SOUTH SOLIHULL PHILOSOPHY GROUP 2 (Philosophy of Science)

ARCHIVE OF BLOGS PRE 2025

10th December 2024: Philosophy of the Physical Sciences & Cosmology 4

We met to discuss the philosophy of religion. This was a wide ranging discussion, starting from the possibility of the argument from design for the Cosmos. If the universe did not somehow condense out of the big bang - the laws of nature and physical constants as well as matter and energy, Then design and the multiverse provide alternative theories - though note these are not falsifiable. We moved on through René van Woudenberg, Professor of Philosophy at the Free University Amsterdam, on the limits of science - here. Noting that science provides only a provisional theory - not yet disproven, we can still validate scientific "knowledge" trough the practical applications we know. It is not good to argue that religion provides answers where science does not - as yet! Smartphones do now acquire knowledge through acquaintance - as in facial recognition. And science can inform ethical decisions with explanations of behaviour through economics, psychology and the social sciences. But religion "Binds together"communities. It should at best provide a gold standard for virtue in the community, but religious institutions seem to be as corruptible by power as any others. And what is "God" at the core of religion?

12th November 2024: Philosophy of the Physical Sciences & Cosmology 4

We discussed Week 4 of "Philosophy and the Sciences: Introduction to the Philosophy of Physical Sciences" the course from Edinburgh University here. The topic was The Anthropic Principle and the Multiverse. We were OK with the weak anthropic principle: the kind of observers we are will set restraints on the kind of conditions that we are likely to observe. We are less convinced by the strong anthropic principle: the evolution of observers like us suggests it's overwhelmingly likely that the universe is such as to permit the evolution of creatures like us. On the multiverse, yes, our universe is so fortunately "Goldilocks" with so many physical consonants, dimensions and evolutionary path that is tempting to posit many other universes to explain it as a low probability instance of many universes, and it is presumptuous to consider ourselves unique. But the multiverse as a concept is unfalsifiable: we cannot experience anything outside our own universe. Stephen Hawking (who lived on after the course was published) demanded that we try to trace our universe back from our" worm's eye view" in a similar fashion to our evolution on earth - maybe it's just how elemental symmetries happened to break down. We note that while we can measure data back until very shortly after the big bang, anything earlier must be conjecture, albeit compatible with what we know and what fits with our best current scientific paradigm. We have been amazed and overwhelmed by some of the concepts: all that matter and energy released fr

8th October 2024: Philosophy of the Physical Sciences & Cosmology 3

We discussed Week 3 of "Philosophy and the Sciences: Introduction to the Philosophy of Physical Sciences" the course from Edinburgh University. We spent much of the time trying to understand Cosmology by going through the NASA primer here together, as we found Alasdair Richmond difficult to follow. This was very fruitful, particularly when augmented by reading from Thomas Hertog's book "On the Origin of Time" on Hawking's later thoughts, which Dave and I really rated and recommended. It is difficult to take on board that our universe was once allegedly millimetres in size (or was it - before spacetime emerged?); that it was unimaginably hot such that fundamental particles could not form and photons could not escape; that the matter we can detect is just 4% of the universe - not that much beside the 25% dark matter that holds the galaxies together and the 71%dark energy that drives the continuing expansion of the universe. But it was then not so strange to go through the objections and cautions from the philosophy of science. It is not possible to falsify these theories by experiment, because the one universe we have is by definition all there is. That said, observations that alternative

theories cannot encompass must be incorrect. There may be other explanations and theories, some that meet Thomas Kuhn's five basic criteria that define a good theory: accuracy, consistency, scope, simplicity, and fruitfulness, and the existence of alternative feasible theories (the course offers modification of Newtonian dynamics) exemplifies underdetermination.

10th September 2024: Philosophy of the Physical Sciences & Cosmology 2

We discussed Week 2 of "Philosophy and the Sciences: Introduction to the Philosophy of Physical Sciences" the course from Edinburgh University. We tried to track the journey from a steady state theory of the universe through to the big bang theory, and how we know the universe is expanding. We had dipped into Thomas Hertog's book on Hawking's final theory of time, and were taken with the idea that Georges Lemaitre who suspected this and persuaded Einstein not to remove the cosmological constant from his equation, because it could represent the rate of expansion - was a catholic priest!. When the red shift in the light from other galaxies was measured, it was put down to the Doppler effect - they are moving away - and if more red shift means higher velocity and the galaxies are further away, the universe would appear to be expanding and any steady state theory is falsified. However, gravity should be sufficiently strong to hold the universe together, so dark energy is postulated to counter this and push them apart. Then again, the galaxies themselves are not expanding, just the space in between, and we need dark matter to keep them from spreading. Add to this that in order for us to even exist, the universe had to expand then take a rest then expand again, and there is room to speculate on the underdetermination problem here, and this will be addressed in Week 3 of the course.

13th August 2024: Philosophy of the Physical Sciences & Cosmology 1

We discussed the first week of the Coursera course from Edinburgh University: "Philosophy and the Sciences: Introduction to the Philosophy of Physical Sciences." here. This was a return to some key concepts in philosophy of science: Popper's Falsification, Underdetermination, and Kuhn's proposition that "normal" science is conducted within the limits of the currently accepted paradigm. Thes ideas are presented as a preliminary to the project of the course which is to show that Cosmology is a science. We discussed the concepts and the value of the scientific approach to many problems at many levels of our condition today. These built on videos we watched: Michaela Massimi's lecture to the Royal Society on why science matters (she is one of the course presenters) and some thoughts of the late Daniel Dennett on these issues.

9th July 2024: Thinking Fast and Slow 3

We discussed Daniel Kahneman's "Thinking Fast and Slow" - parts 4 & 5. In summary we were chastened by the many scenarios portrayed by Kahneman where we do not act as the rational agents we perceive ourselves to be. "System1", that is our instinctive impulse, and our emotions have great influence. When we recall pain, or indeed pleasure, we are sensitive to the peak and the late stages, but not the duration. Adding some "slightly happy years" to a happy life actually lessens our evaluation of the whole. We fear losses more than we appreciate gains and don't recognise "sunk costs" Our risk aversion when faced with a prospective gain makes us accept an inferior guaranteed gain in place of a gamble - this is well illustrated by "the banker's" offers on "Deal or No Deal", and he seems to work on utility rather than cash value! We see percentages more easily than numerical equivalents and look at miles per gallon where should consider gallons per mile. We are influenced by the framing of a prospect: a 90% chance of survival is heard as much better than a 10% mortality rate. We overestimate the probabilities of rare events. The book is more psychology than philosophy, but a caution to our self image.

11th June 2024: Thinking Fast and Slow 2

We discussed Parts 2 & 3 of Daniel Kahneman's "Thinking Fast and Slow". These parts showed some serious potential and often actual flaws in our judgements and decision making processes. We forget that there is more variation in proportion in small samples. "Anchors" prime our expectations: a high asking price attracts a high offer. Specific memorable examples are available when we are asked for frequency of occurrence, though paradoxically trying to recall more instances is harder and is an inhibitor. Our intuitive evaluation of a specific instance usually ignores base rates. We can be fooled into ignoring logic when we classify on a striking plausible back story. Plausible causes trump statistics. Variables regress to the mean: success (or failure) is a combination of skill plus (minus) luck: outcomes correlate to appropriate variables, but inevitable variation weakens the correlation. On overconfidence, Kahneman reported that a simple algorithm beats experts at valuing vintage wine, and investment gurus are no good at all at beating the stock market. We can only trust "experts" who are well practiced in their field - and the field must have a stable predictable outcome. Then intuition equates to memory of similar relevant scenarios. His illustration of wildly optimistic project planning and costing was all too credible - it is important to look "from the outside", that is, what happened on similar projects, and maybe hold a "pre-mortem" rather than wait for the post mortem when everything has gone wrong.

14th May 2024: Thinking Fast and Slow 1

We discussed Part 1 of Daniel Kahneman's "Thinking Fast and Slow". The book is perhaps more psychology than philosophy, but there was a continuity and connection between his System 1 and System 2 thinking and Iain McGilchrists' Left brain / Right brain distinction. Further, Kahneman's exposition and examples made clear the traps of thinking in the less appropriate mode. The "Cognitive Ease" of system 1, clarity of presentation and a good mood, can make us creative, but also gullible. It is easy to make a coherent story fit what we are inclined to believe, and we ignore Popper and look for evidence to confirm rather than refute our beliefs. We answer the simpler question- looking at a politician's image rather than their policies. On the other hand we cannot hope to process everything through system 2, because thinking is uncomfortable and demands effort and attention. And attention is tiring and may make us selfish and suspicious. The good news is that working through system 2 can transfer the skill to system 1 - experience and proficiency in these fields then come naturally to us.

9th April 2024: Iain McGilchrist's Perspectives on Society (Left- and Right-Brain Thinking)

We discussed "Perspectives on the Nature of Reality to Inform Systemic Change" by Dr Iain McGilchrist (see here) His lack of presentation competence and his apparent pride in that were annoying, but the early, scientific part of his lecture about the structure, asymmetry and connectivity of the brain were enlightening. A convincing and key point he made was that the brain had evolved in two halves: the left brain controls the right hand to grasp prey, while the right hand keeps aware of predators. The left brain grasps and holds down ideas, whereas the right explores possibilities. He notes that stroke victims are worse affected when the right brain is affected than the left. From these ideas he notes that whereas left brain thinking has been seen as the preferred mode in our personal and cultural lives, that is to our detriment, and we should be preferring right brain thinking. He then gives many dramatic examples of where the world is going wrong through left brain dominance in thinking: some good points, but then so many that the definition of the serendipitously encountered word "casuistry'": "a process of reasoning that seeks to resolve moral problems by extracting or extending abstract rules from a particular case," seemed appropriate. A helpful, balanced review by psychologist Richard Gipps of Oxford does however state that "The thesis - that our world deprecates valuable modes of attention, and vaunts others which, left unconstrained, make our lives banal

- stands or falls entirely on its own cultural merits; neuroscience cannot itself pronounce on such matters of value." (see here)

12th March 2024: Psychology

We discussed whether psychology is a science. Wikipedia says psychology is the study of mind and behaviour. We agreed that behaviour can, with due care, be studied scientifically, in that it can meet the requirement of the scientific method: clearly defined terminology, quantifiability, highly controlled experimental conditions, reproducibility, predictability and testability (see here) The study of mind in isolation from behaviour is more problematic: while Wittgenstein argued that private language is incoherent, it is difficult to see how the mind can be studied unless through behaviour or neurological studies. As Iris Murdoch writes, "Someone who says……'I have decided' but never acts…..has not decided." That said, psychology may apply hermeneutics to study the mind, but this aspect seems to be more of an art than a science. An article in Psychology Today by Gregg Henriques (see here) argues that psychology is not a science, because it lacks a clear, consensual centre of scientific knowledge that provides a foothold to describe how (portions of) the world actually work. Maybe psychology is an emerging science, or maybe an art that employs scientific methods where currently possible.

