM AND CHEMISTRY

At the end it doesn’t give enough information to demarcate the different kinds – not so much useful for demarcation.

**BIOLOGY**

Another typical example of natural kinds is biology because a species is a perfect example of a natural kind.

OPEN ISSUES

* + Darwinian theory of evolution: there are no properties of species that all members of a species do share.
  + Evolutionary history tell us that these properties can and do change

Are species then kinds at all?

Therefore, both chemistry and biology show that essentialism need a rethinking:

**RETHINKING OF ESSENTIALISM**

In order to respond to the above criticism, some have rethought about essentialism:

1. Property cluster theory – Boyd
2. Promiscuous realism – Dupre

**DUPRE’**

**PROMISCUOUS REALISM**

In his book, he goes against the image of unity given by determinism, reductionism and essentialism. He argues in favour of a disunity image:

* Determinism and more specifically to the epistemological monism
* Reductionism
* Essentialism

According to him, science must:

* Have a strong metaphysical foundation
* Everything can be reduced to a materialistic ground
* Be pluralistic

**CLOCK METAPHOR**

Just like a clock, science has different level of understanding:

* First the different parts of the mechanism
* Secondly how they are connected and work together
* Finally, the hidden mechanism

I go from the most complex functions to the simplest ones so that reductionism and determinism go hand in hand.

ESSENTIALISM AS A PART OF THE MECHANICAL WORLD

Dupre discusses essentialism in the context of natural kinds. Within the same mechanism:

* Individual things
* Kinds of things

**NEW PROMISCOUS ESSENTIALISM**

Dupre’ goes against classical metaphysics that says:

• scientific classifications must reveal one orderly arrangement of the things that exist

• classifications must be discovered, not invented.

• correct classifications or natural kinds tell us everything that we need to know about an object

**THE PROMISCUOS ELEMENT**

We can talk about promiscuity because:

* There is no clear cut in the belonging between different kinds
* Sometimes it is the context of use that specifies why something is classified in a particular way
* The promiscuous view doesn’t deny scientific classification is better
* Choosing a commons sense classification needs a justification – to come up with a reason why we are using it

Dupre view needs a different metaphysical perspective:

* the ontology of common sense is plural
* uses firstly different types of classification – inaccurate, simple, etc.
* it refines them and make them more accurate
* Scientific ontology more accurate (more knowledge) but does not make common sense classifications redundant
* Different classifications are made with different goals in mind and within different context of use
* It is not possible to reduce everything to one essentialism – bur rather there is a necessity to admit many types of essentialism, all valid depending on the context: evolutionary, physiologic, anthropologic, etc.

EXAMPLE

Lillis is more inclusive to what we are used to refer to: it comprehends also garlic and onions