1 Preliminaries

Notes on meeting with Prof. Hutzler

These are the notes I took from our meeting with Prof. Hutzler at the start of week 2, without alterations.

Einstein - "We can only talk about what we can measure"

Wittgenstein - "Whereof one cannot speak, thereof one must be silent"

Physicists: We assume there are rules, we assume there is something there (an objective reality)

What is the nature of reality?

Physical theories are accurate on the relevant scale:

Microscopic/Quantum $\longleftarrow$ Everyday $\longrightarrow$ Cosmic/Relativistic

Physics: The central assumption that there are results, something which is true, progress, and that science is not opinion

Philosophy: Is philosophy similar? Similar philosophies: logical positivism, Popperian falsifiability.

Aim of project: To characterise the work of a physicist.

Philosophy can be considered an amalgamation of worldviews, except at the fringes Physics can be considered established fact.

What does the project want? 'some' historical context, 'some' mention of physicist/philosophers.

Question: We have the notion of truth, outside world, objective reality. Do all philosophers agree with this?

There are different types of philosophy, but we have only one type of Physics.

Physics describes the world, based on measurements, and its correspondence with reality. How do measure the value of a philosophical idea?

Physics has its unknowns and its range of values where we do not know, but we are able to quantify where we do not know, even if Physics is probabilistic we can still determine and quantify these probabilities.

Why do Philosophers read old books?

Are there things on which all philosophers are agreed?

Questions to Answer

This is supposed to be a list of the sort of questions our project is trying to answer.

Do all philosophers agree with the notion of an outside world or an objective reality?

Why do we have different branches of Philosophy when we have just one type of Physics?

How do philosophers measure the worth of a new philosophical idea? How is a philosophical idea thrown out or discredited?

How does a new idea take over in Philosophy, and how can that be contrasted with how an idea takes over in science?

While Physics is non-deterministic at the lowest levels, we are still able to determine and quantify probabilities to a high degree of accuracy. Is there a similar sense of being able to set bounds on certainty and uncertainty within Philosophy?

Are there things on which all philosophers agreed?

Are there any fundamentally philosophical notions which have greatly influenced Physics? Is the notion of the physicist philosopher such that the two aspects of the person can always be separated?

How do philosophers feel about the notion of an objective reality which we all experience and which can be measured and worked with?

Russell's History of Western Philosophy

Just a selection of useful reference points from the book.

Russell on Pythagoras (pg.34) "He founded a religion, of which the main tenets were the transmigration of souls and the sinfulness of eating beans"

p.p. 37-39 The influence of mathematics and geometry on philosophy, scientific method and theology (from Euclid and Pythagoras).

pg. 40 "As to the nature and structure of the world, various hypotheses are possible. Progress in metaphysics, so far as it has existed, has consisted in a gradual refinement of all these hypotheses, a development of their implications, and a reformation of each to meet the objections urged by adherents of rival hypotheses"

pg.41 "When an intelligent man expresses a view which seems to us obviously absurd, we should not attempt to prove that it is somehow true, but we should understand how it ever came to *seem* true" (Russell on interpreting Greek philosophy)

pg.180 "ppolonius is chiefly noted for his work on conic sections. I shall say no more about them, as they came too late to influence philosophy"

Other

The following is a quotation from The Philosophy of Physics by Roberto Toretti, pg. 94

"An intelligence that knew, for a given instant, all the forces acting in nature, as well as the positions of all the things that constitute it, and who was capable of subjecting these data to analysis, would embrace in a single formula the motions of the largest bodies and those of the lightest atom. For her nothing would be uncertain, and the future, like the past, would be present to her eyes" (Laplace 1795)

(Lagrangian/Hamiltonian dynamics, c.f. also Feynman talking about photons 'sniffing out' the correct path to go in Q.E.D.)

"Like the others, it suggests that mechanical processes are governed by final causes, inasmuch as the value reached by the integrals $\int Ldt$ along different trajectories at the *end* of a time interval determines *right from the beginning* the choice of one of these trajectories"

Philosophical theology, Volume 2 by Frederick Robert Tennant pg.208 Descartes and Conservation of Momentum:

"From the immutability of God and the divine perfection, or from 'some invariant' in Nature, he passes on, as if to an identity, to conservation of momentum; whereas quite other things than momentum would suit equally well. So Leibniz corrected him by substituting *vis viva* for momentum..."

Todo: Add stuff about Newtonian mechanics being a reaction to what Newton felt was the 'godlessness' of Cartesian physics, his critique of 'vortical physics' in the Principia (Book 2.9) and his name of the Principia (History of Science journal article)

Todo: Read more of Incompleteness, Nonlocality, and Realism: A Prolegomenon to the Philosophy of Quantum Mechanics by Michael Redhead

Bell's Theorem etc. (what is Bell's Theorem about?)