13th February 2024: Consciousness 5

We discussed the Sean Carroll/Ricard Solé Podcast "State of Cognition" here He noted that computer networks have brain-like properties, but brought in several examples of "wet" cognitive systems, including slime moulds and ant colonies, these latter being examples of "liquid" brains, where the elements (in this case ants) move around to transfer information rather than there being wired neurons. We debated the relationship between cognition and consciousness. Panpsychics argue that everything is to some extent conscious - even Bertrand Russell argued that while physics and mathematics tells us how electrons look and behave, they do not tell us what it is like to be an electron. But although according to Solé even cells can learn Pavlovian reflexes, are they conscious? He said plants are not conscious, nor anthills, nor "Spain", though he noted that some such culture is vital to humans. He implies that artificial systems are not conscious - he would be worried when robots experience hunger. Perhaps consciousness is self awareness that emerges from cognition (= directed perception, processing, response and memory), driven by the survival instinct and enhanced by language? Elizabeth Anscombe argued that intention implies consciousness see here

16th January 2024: Consciousness 4

We discussed the last section of Anil Seth's book "Being You" - on consciousness in animals and machines.. We discussed "what it is like to be" animals or indeed the limb of an octopus. In which animals has an instinctive response become a subjective experience? We discussed language ability, and to what extent we were confounding consciousness and intelligence. We were generally agreed that flocks, ant colonies and societies can be conscious, meeting the requirement of IIT that the system carries more information than its parts. We discussed the growth of (level of) consciousness with the learning of early development. Does this and the fact that machines do not yet need a drive to survive mean that conscious AI is less likely? AI entities can look out at their environment and at the tasks they are given, but their attention to their inner state may remain limited. They have the complexity to score a high phi for the IIT theory, but will they seek states of low entropy?

12th December 2023: Consciousness 3

We discussed Anil Seth's book "Being You" through chapter 11 on free will. We re-capped that we have evolved consciousness, and the cost must be worthwhile to enhance our chances of survival. "Active Inference" says that we do not simply receive sensations: we posit a cause

and seek perceptions and try to correct any mismatch. Active Inference is the end point of a "low road" Bayesian expectation explanation and a "high road" Free Energy Principle explanation - and the maths applies thermodynamics concept such as entropy through information theory to get there. Self consciousness applies active inference to our own internal state and controls our bodies and emotions to keep us in a preferred state (alive!). We are asked how our bodies and wetware give rise to the subjective feeling of self - but feelings must be something rather than nothing. Seth does put forward the idea of a soul, though definitely not in any Cartesian dualistic sense. We have read about various measures of levels of consciousness, all of them seeking a system with some degrees of freedom between its parts yet sufficient interaction or connection between them. A community would appear to be potentially such a system. When we discussed free will we agreed it is limited by our circumstances and upbringing, and it is not easy to argue convincingly for its reality. But the community demands that we recognise free will, else we cannot hold others responsible for their actions and actions justice system becomes impossible. Seth has argued that consciousness is based in our biology. It will be interesting to see how he can make it embrace machines.

14th November 2023: Consciousness 2

We discussed a video on Sir Karl Friston's work on consciousness - an explanation by Shamil Chandria: - and Anil Seth's book "Being You" through part three on Self. The material included some maths, and maybe it would be good to go through Bayes theorem, Tonini's Phi and Froston's Free Energy sometime. On a point of definition, perception leads to cognition, not necessarily to a fact, which is validated if the negation of the proposition leads to a contradiction. Seth's argument is that perception is not a passive reception of sensory inputs, but an active seeking of validation of a cause of what we sense. He structures our perception models into a hierarchy mirroring the features we see, but it is still difficult to grasp how we know where to start our cognitive process without some sort of narrative, and this may help explain why we "don't see the gorilla" in the video. Concerning self, We have many selves, well illustrated by considering a woman deciding how to dress to go out. We discussed the teleportation problem to discuss continuity and change in our self-perception. We discussed transcendental meditation and a feeling of oneness with the world and its suggestion to some of a separate spiritual domain. The description of the structure of AI algorithms suggested that the human consciousness may be modelled if not paralleled by a machine, and we will return to this as we read through the book.

17th October 2023: Consciousness 1

We revisited consciousness. The material included a talk from the NI science festival of a year ago here and a podcast here, both featuring Anil Seth, author of "Being You." Even setting aside the hard problem of consciousness - how does a physical brain give rise to a conscious experience? - it was hard work to grasp Anil Seth's project. His "real problem" is to connect properties of neural activities to the properties of subjective experience. He emphasises subjective experience (Nagel's 'what is it like to be a…..?") and rejects not only Cartesian dualism, but also behavioural or functional explanations of consciousness, e.g. self awareness arising from reflexive cognition about cognition will not do. We did discuss perception and awareness and recognised that our perception is only a version of reality, particularly as Seth emphasises this is a two-way process as we try to predict the cause of the perception. He links consciousness very closely to "wetware": it is a brain and body property, and he doubts whether AI in a computer can achieve consciousness. We felt we should pursue his approach to consciousness at the next meeting…….

12th September 2023: Artificial Intelligence

We met to met to share our appraisals of one of the various articles we had been reading

about AI: what was the question raised? what were the arguments? did we agree with them? and how did we feel? We started by considering just how intelligent AI is now. We perceive that AI is able to perform a fast and extensive search on some question and to collate and present the answers in as a coherent piece. We thought that it would be desirable for AI to at least ask us if we wanted some alternative explanation or contrarian view on the question we had posed. We agreed that at this point AI was probably not sentient or conscious but that we needed to further explore what we meant by these terms to explore in what sense it could be (see below). We discussed power: who controls AI, and how that could harm us. We clearly saw the possibility of a war or terrorism using AI controlled weaponry. We hoped that regulation was possible on this but there are many difficulties. We noted AI is developed by technology companies to enhance their advertising revenue, and we noted the paradox that as AI replaces people in employment, the market will potentially shrink, so we will have to find new ways of distributing wealth, as well as filling the time that unemployment brings. Overall we need to educate ourselves: it is necessary to remain as far as possible as intelligent or more intelligent than AI to evaluate what it offers and to set its goals carefully and with due diligence.

13th June 2023: Future Machines

We discussed the section of Future Machines in "Future Morality" by David Edmonds. On alternative policing, we took the point that the police do stop and search black people far mare than in proportion to proportion of black people in the population, but do black people commit more crimes in proportion? Some Bayesian analysis might help - though again, do black people "commit" more crimes because the police target them and detect these crimes? In medicine, we thought that AI for diagnosis could be an advantage, overcoming our heuristic approach to data that allows us to ignore symptoms that could point to rarer diseases. We cannot conceive that AI could deliver a bad prognosis in any way comparable with a human. This supports a general conclusion that we need to use AI to complement human decision making rather than try and replace it. The driverless car raised important ethical questions, but it is hard to imagine the law and insurance companies accepting the driverless car: someone will have to be at the wheel for a long time to come - but they probably said that about the man with the red flag in front of early cars. The project that no-one should take the blame in the chapter on retribution was interesting but difficult to accept, though we did discuss the question of diminished responsibility.

16th May 2023: Plant Biology - Intelligence?

We completed the Coursera MOOC on plant biology: "What a Plant Knows" presented by Professor Daniel Chamovitz of Ben-Gurion University. This covered the plant's five senses and its capability tp remember stimuli short and long term and respond later.. We all appreciated the course and praised the subject matter, much of it quite recently discovered; the presenter, and his properly scientific approach. He certainly succeeded in persuading us that plants are complex life forms with many more similarities to animal life than we would have attributed to them. While his anthropomorphism of style was noted, we were aware of it and could agree that plants do sense their environment with the equivalent of our five senses. They respond to the environment and have both short term and long term memories all helping them to survive. The complex biological mechanisms were well explained. We are a philosophy group and it was good to move on to considering whether plants are intelligent. Chamovitz differentiated creative, analytical and practical intelligence and argued successfully that plants have practical intelligence - they process sensory inputs to respond with effective responses, at a later time where appropriate.

18th April 2023: Plant Biology - plants can see - and smell!

We discussed the five weeks of the Coursera MOOC on plant biology: "What a Plant Knows"

presented by Professor Daniel Chamovitz of Ben-Gurion University here. This covered the plant's five senses. Much of the content was science rather than philosophy of science, and we were impressed by Chamovitz' scientific approach. He explained the sensing mechanisms of plants down to structural and cell levels, making this a fairly deep course in biology. We noted particularly his emphasis on experiments designed to falsify a theory. He was therefore convincing in his arguments that plants really do sense different colours of light and different odours, etc. and respond to them. Plants also emit odours for example that "signal" information to other plants, and in this sense plants have a language and communicate with each other. Here we started to get back to philosophy, debating whether this means that plants have consciousness. It was argued that while this communication has evolved for clear advantages in survival, it is hard to detect intent. Higher consciousness involves the ability to remember and recall past experiences and make a choice, demanding a nervous system and a brain to do the processing. That said we need to explore what we mean by consciousness further, and this article from the Guardian is thought provoking: 'You can anaesthetise all plants."

14th March 2023: Plant Biology - plants can see!

We discussed the Coursera MOOC on plant biology: "What a Plant Knows" presented by Professor Daniel Chamovitz of Ben-Gurion University. - here. The course presents the biology of plants: how they "see", "smell", "feel" and know where they are. The philosophy comes in when we question the validity and relevance of this anthropomorphic narrative. We see and respond to light, that is that part of the electromagnetic spectrum sensed by the cones in our eyes. Plants don't have eyes, but they respond to light of different colours across and beyond the visible spectrum, sensing different colours with different parts of their structure and responding for example by growing towards the light or by flowering. Is this "seeing"? We also respond to light outside the visible spectrum: we feel infrared radiation as heat and ultraviolet light reddens our skin - but we don't call that "sight". What is Chamovitz's project here? It would appear to be to demonstrate that plants are not simple, inferior forms of life, but that they have evolved separately but in parallel with animals to survive in their environment, their constraint being that they are sessile - literally rooted to one spot. We should recognise this and our dependence on them.

14th February 2023: Skilled Performance and Embodied Cognition

We discussed a podcast: from ABC Australia on Skilled Performance here and Embodied Cognition [no longer available]. Essentially this idea refutes the traditional mind-body dualism going back to Descartes and Plato in favour of embodied cognition - the mind is part of the body, and all life develops by experience of its environment to find at least autonomy if not self awareness. There is no "self" separate from the body. There is something of the blank slate argument here, but we do come with genes from our parents, later supplemented by memes, and our active engagement with the world is driven by these and the properties of our bodies. Mental activity is not passively interpreting representations that come to us - we are actively seeking to respond to what is around us. This led to discussions of performance mainly in sport or music, re-visiting the puzzle we have discussed before that the brain cannot process the information fast enough to catch a ball. We can understand that this is about practice leading to the ability to anticipate and keep up with the ball or a rapid sequence of notes and then to adjust and adapt to the particular situation. We had also been drawn to the observation that while our genes define us, they only make protein. Our genes are the same in all the different cells in our bodies - it is bioelectrics that ensure our limbs and organs are in the right places. This helped us decide on the topic for our next meeting.

10th January 2023: Jim Al-Khalili's "The Joy of Science" 2

We will continued Jim Al-Khalili's "The Joy of Science" Here is a link to a presentation of the

book by the author His project is to persuade the non-scientist of the excitement of science and even more to promote the scientific method. We felt some disappointment with the book, mainly because we are scientists and understood the ideas. It was helpful to look at the pluses and deltas of the book in terms of the domains of philosophy. Ontologically he is a realist. His claim that science can give us knowledge beyond our senses looks strange, because science must come back to the observation of experiments. It is true that we can understand why the speed of light is constant, for example, but he unlike Kant he admits of no noumena beyond phenomena. He explains the logic and epistemology of science: knowledge is empirical, contingent and inductive and always open to revision as a result of experiments seeking to disprove the thesis. He demands we seek evidence and challenge conspiracy theories - but is he too quick to dismiss claims that Covid could have escaped from some laboratory? Science can contribute to ethics and aesthetics: assessing consequences, explaining psychological responses to art, but cannot ultimately tell us what is right or beautiful (though Radio 4 Front Row had an item on AI apps to help artists.

13th December 2022: Jim Al-Khalili's "The Joy of Science" 1

We discussed Jim Al Khalili's "The Joy of Science". Prompted by Covid and in response to post truth, his project is to explain the scientific method and forward it as applicable more generally to decision making and opinion forming. Science is not knowledge but a method. Its theories are subjected to tests that attempt to falsify them and the results are subject to peer review. While science seeks a simple solution, it is recognised that things may be complex, and theories must be sufficient and not over simplify. He describes various classes of mystery, partly to argue that science enhances rather than destroys our sense of wonder, and as a route into conspiracy theories, which he says are irrefutable just because those who hold them do not accept any contradictory evidence. He says science describes reality, but does not qualify this, for example allowing Kant's noumena and phenomena - science applies to the latter. His discussion of moral truths links cleverly to the scientific concept of frames of reference, but the questions seem much wider. But so far we have discussed to chapter three, and some of these points may well be resolved.

8th November 2022: Trust and scepticism in a post-truth world

We discussed podcasts from The Philosophers Zone: Trust and scepticism in a post-truth world by Mark Alfano [no longer available]. Despite traditional exhortations to find things out for ourselves, so much of our knowledge comes from what we are told - including our date of birth! Nietzsche sounded ahead of his time saying we should trust sources where we are not experts and surround ourselves with distrustful critics where we are, the same principle that underpins scientific peer review. A test question to ask of any source is what internet do they have - particularly if they stand to make money. On the other hand, we should avoid the argument ad hominem trap - even untrustworthy sources may be telling the truth, and if we distrust a source we cannot learn from it. Where possible, trust should be tested for and earned. In What can David Hume teach us? presented in a discussion with Julian Baggini Hume basically exposes the problem of inductive logic: what we call cause and effect is no more than habitually observed association of events. He also noted that reason is slave to the passions - reasons may justify our actions, but does not supply the motive.

18th October 2022: Philosophy of Cognitive Sciences 4

We discussed Week 4 of the Coursera Edinburgh University Course: Introduction to the Philosophy of the Cognitive Sciences - Embodied Cognition. The fourth and final week of the course is all about the huge differences that having an active body, and the physical and social environment make to the kind of tasks that the brain has to perform in order to support adaptive success. This was particularly brought home by the example of a robot with a passive dynamic walking machines built at Cornell University, showing the brain isn't necessary for

the basic task of walking. This plus examples of using the environment - creating eddies to enhance swimming performance, nest building, even using a pencil and paper to hold the stages of mathematical calculations show that we should not think of minds as disembodied computers in charge of meat machines, but rather as completely integrated and intermingled with our physical capacities and our interactions with the world. Conversely, this would suggest that robots will need to be designed as systems with a physicality to complement the AI power.

9th August 2022: Philosophy of Cognitive Sciences 3

We continued the Coursera MOOC from Edinburgh University. We discussed Week : Introduction to the Philosophy of the Cognitive Sciences - Intelligent Machines and the Human Brain. The two videos gave a structure for describing how our brains work: First, which task does the brain solve? Second, how does the brain solve that task? Third, why is that task important for the brain to solve? The second video developed the idea that our minds augment or modify our perceptions based on the probabilities in the situation and (re)visited Bayes Theorem. We spent more time on a YouTube video: The Mind of a Bee by Lars Chittka. He showed bees working out problems in ways we may have seen from squirrels and teaching other bees the method. He showed they can behave anxiously in appropriate circumstances. We found it hard to comprehend how they can do this with very small brains. We discussed how we might define and recognise consciousness and sentience in living things (down through plants to the cells in our bodies) and what might constitute such qualities in machines. Perhaps as the first video has it, this involves the ability to structure tasks as a hierarchy with an awareness of this and the ability to think at the different levels.

12th July 2022: Philosophy of Cognitive Sciences 2b

We continued the discussion on the second week of the Coursera MOOC from Edinburgh University on the philosophy of cognitive sciences. This was on Consciousness - “The Hard problem” Is the problem of consciousness really a “hard problem”? Is it a problem at all? We did not disagree with the conclusion of the previous meeting: we have evolved from simple organisms with direct responses to stimuli to having highly complex brains that recognise and analyse our perceptions of the world, why would we not direct them inwards on ourselves and analyse (at least experience) what is happening? We see consciousness as a spectrum correlating with brain complexity - and this is well explained by an article from the Guardian from “The Book of Minds” by Philip Ball (just published in hardback). We returned to conundrum that Buddhists believe in re-incarnation but not in a soul: all is perception in the instant. Simon Blackburn’s “The Big Questions - Philosophy” was worth revisiting. “Am I a ghost in a machine?" takes on the problems of zombies and Mary coming out of the monochrome room, and questions the idea that consciousness simply correlates with complexity and language development. His chapter on “Can Machines Think” maybe links better to our next topic, but does deal with semantics versus syntax - Searle’s Chinese Room - and the factor of intentionality in sentience.

7th June 2022: Philosophy of Cognitive Sciences 2a: Consciousness

We discussed the second week of the Coursera MOOC from Edinburgh University on the philosophy of cognitive sciences. This was on Consciousness - “The Hard problem” But is the problem of consciousness really a “hard problem”? Is it a problem at all? If we have evolved from simple organisms with direct responses to stimuli to having highly complex brains that recognise and analyse our perceptions of the world, why would we not direct them inwards on ourselves and analyse (at least experience) what is happening? We were reminded of various past meetings when we discussed consciousness. One theory that’s stuck is that consciousness emerges from the growing complexity in the brain. While it is not possible to “think like a bat”, it seems reasonable to assume that a worm plunging out of the light is acting

almost entirely instinctively, but a dog seems to know what it is doing when begging for food and enjoys being petted. Consciousness could be a spectrum? We agreed that consciousness and language development may well correlate. Philosophically it is a problem or at least an issue. Discussions of zombies are apparently about monism versus dualism. The lecture on the debate between the Hindu and the Buddhist view of consciousness and the self puts forward that the Buddhist view, despite their belief in reincarnation is that the self is merely the subject of the first person body and experiences. This seems to question whether there is a self, let alone a soul.

10th May 2022: Philosophy of Cognitive Sciences

We discussed the first week of the Coursera MOOC is from Edinburgh University on the philosophy of cognitive sciences here. This was augmented by a series of lectures on the science, the most relevant being no. 8 on object recognition. That video supported the idea that the brain is a collection of linked specialised areas dealing with different sensory inputs and tasks including feature recognition, object recognition and language. On the other hand, the brain seems capable of adapting the use of some of these areas to compensate for damage elsewhere, and the brain is also programmed by training from social interaction. Is language a necessary enabler for carrying out or transmitting complex tasks when animals hunt successfully alone and in packs by instinct? We saw that we were programmed to recognise "cheats" and discussed whether we were indeed less able to transfer the skill to other logic problems.

5th April 2022: The Reith Lectures (AI) 4

We discussed the fourth and last of the Reith lectures: how we hope to stay in control of AI here. Alan Turing in 1951 predicted we should have to expect machines to get cleverer than us and to take control. Stuart Russell attempted to dispel this fear, and following Asimov, suggested some "laws": The machine's only objective is to maximise the realisation of human preferences / The machine is initially uncertain about what those preferences are / The ultimate source of information about human preferences is human behaviour. These are rules not for the machine but for the engineers setting up the problem to be solved. We hoped but doubted that all engineers and their employers would heed these rules. We have the ability to build a better world, but we discussed the need for better education and guidance in our dealings with others - in this as well as in using increased leisure when AI takes on much work. We also agreed there is a risk that as we hand over the management of our civilisation to machines, we lose the ability to do it ourselves, and the next generation loses the incentive to learn how to do it.

8th March 2022: The Reith Lectures (AI) 3

We discussed the third of the Reith lectures on AI: AI in the Economy on BBC Sounds here. Marx held that our society and hence even the way we think depends on the economic system in which we live. AI is going to have a great impact economically, and we questioned whether we can adapt our ways of thinking, our social structures and our ethics at the same pace. Money is the measure of nearly everything right now, and wealth is power. AI is a further stage of automation, this time taking out not "working class" jobs, but eroding middle class professions in medicine and the law. If our personal wealth is a "hygiene factor" in our life, i.e a big problem if you don't have enough, but not a guarantee of happiness as you amass more, then will we be able to free more people - worldwide - from poverty: or will the rich get even richer? Many people's aspirations include independence (not being beholden to others) and a feeling we are striving to contribute something to society. Paradoxically, that contribution may well be more in the caring sector, low down in the ranking for reward at present. Our education system is focused on getting a job, and whether thetas embraced or rejected, more needs to be done to prepare us for the new opportunities AI could bring to our increased

“leisure”. It is suggested AI will not solve climate change. It certainly will not if we don’t give it that objective, and that means we have to re-evaluate our values - the demand for cars, clothes and travel. Overall there is an urgent challenge to adopt new values and goals and an education system to lead us towards them.

8th February 2022: The Reith Lectures (AI) 2

We discussed the second of the Reith lectures on AI: AI in Warfare on BBC Sounds here. We understood how AI made low cost lethal weapons that could be deployed feasible and available, and again our discussions were more about the surrounding political and ethical questions. Stuart Russell sounded quite optimistic that a ban or arms control agreement can be reached, but would that ban be ignored if a government or group found its survival fundamentally threatened? Despite the immorality of such action, it was felt that the ban could be broken. That does not negate the need for or likelihood of a treaty, because the powerful nations will not want such weapons to be readily available to less powerful regimes, terrorist groups or fanatics. Such a ban would need to be subject to inspections and reprisals, and must prohibit the use of such weapons by the strong against the weak. Enforcement of a ban would be difficult, and it was suggested a requirement for a fairer ethical approach by the powerful to the weak - otherwise they may feel they don’t have much to lose by war or terrorist action when weapons are feasible at such low cost and personal risk.

11th January 2022: The Reith Lectures (AI)

We discussed the first of the Reith lectures on AI: AI in Warfare here We discussed how much of the workings of computers we needed to know to discuss AI, but concluded these lectures were more about the surrounding philosophical / ethical questions. We also discussed whether AI computers were conscious (though Stuart Russell said this is irrelevant). We took his definition that “Machines are intelligent to the extent that their actions can be expected to achieve their objectives.” That with his statement that the goal of AI is and always has been general-purpose AI: that is, machines that can quickly learn to perform well across the full range of tasks that humans can perform, led us to consider the setting and control of those objectives. AI machines will become cleverer than us, and we don’t have a great track record of foreseeing the harm new inventions can do along with the good. How do we set good objectives? This involves questions of ethics and politics. Can we prevent machines developing the objectives we give them to their own benefit? Is there another approach to what we want from AI? Russell promises to explain this later.

16th November 2021: Subjective Time

We discussed the Coursera course "Off the Clock: The Many Faces of Time” here. This production by a team of academics considered time from the viewpoints of physics and also psychology, biology (humans, other animals, plants and even inanimate objects) and general experience Some interesting points that arose were on that while we see lightning before we hear thunder, at less than 10m we hear an event before we see it. Our experience that an outward journey seems to take longer than a return journey, and time passes more quickly as we get older were addressed. Do we study history to guide how we should see the present, and can we judge history by current standards and paradigms? The breadth and content of the course were impressive.

9th October 2021: "The Order of Time" 5

We looked at various theories of the nature of time and try to put Rovelli’s ideas in context. Shri supplied a helpful summary from The Economist ("Bye, Bye little Susy",28th August 2021). This essentially came down to a comparison of the various quantum theories of matter and fields, specifically gravity: String Theory versus Rovelli’s Quantum Loop Gravity included. This drove some of us to revisit Stephen Hawking”s “Brief History of Time” - which we both

found reasonably comprehensible this time through! He does give a good explanation of the arrows of Cosmological Time, Cosmological, Psychological and Thermodynamic. That said, we realised we were moving beyond physics into metaphysics here and had a useful recap on what we believe we know and what we don't know - and whether we or anyone ever will! We are led to believe that Aristotle was right - space and time are a reality between objects or events. Spacetime is a field and may even be a foam of volume quanta moving to manifest time. History suggests better models will emerge, but is there a limit to what we can grasp of a potentially multi-dimensional universe with the sensory and mental equipment we have evolved for millennia?

28th September 2021: "The Order of Time" 4

We discussed the last chapters (10-13) of Carlo Rovelli's "The Order of Time". Again, difficult going, though Rovelli does give a concise summary of his book in Chapter 13 pp167 - 171. We could see that space is granular - going down to quanta, and in another work Rovelli describes the quanta of space as interconnecting loops, and this structure is deformed by local masses and under relative velocity to what we perceive: Newton was wrong! Relativity, specifically the Lorenz transformation, would link time to space - it should be real and quantised in the same sense, but this seems much more difficult to understand, and to link to Rovelli's claim that our experience reflects our "blurred" knowledge of quantum states and the disorder as measured by entropy. We also debated whether time is indeed real, or just a construct of our limited senses, particularly recognising we have evolved to survive at the scale we are, not at the minuscule quantum level nor at the scale of the whole cosmos, nor even at the scale of our region, that where entropy is increasing - or where we see entropy increase.

17th August 2021: "The Order of Time" 3

We discussed chapters 7-9 of Carlo Rovelli's "The Order of Time". This was difficult going. In chapter 7, Rovelli is trying to emphasise that there is no universal "now", but each observer (or interacting entity) experiences space-time that depends on speed and local gravitational forces. Having dismissed Presentism, he rejects Eternalism and the "block universe", perhaps surprisingly, though on the grounds it implies nothing changes. He asks what really exists, then sys that there are many definitions of reality. In chapter 8 he argues that Newton's idea of a privileged variable called "time" was a wrong move, and all we need is to find variables that enable us to sequence events. He introduces his theory of loop quantum gravity to account for the quanta of space-time. Very hard to understand, but here is a link to his lecture series on this. In chapter 9 he reverses the idea that at a particular time a system's energy levels define its macroscopic state and says that a "blurred vision of the world", i.e. a macroscopic state, preserves an energy and this generates a time. He concludes by linking quantum time with the non-commutativity of quantum variables.

20th July 2021: "The Order of Time" 2

We discussed Carlo Rovelli's "The Order of Time", chapters 4-6. Chapter 4 dismantled our concept of independent time marching on regardless, drilled into us since Newton, and noted that Aristotle couldn't conceive of time without change to senses it. We were led to Einstein's explanation of time as part of the spacetime gravitational field. Chapter 5 showed time is discontinuous - quantised like anything else. We suppose if particles "jump" from one state to another with no in-between existence possible, they may well need quanta of time to make the jump. His paper on Relational Quantum Mechanics referenced under note 7 to chapter 5 looks interesting - and is explained in his latest book. Having spent five chapters explaining why we have got time all wrong, Rovelli starts in chapter 6 to tell us what time is, and proposes we see the world not as things but events, and "they do not form an orderly queue like the English, they crowd around chaotically like Italians"!

22nd June 2021: "The Order of Time" 1

We discussed the first three chapters of Carlo Rovelli's "The Order of Time". His project in the first part of the book is to show how modern physics has undermined our accepted concepts of time. At the top of a mountain, time passes faster (i.e. people who live up there get older than people in the valley (though very slightly). The twin who flies off to a distant star and returns is younger than the twin who stayed at home. Following the maths of special relativity is difficult partly because it is difficult to take in these concepts. Heat transfer is the only physical process that cannot be reversed in time: entropy within a closed system never decreases, and the "quality of heat", i.e its entropy, $S = \Delta Q / T$, always degrades. We did have problems understanding his point in saying that in Boltzmann's entropy, $S = \ln kW$, is a statistical view of the many possible configurations of the energy states of the particles in the system. He seems to say that if we could track them all, then the time dependence and therefore our idea of time would disappear. His destruction of simultaneity across space time made sense and the effect of black holes on time, though Gödel's proposal that time loops are possible is still disconcerting.

11th May 2021: Philosophy of Maths 11

We discussed Stewart Shapiro's "Thinking about Mathematics", Chapter 10 "Structuralism", perhaps supplemented by the IEP pages on Structuralism here. Structuralism is Shapiro's declared position. Structuralists don't start with numbers but at the next level up, claiming it is easier to grasp the pattern of a counting system as fundamental, so that numbers become simply the place holders in the mathematical structure. Inevitably they cannot escape the fundamental realist question: do structures exist as abstract entities or are they just identifiable in the appropriate example systems? We returned again to the general question of the existence of abstract ideas. We questioned why this issue seems to arise in the case of mathematics more than stay with logic or language or music. We appealed to Kant's ideas of noumena and phenomena in the context of sensation and experience. Is maths one of the tools we have for dealing with the phenomenal world, or does it have its own nuomenal or ideal independent form? We accept this is one of those philosophical questions we cannot answer, but the exploration has enriched our understanding of maths and its status.

13th April 2021: Philosophy of Maths 10

We discussed Stewart Shapiro's "Thinking about Mathematics", reading Chapter 9 "on Fictionalism, which denies that numbers and sets exist. Fictionalists do find maths useful though, and we discussed how a work of fiction can convey to us a meaningful message about the real world, but at the same time we fully realise that the characters in the work never existed and the situations (specific to the story) never happened. Fictionalists attack Platonists (or more generally Mathematical Realists) on the premise in their argument that maths is essential to science - which does convey truths about the real world. Their project is to provide a Nominalist explanation for a scientific theory and show that maths is just perhaps an easier route to get to the theory, but is thus not necessary - and doesn't add anything extra that couldn't be explained otherwise. Hartry Field explained gravity using space-time points, rather like Euclid did geometry without needing Descartes' translation into numbers. Charles Chihara dispensed with sets by using open sentences with attributes ("x is a cat" instead of the set of cats). Then we found that Burgess & Rosen show how each side of the debate push the burden of proof to the others, and Mark Balaguer offers both an invincible version of Platonism / Realism and an invincible version of Anti-Platonism / Nominalism. His conclusion is that there is no fact of the matter! We later found an alternative presentation of these ideas on the Internet Encyclopaedia of Philosophy

9th March 2021: Philosophy of Maths 9

We discussed Stewart Shapiro's "Thinking about Mathematics", reading Chapter 8 "Numbers Exist". We looked at Gödel's realism (as well as his incompleteness theorem, Quine's "Web of Belief", and Maddy's realism based on our ability to recognise (sense?) sets. On the maths there are links to Gödel's Incompleteness Theorem on Wikipedia and YouTube and for Cantor's Infinities and Riemann's hypothesis. We discussed how it's near necessity to science and the success of science argued for the reality of maths. The web of belief provides a good metaphor for empiricism, and also gives an alternative to a priori knowledge. We discussed the parallels between the problem of reality for maths compared with that for colour: there is no such thing as colour before biological life; and if colour is part of our evolution to detect predators and prey, then doesn't the recognition of sets of predators complement that? We agreed the question needs looking at from many viewpoints: will the next chapter modify our perceptions?

9th February 2021: Philosophy of Maths 8

We discussed Stewart Shapiro's "Thinking about Mathematics", reading Chapter 7 on Intuitionism: Brouwer, Heyting and Dummett. Intuitionism sides with Kant as opposed to Plato: numbers do not exist independently of the human mind. Kant held that numbers are part of our synthetic a priori way of making sense of the phenomenal world. As with geometry, we construct maths.Brouwer pursued this analogy: as geometry is to space, numbers are to time, thus explaining the discrete progression of numbers and the continuous. Because we construct maths, demonstration and proof are more appropriate concepts than truth. This leads to a problem with classical logic's "undivided middle": Either A or Not A must be true. Intuitive logic brings in the issue that the negation of "There is a proof that A" could be "There is a proof that Not A", or "there is not a proof that A". So the undivided middle - and "proofs" that rely on it - are invalid. Heyting requires the proof or demonstration to be constructed. Dummett relates logic to meaning, and this to manifestation, i.e. use of the knowledge demonstrated. Helpful videos were found for "does maths exist?" and Intuitionist Logic (Excluded Middle)

12th January 2021: Philosophy of Maths 7 - Logicism

The Logicism of Frege and Russell ran into the sand trying to make numbers some logically definable entity, so the Formalist approach takes numbers to be just symbols with no meaning outside mathematics, and the rules that govern their manipulation as similar to the definition of moves of chess pieces. Hilbert took the basic approaches of Term_ and Game Formalism through Deductivism, aiming to show that for any branch of mathematics, the rules are logical and consistent. This leads on to the project of removing the role of intuition in geometry, and further, to "meta-mathematics", studying the formal languages of mathematics themselves. Back in arithmetic, Finitism restricts arithmetic to finite numbers only, avoiding the problem of seeking an example falsifying a theorem when the list of numbers is endless. Then any other arithmetic is just a theory, but it must work in the finite mode. Further, rules can themselves be enumerated and listed and analysed by a (reminiscent of Turing) computer. Then Gödel came up with his Incompleteness theorem and showed that the Deductivist project must fail - it is not possible to show the consistency of any system within itself. A proof sketch of the (first) theorem may be found here . Curry later proposed that various branches of mathematics emerge, and as they develop they become more rigorous and our confidence increases, enabling further progress.

8th December 2020: Philosophy of Maths 6

We discussed Part 3 of Stewart Shapiro's "Thinking about Mathematics", reading Chapter 5 on Logicism: Frege, Russell, Carnap and Logical Positivism. The project of Logicism was to define numbers and derive mathematics from logical principles, thus showing Maths to be analytic without Kant's claim for intuitive a priori synthetic knowledge. We had read Frege's

argument, helped by a video from the University of Chicago [no longer available]. The trick is to avoid including any idea within its definition, and we discussed how Russell's library catalogue paradox concerning sets that were not members of themselves de-railed Frege's analysis. We also discussed Russell's own approach wherein he differentiated types of classes from each other and from objects, but he still had to postulate infinity (and the set of all sets cannot exist) and that classes could be reduced to objects. Spoiler alert - we know Goedel showed the impossibility of the stated Logicism project. We liked the pragmatism of Carnap's "tolerance": from a set of (presumably viable) rules, maths can be shown to be a priori if it can be derived logically from these definitions. But any claim by a logical positivist that cannot be verified is deemed therefore meaningless, and it is noted that any explanation of a theorem beyond its simple statement seems to require ideas beyond the basic axioms.

17th November 2020: Philosophy of Maths 5

We discussed the second part of Stewart Shapiro's "Thinking about Mathematics". This covered the ontology and epistemology of numbers and geometric shapes: do they really exist and how do we know about them? He gives the views of four philosophers: Plato, Aristotle, Kant and Mill. Plato said they were real: in the realm of being just below his ideal forms, but not in the practical world of becoming. Aristotle and Mill later said we know them by familiarity and Mill said we get to maths the same way as all knowledge - by extended induction. We discussed Kant's view that we know them "synthetically a priori". and that they are like space, time and causation part of our built in equipment for looking at the world. We explored why maths is "magic" and deserves all this study beyond other languages we use. Both involve abstraction, but whereas "cat" without any qualification includes all possible cats, numbers are very specifically about quantity and geometry about shape. We recognised that while the theorems of maths are eternal - once discovered - but maths does proceed in response to the scientific questions a society is asking at the time.

20th October 2020: Philosophy of Maths 4

We discussed the first part of Stewart Shapiro's "Thinking about Mathematics". We found this hard going, even realising this was just to set out the question and the project that a philosophy of maths should address. The first issues to be addressed are what are numbers (ontology) and how do we get knowledge of them (epistemology), and it turns out that explanations that address one part of the question run into problems in the other. Are numbers real, perhaps not as Plato certainly thought but as "abstract objects" not occupying time or space or causing anything in the physical world? ** If so, how do we know anything about them? If they are memes which are learnt (empirically) or understood innately (a priori)? then how do you get to a number from lots of examples of that number of things? It has been shown that as well as logic you need set theory - but with sets we are back to abstract nouns and an infinite number of sets. Logic itself is undermined if numbers don't really exist as abstract objects. We can show that a proposition about a real object is either true or false: "all stags are male". But "all unicorns are pink" is different: as Russell said with " The King of France is (/ is not) bald". Impredicative propositions are another problem - is "the least upper bound" equivalent to "the village idiot"? Is maths just a special language, with syntax and semantics? Given that maths pragmatically "works" and seems fundamentally rather than contingently true, and that mathematicians got where they are today without philosophy, is the problem to underpin mathematics and say how it should be done, or to describe what mathematicians do? ** Is "love" real? An abstract object or a meme (/gene?) we take in with our mothers' milk?

15th September 2020: Philosophy of Maths 3

We read the remainder of "Mathematics A Very Short Introduction" by Timothy Gowers , plus his paper Does mathematics need a philosophy here. We reviewed the mathematical concepts

the book, looking at multi-dimensional space and hyperbolic geometry. Having clarified these ideas, we noted he included them to show how maths is about abstracting ideas and building coherent structures from a minimal set of axioms. So multi-dimensional space shows we can progress from numbers to ordered pairs and on to n-tuples and the linking idea is distance between points in the Pythagorean sense. Spherical and hyperbolic geometry result when the axiom of plane geometry that parallel lines never meet is modified. This led to a discussion contrasting the idea of abstraction with the need to visualise mathematical ideas, and thence to the link with the physical world and the interplay of maths and science: Stephen Hawking in "A brief history of time" notes that string theory requires that space-time really has ten or twenty six dimensions! So do numbers exist, as Platonists would argue, or are they just concepts in a language, having some public meaning Wittgenstein held?

11th August: Philosophy of Maths 2: Models, Abstraction, Profs, Infinity

We discussed the first four chapters of "Mathematics A Very Short Introduction" by Timothy Gowers. From the points he was making we examined real as opposed to rational numbers. We tried to understand them beyond their approximate values, and this led to a discussion of the concept of infinite and how infinities could be different sizes. A good question was why there is such an emphasis on proofs. This is because all of mathematics is built on axioms which are assumed to be true, and any theorem has to link back logically to a minimal set of axioms and no further assumption. So rather than saying a mathematical theorem / statement / construction is "true" rather say it is proven - it does depend on nothing more than the axioms. This axioms are purportedly self evident, but it is more important that they are consistent than that they are true. Gowers is keen to present mathematics as an abstraction: it abstracts a model of the essence of a problem, but also he asks us to go with the abstract and just follow the rules. He is dismissive of philosophy, holding that maths is what it does - he refers to the later Wittgenstein here, and we concluded that maths is a structure, like architecture, and a form of language - like language itself and music. We wonder that maths seems to reveal so much of the observed physical world, but then language and music are also composed of simple elements, yet they can convey deep truths or feelings.

14th July 2020: Philosophy of Maths 1: Scope

We had read six chapters of 50 Maths Ideas you really need to know. This was to level up, and those present were happy to go through the book in due course and raise and discuss any concepts we found difficult. We also considered Timothy Gowers' Mathematics a very short introduction. His approach is rather hostile to philosophers "who take seriously the question of whether numbers exist, and this distinguished them from mathematicians, who either find it obvious that numbers exist or do not understand what is being asked." He takes a functional approach, explaining how maths proves useful in modelling the world. is Michael Frayn's approach in his philosophical work The Human Touch is both helpful and entertaining. His thoughts led us to see Maths as one of the modes we have of communicating - an alternative to language, art and music, each being more appropriate to different situations. That said, we are left to puzzle how it is that mathematical ideas developed as abstractions later turn out to be really insightful models of physical, chemical even economic and social phenomena.

May 2020 In the time of Coronavirus! - The Case Against Reality

We discussed the IAI course, "The Case Against Reality" by Donald Hoffman here. "Is reality how it appears? Or nothing like it seems? Professor of Cognitive Science and author of the forthcoming "The Case Against" Some challenging concepts to get to grips with, as our responses brought out. He does seem to cross the boundary drawn by Kant between things as we sense and interpret them and "things as they are". Science is a disciplined approach to the former and cannot penetrate the latter - thought metaphysics of contemporary science does tempt us to guess what's beyond the curtain

10th March 2020 Consciousness

We discussed David Dennett's lecture to Google on Evolution here and "Unintelligent Design", Paola Arlotta on Brain Development here and related materials on consciousness in the BBC Science Focus Magazine. After we had acknowledged the Corona Virus situation (is it Gaia self regulating the ecosystem?), we explored Dennett's exposition of evolution and it's timescale and mechanics, and his contrasting them with the development of human culture and targeted design. He took the discussion on into the "post intelligent design" of AI and some of its ethical implications - a good development and extension of our reading of Dawkins. Paola Arlotta's amazing description of the time taken for the human brain to grow and its adaptability informed our discussion of consciousness. We looked at theories of consciousness, some concerned with how it relates to brain structure and / or activity, some debating whether it is an emergent property, even an illusion, but we noted the Attention Schema theory, the brain modelling the outside world and its own internal states.

11th February 2020 Richard Dawkins, "The Selfish Gene" Chapters 12-13

We discussed the last two chapters (12, 13) of "The Selfish Gene" by Richard Dawkins. Chapter 12 discussed game theory, specifically "The Prisoners' Dilemma", but as a repeated game with no known last round. The point was to show that altruism, or at least "kind" strategies were more profitable than cheating strategies and could form a (quasi) environmentally stable strategy (ESS). The last chapter is an introduction to his later book "The Extended Phenotype", probably worth noting for further reading. The extension he addresses is the reach of the gene beyond its host - e.g. a beaver's dam. He also discusses "bottleneck" organisms: for example we might contrast plant propagation by root division or cuttings with growing from seed. The latter gives life an opportunity to go "back to the drawing board" to face the current environment. We feel we have learnt about the mechanisms of genes and there may be lessons for us ethically if we understand some of the underlying forces that drive us, though we are still struggling with the insistent consciousness fallacy of the "selfish gene" metaphor

14th January 2020 Richard Dawkins, "The Selfish Gene" Chapters 10-11

We discussed the next two chapters (10, 11) of "The Selfish Gene" by Richard Dawkins. Our discussion was wide-ranging, and to summarise it is simpler to start with the discussion of memes. Dawkins refutes the theory that we studied at length a while back, that religion has arisen to bind societies together. He is an atheist and is determined to refute group selection as a theory. It does seem clear that while memes inhabit individual minds, they do "belong" to groups, tribes and organisations and contribute strongly to their identity. We discussed how to differentiate the effects of genes and memes on behaviour: what is instinctive and what is learned? Perhaps a meme can exist only where there is a mind capable of some level of imagination or foresight - though this does not limit memes to humanity. The chapter on herds and parasites, and the discussion of reciprocal altruism and environmentally stable strategies accommodating cheats and freeloaders led us to examples in human social behaviour, via litter to climate change - taking in Lovelock's theories and the wide effects humanity is having despite its low weight in the earth's biomass and our short existence in the time-span of life on earth - and as far as democracy and whether our form of democracy is capable of addressing the challenge.

17th December 2019 Philosophy of Science - Richard Dawkins, "The Selfish Gene" Chapters 7-9

We will read three more chapters of "The Selfish Gene": chapter 7 Family Planning, asks how brood sizes come about, chapter 8 is "Battle of the Generations" and chapter 9 "Battle of the Sexes". We again agreed that it is very easy to understand "the selfish gene" too literally as a

scheming, conscious entity. We re-affirmed it is just a metaphor: genes are propagated through reproduction, and those individuals best fitted to meet the challenges of their environment out-survive those less well endowed, so those genes that give advantage are propagated in greater numbers. We then discussed interaction between genes and the environment, where the environmental conditions trigger an otherwise dormant gene behaviour. From the text we focused on Dawkins' observation that in humans it is the males rather than the females who are drab. Does this really mean that in contrast with other species women compete for men? We did recognise that power is an aphrodisiac: perhaps we are not so different from Walruses or lions where the powerful males dominate? We wondered whether there were more matriarchal societies before agriculture was developed, and this then of course led to higher sophistication in human society. From there we moved to the challenges of climate change and over-population and whether mankind would be able to think its way through these problems - and what would be left if it doesn't?

12th November 2019 Philosophy of Science - Richard Dawkins, "The Selfish Gene" Chapters 4-6

We discussed three more chapters of "The Selfish Gene" by Richard Dawkins. Chapter 4 deals with how genes influence their "hosts", chapter 5 explores aggression and how behaviours can coexist stably in a population, and chapter 6 does the maths of altruism and survival of the gene. We reviewed all of the book and noted that Dawkins is an academic with a theory to promote and he anticipates and addresses objections to his argument. We also found it very simple to forget that "the selfish gene" is not a conscious "ghost in the machine", but a metaphor for the idea that successful genes survive many generations of their hosts and their success breeds success. That said, the idea that we are mere temporary vehicles for genes contrasts with our emphasis on the individual. We discussed the idea that genes "programme" our brains and our behaviour, conscious or instinctive. We explored this in the example of once carnivorous pandas responding to the lack of food in the ice age and adapting to eat bamboo. We noted we carry many dormant genes and wondered if these were called Back into play in this evolution. We looked at the idea of an evolutionary stable strategy and the levels of kinship based on the fraction of shared genes between individuals.

8th October 2019 Philosophy of Science - Richard Dawkins, "The Selfish Gene" Chapters 1-3

We started "The Selfish Gene" by Richard Dawkins. We discussed the first three chapters, which gave us some introduction - setting out his project to show that evolution is best looked at as selection at the lowest level - and a lot of science. He traces life back to the formation of replicators - molecules that can copy themselves, and these have become genes. He then places genes between chromosomes and their constituent cistrons, which are themselves strings of nucleotide letters which are the instructions for making a specific protein. Chromosomes are copied (mitosis) every time a cell divides, so every cell can have its copy, and the formation of egg or sperm cells by meiosis, a crossing over of genes between the maternal and paternal given chromosomes explains the gene pool. We felt we need more detail on these processes - how do the chromosomes make copies? Stay the right length? Given these processes, why does he emphasise the gene level and not look further at the proteins enabling them? A problem with his title is to remember that "the selfish gene" isn't actually conscious, but he is presenting a metaphor that describes the outcome of evolution. Philosophically, we see the ontological demolition of the idea that we are the pinnacle of creation: we are throwaway survival machines - the product of the interaction of the most successful genes with their environment. He will argue that genes influence our behaviour, so that we can see whether they support or conflict with desirable ethical responses.

10th September 2019 Philosophy of Science - the Basics (17) - Special

Relativity & Phenomenology

We discussed Chapter 49, Special Relativity. While it is easy to accept that you can't tell how fast you are travelling without looking at something external, it is difficult to conceive that it is the velocity of light that is fundamental and that space and time in a moving frame of reference shrink and slow down to fit. It is hard to understand relativity without going through the maths, and it is tough going, but for example Richard Feynman's "Six Not So Easy Pieces" is a good guide. At another level, working through Maxwells equations with vector calculus leads to the wave equation for electromagnetic waves and relates the velocity of light to the fundamental constants of electrical permittivity and magnetic permeability. So we can understand the consternation caused: if the speed of light were not constant, then electrical & magnetic effects would change with velocity. We also discussed Chapter 50, Phenomenology, and linking this to relativity, we explored the idea that we cannot stand outside when we observe the universe - we are part of it and need to understand that it is from within that we experience sensations and even space and time. Michael Frayn's "The Human Touch (Our Part in the Creation of The Universe)" is an exploration of these ideas.

13th August 2019 Philosophy of Science - the Basics (16) - Indeterminacy

We discussed Chapter 47 Indeterminacy, essentially about Quantum Theory, Schrodinger's Cat and the Copenhagen Explanation, and the problem of the apparent randomness of the universe. We discussed several ideas of quantum theory, particle wave duality, starting with photons and moving to electrons and all particles. We mentioned Heisenberg's uncertainty principle and the interaction of the observer in determining the state being measured - and that someone or some thing needs to act on the system for the indeterminacy of its state to be resolved. We mentioned chemistry, the periodic table and electron shells, and talked about Schrodinger's Wave equation, noting it was about probabilities rather than waves. We felt that it was probably OK that God appeared to play dice, and accepted that we are not built on the small scale of elementary particles, so that our descriptions even of the phenomena must be in metaphors, and the "really real" is forever unattainable. We did accept that mathematics, given the skills in that discipline, could enable us to describe what was happening and appreciated the pragmatic understanding that has informed useful predictions and applications.

16th July 2019 Philosophy of Science - the Basics (15) - Non-Euclidean Space and Kant,

Continuing "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell, we discussed Chapter 46 Non-Euclidean Geometry. Spherical geometry is not too difficult once you realise that a straight line, being the shortest distance between two points, is a great circle, but we watched a YouTube video where the presenter explained that the angles of spherical geometry triangles add up to more than 180° whereas for hyperbolic geometry triangles they add up to less than 180°, and showed us how to crochet hyperbolic geometry! We also discussed Einstein's explanation of gravity as the deformation of the geometry of space - where a mattress or rubber sheet provides a good model! We moved on to Chapter 48 Kant's response to Hume's scepticism that there could be any justification of our belief in cause and effect. Kant replaced a priori and a posteriori classifications of knowledge with the subtly different classes of analytical and synthetic metaphysical truths. Analytical truths depend on the meanings of the terms involved, for example "red is a colour". Synthetic truths depend on experience: "a flame is hot". However the proposition that "Effects have causes" is not (totally?) carried in the definitions of cause and effect, but its truth transcends being synthetic as a way we make sense of the world. Difficult concepts, but we could follow that we can only comprehend a phenomenal view of the world - that which our senses and minds allow us to perceive - and we cannot go beyond that to know what is "really real". After the

meeting this YouTube presentation was found here

21st May 2019 Philosophy of Science - the Basics (14) - Incompleteness, Epistemological Anarchism and Supervenience,

We discussed Chapters 43-45, Incompleteness, Epistemological Anarchism and Supervenience. We took on the technicalities of Gödel's Theorems with the help of videos by Marcus de Sautoy and by Cory Chang. We learnt that any mathematical system that is sufficiently expressive (i.e. useful) must be either incomplete (needs axioms), or (worse) inconsistent - and you can't tell which. If this applies to carefully defined mathematical systems, what chance has any conceptual framework got? Our discussions took in Bertrand Russell's problem in writing Principia Mathematica - essentially the library catalogue problem. We discussed supervenience, mostly through thinking about mind and consciousness supervening on neural activity in the brain and weather patterns arising from the interaction of the molecules of the atmosphere. We watched a Wikipedia audio article to get to grips with Feyerabend's assertion that the rational approach claimed by science conceals a number of approaches making it in fact much closer to myth and religion. However, his form of cultural relativism is not "anything goes", but an attempt to get an alternative understanding.

9th April 2019 Philosophy of Science - the Basics (13) - Science & Gender

We discussed Chapter 42, Science & Gender, straying a little onto Chapter 42, Epistemological Anarchism. Our discussion stressed the difference between sex and gender, the latter being a social construct. We were in broad agreement that women have been less prominent, indeed discriminated against largely through social pressure. The chapter did also suggest that science was subject to and served "male domination". We picked up on the economic exploitation of nature, and also noted that drug dosages are based on tests on a predominantly male sample groups, and air bags are reportedly designed to protect the male body and so may even endanger some females. This lead to our considerations of the interaction of the instincts of the sexes with societal attitudes and scientific endeavours. The variation in abilities and in masculine and feminine perceived qualities within the groups was seen to far outweigh the difference between males and females, though it was suggested that women may be in fact more fitted to science than men through their greater diligence through education, their biological need to care and their socialising skills in groups - though these hypotheses maybe just represent today's constructs of femininity.

12th March 2019 Philosophy of Science - the Basics (12)

Continuing "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell, we started with Chapter 39, Reduction. All disciplines seek unifying principles, and these set aside the particular aspects in favour of common ground. Reductionism between disciplines - usually reduction to physics - makes a point, but there is no conflict with other disciplines - it depends on the focus: don't go down to the chemistry and physics when studying digestion, even though the reduction informs us about the reactions. In chapter 40 Underdetermination we examined the apparent conflict between the wave and particle theories of light. We recognise that we are just not built on the same scale as the atom, nor the whole universe: our sensory systems are not appropriate on these scales, and many of our theories are metaphorical. In another example, the analogy of water pressure and flow to electricity is helpful but limited: electricity doesn't leak out of the socket! This perhaps contributes to the postmodernist critique of science as merely a particular social and linguistic construct. But in denying the claim of science to explain reality, aren't postmodernists putting the cart before the horse? Language and society are themselves evolutionary adaptations to cope with reality - but scientists would say that wouldn't they?

12th February 2019 Philosophy of Science - the Basics (11)

We continued with Philosophy of Science, based on "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell. We started with Chapter 36, Natural Kinds. This in a way made a gentle lead into Anti-Realism, the question being whether our taxonomies are just useful or do they reflect the “really real” nature of things? We did consider taxonomy necessary - some order is needed to thoughts - and felt that classification is pragmatic, and depends on the purpose of the classification. We discussed whether Darwinian theory and genetics justified and modified earlier classifications - and then whether - since genetics doesn’t yet simply map or guide our classifications, is that just a "Research Programme” (Chapter 37) currently running? To understand that concept we considered earlier foundations of science: the Aristotelian model of the motion of the stars and planets, and Newtonian versus Einsteinian Space-Time. Again, this transitioned into a discussion of Anti-Realism. We were comfortable that Science is pragmatic, and gives useful answers. It was easy to see that we are programmed by Genes and Memes to think the way we do with the present world-view and zeitgeist. We re-visited theories of truth: correspondence, (briefly) coherence, and the deflationary approach. Leaving room to doubt and alternative explanations seems essential to good science, but one approach is not necessarily as good as another, and denying the ”truth” of science gives too easy a get-out to those who deny climate change for example. Science may not show us the "really real” - we are not privileged to know: but surely there is a correlation?

8th January 2019 Philosophy of Science - the Basics (11)

We continued with "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell. We started with Chapter 34, Paradigm Shifts, and once again found it impossible to avoid linking this to Brexit and the social media politicking of the Leave campaign. We also found it exemplified in nutritional science: the reversal of the idea that we should be eating carbohydrates (never sugars of course!). We discussed Kuhn’s further assertion that different paradigms are incommensurable (Newtonian and Einsteinian mass) and it is therefore impossible to make a rational choice - thence even that change is not necessarily progress, but he later retracted that. We also noted that research funding follows the paradigm, reinforcing Kuhn’s point that normal science works within and supports the paradigm. We also discussed Chapter 35, Phenomenalism. the epistemological take on Berkeley’s ontological stance that all really is just perception. So does science tell us about the real world? Or are sub-atomic particles (or anything postulated that can be detected rather than observed) just convenient narratives that explain observable phenomena? It is easy to find past examples of false paradigms - phlogiston, the wave theory of light - but by the “no miracles” argument, can a theory that explains and predicts many phenomena not be really real?

11th December 2018 Philosophy of Science - the Basics (10)

We had read about Chaos - Chapter 33 of "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell and found it impossible to avoid linking this to the current political scene around Brexit. That said we had been pointed to a sequence of YouTube videos on Chaos by Jos Leys, Étienne Ghys and Aurélien Alvarez, Their website has summaries of each chapter. This material goes through ideas of determinism, Newton's laws and the key concept of chaos theory that very small changes in the initial conditions - that is the position and velocity of each body in a system - can have an entirely disproportionate effect on the future behaviour of the system. Sometimes the system is unstable or breaks down: stop the moon and let it restart with zero velocity and it will fall to earth: give it a higher velocity than before and it would fly off into space. However some systems settle into a statistical pattern of behaviour: the weather model shows consistent probabilities of hurricanes, heat waves and freezes, even if the order in which they occur is in unpredictable. It was interesting that while

a butterfly may cause a hurricane, it may also prevent one. Very watchable and artistic videos.

16th October 2018 Philosophy of Science - the Basics (9)

We actually spent the first part of the meeting discussing grief and grieving, following the recent death of a U3A member. We then discussed Chapter 30 of "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell - Gaia Theory, which holds that the earth is a homeostatic system - exemplified by the Daisyworld parable explaining how black and white daisies thrive and decline in response to temperature, and thereby regulate the temperature of their world. We questioned whether the theory was a cause of the environment in our world, or just an outcome, in the same way that the values of fundamental physical constants have to be just right for us to exist to ask the question. We also noted that it is feasible that perturbations like global warming could pull the climate beyond the operating region of homeostasis. We successfully argued that Gaia theory is not necessarily teleological, in the same way that the “selfish” gene is just a metaphor for the way the gene appears to have a purpose, whereas genes just replicate, sometimes with errors that then sometimes their “carrier” organisms fare better in the environment than their progenitors. A parallel is Adam Smith’s theory that the economy is regulated by the forces of each participant’s self-interest.

18th September 2018 Philosophy of Science - the Basics (7)

We continued with Philosophy of Science, based on "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell. We focused on Ch 28 on Artificial Intelligence and most of us watched some BBC4 programmes broadcast on 4 September: the Joy of AI andThe Horizon Guide to AI. We also listened to Jonathan Sacks on Radio 4 on Morality in the 21st Century on AI. We discussed the effect of AI on jobs, and -as Marx said - noted that economics strongly influences the way we think, and we will have to define ourselves in other ways than the job we do. We discussed the current workings of AI: it “thinks” very differently from us (as shown by the way it mistook a dog for a trombone when a few pixels in the image were doctored. Searle’s Chinese Room is a good analogy here. However, if we accept that Moore’s law that computing power doubles every year will continue, there will be further advances. This led us to discuss when robots or perhaps robots with biological parts will become moral objects - as "bionic men" (thinking the paraplegic who “willed” his mechanical arm to move) are now. We were far from sure that robots would not harm humans (pace Asimov!), and whether they will leave us behind in intelligence and consciousness, but were on balance optimistic that they could improve the lives of all.

21st August 2018 Philosophy of Science - the Basics (6)

We continued with Philosophy of Science, based on "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell. We focused on Ch 23 on Science & Utopia, but addressed Abduction and aspects of Science and God and Metaphysics during discussions. We agreed that - as asserted in the discussion between Stephen Fry and Steven Pinker - science, as a component of the enlightenment, has transformed our relationship with our environment and given us enormous improvements in our health, life expectancy and wealth. But are we riding a tiger? Marx said that economics determine our social structures and the way we think - but are we able to keep ahead of the side issues of technology and properly understand where it can and cannot be applied? Darwin’s "survival of the fittest” led down the now discredited path of eugenics, and we still face the issues of when to use gene therapy, and indeed whether and how we should try to control world population growth. Global warming would seem to need a global political solution, but we are still organised on the basis of nation states with their own interests. We know we don’t naturally make decisions based on reason. Science has changed metaphysics, but there may well be a case for some form of religion, humanism or not, to foster the altruism necessary for a wider view of our interests as we address such problems - which will of course need yet more scientific advances for their solution.

19th July 2018 Philosophy of Science - the Basics (5)

We addressed Ch 21 on Positivism and Ch 22 on Vitalism. Logical Positivism declared any statement that could not be verified by experience meaningless. While Karl Popper refuted logical positivism by pointing out that it failed to meet its own criterion, he used the underlying idea in his definition of (good) science: any scientific theory must withstand experiments that might show it to be false. Logical positivism was itself proposed in response to the less rational ideas of Hegel (and then Nietzsche) and Heidegger (and the existentialists). We discussed the relationship between science and rationality and these other world views. Science is able to demonstrate cause and effect (or at any rate correlation), so, as we saw in our studies of religion, it can suggest the underlying drivers to religion, the biological and cultural forces that may lie behind Hume's "passions" that drive our morality, and the qualities of art and music that trigger aesthetic appreciation. We did not imagine science gave the complete answer, and certainly at this point in time, we need holistic minds and souls complete with aesthetics, music and passions - tempered by science - to live life as best we can. During the discussion we debated whether the more statistical outcomes of science, where predictions cannot be made about an individual case weakened its force. Another aspect of complexity led to our discussion of Vitalism, a concept perhaps strengthened by Hegel's Will and Darwin's struggle to survive. Is it now just a historical stance, or does the metaphor of a spirit contribute to our wisdom as do other forms of fiction and myth?

5th June 2018 Philosophy of Science - the Basics (4)

We need to verify that the "Rayfish" in the paper we read really is fake news (very convincing, clearly!) and then we spent the whole session almost entirely on Chapter 20 of Southwell - Science and Ethics. We differentiated the discipline of science from its application. We noted that science has to be funded, and debated whether basic research, usually government backed, could really be "pure". Much science is carried out for sponsors, and the sponsors' interests can lead to a "sub-optimal" exploitation of scientific research which can be harmful to another perhaps wider organisation - the state or the ecology of the planet. We noted that the longer term effects of scientific developments were very difficult - sometimes impossible - to predict, but it was proposed that society - including, perhaps particularly the scientists working in the field - should take responsibility for exploring possible consequences of their work. At least being able to justify what was considered and decided on at a later date would be a defence in the spirit of Hannah Arendt's "Banality of Evil". This and the example of armaments development (specifically nuclear weapons) led to a discussion of the dependence of such arguments on the current social construct - and the difficulty of judging the actions of different eras (past or future) in the light of present day attitudes.,

8th May 2018 Philosophy of Science - the Basics (3)

We had previously considered Newton, but could add his view on God, according to Karen Armstrong, as the designer and driving force behind his mechanical universe. We all found Chapter 19 on Berkeley's Idealism challenging. We first discussed Locke's primary and secondary qualities - such as when a tree falls in the forest with no-one there, does it make a sound? This led to distinguishing physically measurable quantities from sense perceptions. That covered, Berkeley was saying that Locke's "material substrate" that carried these qualities was, by Occam's Razor, an unnecessary entity, and all we had were the perceptions, which he said were maintained by God. It is difficult to disprove that we could be just a brain in a vat, or an avatar in a computer game, though we noted Russell's argument that just because an idea of an object requires a mind to hold it, that does not mean that the existence of the objects themselves depends on the mind. We pursued the ideas of materialism to the sub-atomic. While evidence for the Higgs Boson is indirect, we understood that the theory is a logical extension of the models that have been demonstrated, and therefore there is at least a

coherent argument that it represents reality. We started to discuss science and ethics: Einstein's regret that he encouraged atomic weapons development. Science provides good outcomes - and bad ones, sometimes unforeseen. We will continue this thread next month.

10th April 2018 Philosophy of Science - the Basics (2)

We noted that the world seems to behave in ways which can be described mathematically, and discussed maths as a variety of language, but with axioms. W e discussed experiment, observation and induction and its problems. We noted and admired Bacon's Eliminative Induction and Newton's rules for reasoning and his approach to science as explaining and predicting phenomena without offering a theoretical explanation that could not be tested. We saw how it takes a lot of effort to get down to basic principles and explanations - e.g. gravity waves, and we considered how highly theoretical models such as string theory fit this approach. Through Newton and Descartes we could see how the ideas of mechanism arose and how Laplace could see the possibility that his daemon could predict the progress and outcomes of a materialistic, deterministic universe. Descartes had maintained Dualism, and, having discussed Ockham's Razor we discussed whether Mind is an unnecessary concept beyond being an emergent property of a physical brain. But this discussion will recur when we get to Supervenience and Reductionism.

20th March 2018 Philosophy of Science - the Basics (1)

We had decided to revisit the basics of Philosophy of Science, based on "50 Philosophy of Science Ideas you really need to know" by Gareth Southwell. We had read the first ten chapters. We quickly tabled and discussed several questions covering most of those chapters. We appreciated the efforts of the pre-Socratics seeking the underlying nature of the world. We generally recognised there is a real world, though we could appreciate Berkeley's position that we only know sensations and Plato's that we need senses to try to ensure these sensations do not deceive us. We discussed knowledge as true, justified belief, and what that meant, and considered pragmatic truth relevant to science: while a scientific theory explains and predicts usefully, it is true. We recognised science explains how but not why. Science demands demonstration and looks for first principles. We talked about first causes. It was remarked that it is a weak argument for God to say he fills the gaps in our knowledge. We discussed a priori truths and the need for axioms, and deductive versus the inductive logic of science and its problem. We did appreciate the organised observation and eliminative induction of Francis Bacon. We may claim to have covered the first six chapters, though with more to say on the maths of chapter 5.

13th February 2018 Health Care Provision

We discussed the provision of health and social care. We wanted to focus on the philosophical issues rather than politics and economics, but the Kings Fund website provided a comprehensive comparison of the percentage of GDP various (richer) countries spend on health- and social care, and how it is paid for - free, through insurance or per use The World Health Organisation addresses healthcare as a human right, and we noted that it must indeed follow that the state is legally obliged to provide healthcare: rights which are not legally enshrined are "nonsense on stilts" or at least just being advocated as rights. The WHO call for "maximum available resources" to be applied to healthcare sets no figure, and the NICE guidance on Social Value Judgements has to be more specific albeit for one particular state. But while NICE gives a band of acceptable cost of intervention per QALY effect, it proposes a balance between this utilitarian approach and the egalitarian approach, but with a requirement for an open, transparent justification. Positive and negative freedom for the patient and the taxpayer have to be balanced, but treatment is generally not withheld from those who might be judged to contribute to their own issues.

10th January 2018 Bio-Ethics: GM Food - continued

We continued discussing GM crops. We set out to think of arguments - hopefully for and against GM crops - from various ethical frameworks. First we looked at moral systems shown as a matrix of Principles versus Actions and Consequences. Divine Command theory tends to be against GM crops, because they interfere with the essence and teleology of life forms (natural law), but one could invoke the divine command to feed the hungry. In a societal context, a big issue is the power of the big corporations controlling the supply of GM seeds, while recognising that it takes big investments which require returns. It was questioned whether we need GM crops when we have not worked on reducing food waste, and it was noted that the key driver of sustainability - which was stated as "giving future generations options" - is population limitation. It was proposed that a utilitarianism view seemed to fit the problem of satisfying conflicting demands on the macro level - such as the trade off between feeding people and protecting farmers from pesticides versus potential health and environmental risks of GM foods (particularly those applicable to western societies), though it was accepted that the "equations" are difficult to set out, particularly when the risks are unknown.

19th December 2017 Bio-Ethics: GM Food

We met to discuss Bio-ethics starting with GM crops. There was lot of preparatory material and we spent part of the meeting assessing and responding to it. Ethical theories in the first three of Marianne Talbot's podcasts were familiar to some, but not all of us. They do provide different approaches to bio-ethics, and differences of opinion may arise from applying different frameworks. The references on genetically modified food and gene transfer were helpful and instructive - but the responses and comments were so angry and irrational, and we discussed why that might be so, which led to a discussion of type 1 & type 2 thinking. This linked well to Marianne Talbot's three later podcasts on common moral arguments against bio-ethics initiatives, which argue the need for a rational approach. We started to look at the issues, discussing Malthusian economics and acceptable levels of risk. We looked at Marianne Talbot on Bioethics: Basics of GM: 1 Royal society 2 Scientific American 3. kurzgezagt – in a nutshell 4 sci show (from crash course mob)

14th November 2017 Science of Religion

We discussed the additional material we had not covered from week 6 and examined whether we need religion. We also looked at at Universe Spirit as a self-proclaimed meta religion and Alison Morgan's quotations from and comments on Alain de Botton's "Religion for Atheists", Universe Spirit as a self-proclaimed meta religion and Alison Morgan's quotations from and comments on Alain de Botton's "Religion for Atheists", and an article fro the New Scientist 15th April 2017 on Atheism - is it a religion? It was interesting that Ed Slingerland gave support to the need for religion, and we found Sam Harris's Atheism nihilistic and agreed that man is a social animal benefitting from the bonds that religion builds. The problem is belief in God, and this is perhaps the difficulty of the concept of God in the modern(its) world. We sought clarification with Peterson and Scruton, giving Darwinian and more conventionally religious approaches respectively. Meta-religion allows us to explore the properties of religion, and the site referenced confirms we need a Catholic (all inclusive) church, and dogma that does not conflict with the scientific. If the current culture is non-religious, why do people turn to fiction, which is another story-telling insight into life? We debated religion versus spirituality: isn't the latter too personal - self-centred - to provide the social cohesion of religion?

10th October 2017 Science of Religion

We discussed the final week 6, "The Future of Religion, Conclusions", of the University of British Columbia's course on "The Science of Religion". We discussed "infectious teleology", the human need to ascribe purpose, and contrasted it with Sam Harris's atheistic stance and recognition of only scientific truth. But science cannot answer any "ought or should" question and our position on religion reflects our normative world view. It has now been shown that our genes can be switched off by environmental factors and behaviours passed on to future generations, and co-operative behaviour - which religion encourages and supports has contributed to the survival of many species, including ours. We reflected on the transience and fragility of our current situation, and suspect that the example of Scandinavian society with its secularity attributed to a strong welfare state might well prove ephemeral under stress - and we also thought that they were well equipped with custom, ritual and a sense of identity not identified as religious. It was agreed that the most helpful parts of this week of the course were in the supplementary material, We noted that the downside of religion is that because identifying with an in-group defines an "out-group" and its strong power to make individuals ready to sacrifice themselves for the group may encourage violence. That led us to think we should address the "should / ought" question of religion: is it good or bad that religion is waning, at least in our society?

12th September 2017 Science of Religion

We discussed week 5, "Religion in Texts, Stones and Bones: Data from Dead Minds", of the University of British Columbia's course on "The Science of Religion". The topic described methods of analysing texts using computer databases to search for words and associated words, and to compare across texts. Computer models based on responses to texts can predict the evolution of cultures and texts in a way analogous to gene mapping. We recognised the power of these approaches, but noted that interpretation still needs experience and expertise, and, comparing this modelling with finite element analysis, for example, we queried whether the underlying theories were science or might be pseudo-science. We noted the examples linking religious rites with practical issues (the water temples), and this led to a discussion perhaps anticipating the final session, whether religion which is in place to embed a society's values and practices can evolve with the culture and its memes to remain relevant.

8th August 2017 Science of Religion

We discussed week 4, Ritual & Costly Displays, of the University of British Columbia's edx course on "The Science of Religion", Ritual is compulsive, repetitive, causally opaque action - that is the action is not causally linked to the desired outcome: though we debated a link if the desired outcome is the reduction of anxiety or the feeling of greater control. Ritual does bring about those effects and a sense of belonging to the group. It is insufficient to say we identify with a group: ritual demonstrates that commitment to ourselves and to other group members. Dysphoria - ritual that is very costly and painful - is a stronger signal. Rituals may be repetitive and doctrinal - encouraging conformity - or singular, and imagistic, such as baptism or marriage. Rituals involve an agent, an action, a patient and a non-natural consequence. In imagistic ritual, the agent may be the supernatural agent. We recognised the power of ritual in religious and current life (sports and football in particular) and the sinilarity to OCD. We noted that the power of ritual could be used for good ends or to manipulate people.

11th July 2017 Science of Religion

We continued with week 3 of the University of British Columbia's course on ""The Science of Religion" The topic for week 3 was "Religion in Individuals & Groups", and the focus was on groups and how religion helped successful groups to evolve. We noted that humans stood upright and discovered fire, consumed protein more easily, reinforcing the growth of the brain and the development of consciousness and language. Groups formed and procreated through genetics plus culture, but were limited to approximately 150 individuals, because beyond that

anonymity enabled freeloading. Religion strengthened respect for a hierarchy and fulfilling group needs at the expense of individual needs. One example was monogamy, reducing the intra-group rivalry between males. However women were subjugated to bear children: we wondered whether society still subjugates women, if for different (economic) goals? We discussed Moral Foundations Theory - individual foundations based on harm and fairness are universal, but it is claimed that the religious and "conservative" are more likely to espouse the binding foundations of Authority & Obedience, Group Loyalty and Purity. We compared deontologocal and utilitarian meta-ethics.
Religion also helps enforce society's rules: tests show people primed with religious suggestion behave better. We noted the suggestion that religion is not necessary to enforce rules - a strong accepted legal system can do that, but such societies got there from a religious point earlier. We surmised that if religion is such a strong force for society, how will we fare now that religion is in decline and there is more emphasis on the individual not the state? Or do we worship false gods? We also still suspect reductionism in the course, and noted storytelling as a long established medium for passing on important truths.

20th June 2017 Science of Religion

We discussed week 2 of the University of British Columbia's course on ""The Science of Religion" The course asked and answered the question "What features of the mind draw us to religion?" First, Mind - Body Dualism is a way of thinking difficult to avoid. We are able to understand what others are thinking and the mind seems such a different kind of thing from the body, so the "ghost in the machine" something quite separate, with an existence of its own. Then evolution has given us hyperactive agency detection: we look for causes from when we reacted to a twig snapping in the jungle. We also ascribe purpose when there may be one, and both of these features lead us to religion and the argument from design for a god. The course considered those who are not "religious", noting many would still claim to be "spiritual", that is believing in something though not in a conventional faith group. We considered whether Tarzan would be religious. The course noted that Terror Management, that is the response to extreme danger tends to increase religious conviction, and that a habit of rational thought reduces the religious tendency. Some of us had considered the extra material suggestion religion stemmed from our attempts to understand and live within hierarchical groups. This section also discussed the concept of Newtonian versus Darwinian truth - an argument quite close to pragmatism.

9th May 2017 Science of Religion

We discussed Week 1 of the University of British Columbia's course on ""The Science of Religion" " This first week described the approach and anticipated and addressed possible objections. The cognitive science of religion approach rests on five key principles, ideas, or commitments. The first is the idea that there is no such singular, naturally occurring category to which we can point and say, "This is religion." The second principle is that religion can, and should, be explained scientifically. The third principle is that in order to explain religion scientifically, we must fractionate it into its psychologically meaningful units then build them back up again to explain religious ideas and systems in their entirety. The fourth commitment is that religious ideas and practices are actively filtered and processed by the human mind - like language and music. And the final point-- if religion, like music and language, can be explained by understanding the human brain and its interaction with the cultural environment, we don't need any specialised domain to understand and explain religion. The objections are principally those of reductionism, and we discussed these in detail, encountering several philosophical ideas, including bracketing (setting aside whether beliefs are "true"), Ryle's "thick" and "thin" descriptions ("thick"descriptions requiring explanation of the human meaning, not just the mechanism), and denial Locke's "Blank Slate" model of the mind in favour of consilience plus culture. We expect an explanation of religion beyond an

psychological explaining away of the plain text of the story: the explanation must address other hermeneutic aspects of religion as it can be re-interpreted and applied to the needs of the moment.

11th April 2017 Risk

We looked at the Stanford Encyclopaedia of Philosophy entry on risk This references Daniel Kahneman's "Thinking Fast & Slow", more about the psychology of risk: the relevant chapters on Risk are 13, 25, 26 & 30. There is an interview with Daniel Kahneman in which he explains slow and fast thinking as well as some of the bases of our biases and a graphic of 20 of these biases Discussion of Kahneman's theories of thinking fast and slow led us into discussions of modes of thinking and the effects of personality, though we recognised that such ideas as availability showed our reluctance to do the maths in risk situations. We did therefore discuss type one and type two errors in hypothesis testing. We discussed the ethical implications of risk in relation to development projects. While Failure Modes and Effects Analysis may be and usually is applied to assess risks, the Feynman investigation of the Challenger disaster showed how subjective risk may be minimised in the interest of delivering the project. A strict code of professional ethics is a need.

13th March 2017 Missing Evidence / Ultimate Proof

We looked further at evidence, majoring on the IAI video "Missing Evidence" with Massimo Pigliucci, Tara Shears, Rupert Sheldrake. Philip Ball, We also looked at Sheldrake's theory of Morphic Resonance. We touched on "Ultimate Proof," with Nancy Cartwright, George Ellis, Daniel Everett. Hilary Lawson, It was noted that Pigliucci refused to entertain Sheldrake's complaint that the evidence he presented for his theory was not being considered by the scientific community. Was this an example of Kuhn's narrative, that scientists do not strive to disprove theories, but work to prop up conventional wisdom? Or is Sheldrake's idea to be readily dismissed? Why is his notion of a universe with developed habits rather than laws of nature, of "fields" remembering shapes in a way reminiscent of Plato's forms to be taken any less seriously than string theory or parallel universes? We recognised the need for theories to run ahead of evidence in the search for explanation of the currently inexplicable. Sheldrake is addressing the question of how genes, reproduced in every cell, can explain how we grow the appropriate cells in appropriate places. But theories also need to make predictions which align with consequential phenomena, and these predictions must be sufficiently important and useful to justify the speculation. Where testable, they must be subjected to properly designed experiments and interpreted in accordance with those principles. This lead us on to the interaction of science with society. Perhaps science, which arose in the enlightenment, is now too much subject to the paradigms of romanticism and post-modernism. Perhaps this underlies the mistrust of science and scientists - and we forget scientists are also members of our society and not the caricature of emotionless beings. We were made conscious that every society has its way of defining, using and processing science, dependent on its structure and zeitgeist.

13th February 2017 The Tyranny of Evidence

We discussed the IAI video "The Tyranny of Evidence" by Rupert Read . The main point of the video, that the absence of evidence of harm is not evidence of the absence of harm was accepted, but the argument of prudence - don't do anything if it might cause harm - was not. Logically, one can make an equivalent statement of prudence to assert an action should not be banned to one that it should. We noted that many human projects have risks and costs, even the loss of life. Driving a car or even going out of the house involves some risk, but we are not deterred. Many scenarios are complex - economic forecasts, for example can be wildly wrong. It is important to realise that "the past is a tiny fraction of what might have been" or at any rate to look at as wide as possible a range of future outcomes and identify and implement as

deemed necessary appropriate preventive or mitigating strategies. The engineering activity of failure modes and effects analysis does this - but it was noted that risks can be biased by politics: the Challenger investigations by Richard Feynman being cited. This led to a discussion on the reliability of evidence. We should trust experts: but only after looking for alternative motives for their recommendations and checking there is strong effective peer review or regulation where appropriate. Returning to the initial theme, we live in a probabilistic world, and Popper's thesis that we should seek to disprove a hypothesis points us t properly designed experiments and an awareness of significance levels of results.

10th January 2017 Mind - Consciousness

We majored on the Tononi interviews here We acknowledged his approach, starting not with the brain, but with the experience of consciousness - "what is it like to be…" Brain states cannot explain the vegetative state or what it is like to be a newborn, but what would correlate with these states? He turns to complexity and integrated information theory. We discussed the difference between complex and complicated and how non-deterministic systems with many variables can show quite simple patterns. We compared fractals. Consciousness would appear to need not only a very large number of neutrons, but they must also be able to link in many ways. The cerebellum has more neurons than the cerebellum, but tit is the cerebellum that enables consciousness. Tononi said that the perfect zombie is possible, but it would seem difficult to generate a machine that would avoid being conscious if it were really convincing. We sought examples of other systems that could possibly be conscious. W

13th December 2016 Mind - Consciousness

The material we had studied enabled us to discuss how complexity (Complexity theory) explains how the miracle of the mind and consciousness emerges from simple neurons, because they are able to connect together very large numbers in complex ways to form and reform groups. We discussed the measure of complexity and its relationship to consciousness, and were taken to the conclusion that consciousness is a continuum. We discussed whether this leads to a conclusion that the mind can be explained purely as a physical embodiment, and the consequences of this. What is the soul? It was suggested that consciousness could be an emergent property of the mind: once the mind can represent the outside world, it can represent itself thinking. Blackburn in his chapter on "the ghost in the machine" takes us through the argument that zombies are in the end not possible: our minds map our bodies and our bodies give evidence of our feelings and self awareness.

15th November 2016 Mind - Searle, Turing and Learning machines

We had looked at Searle's Chinese Room, and the Turing Test and the Jeremy Howard's contribution Deep Learning on the TED on AI here & and Personhood the Crash Course on AI. While the Turing Test proposes that if you cannot tell how a computer responds from how a person would, then the computer is thinking, this is response based on behaviour. The Chinese Room taken as a system may or may not be said to effectively understand the semantics of Chinese, but it is still responding in a pre-programmed way. Deep Learning computers with their ability to look at a set of items and make out their own classification, and perhaps this is the threshold of thinking? AI systems can also listen and speak, and before long will pose a threat to the jobs of the middle classes, and in a way more threatening than industrialization in that they can continue to grow their powers - even to reproduce themselves in the sense of designing even better systems. This is closing in on personhood, and we discussed the need for consciousness and debated what that was, beyond self monitoring and fault diagnosis. We felt consciousness is emergent and has evolved to different degrees in natural species, and may emerge similarly in androids. We may soon have to address such questions as whether it is a crime to destroy an android, and how to define human purpose without the prospect of employment.

11th October 2016 Mind - Nagel

The discussion started with a discussion of how we can know what is right and how much we accept that we know things to be right through science. As example of alternative worldviews Chinese medicine, Homeopathy, Ayurvedic medical systems were suggested. We realise that science operates within a particular paradigm as do these others and it becomes difficult to say clearly that one is right and another is not. We then moved to notions of objectivity and subjectivity. We accepted the realist scientific approach and that there is an external world. We know that there is a table in the real world if our perceptions either correspond (or cohere) with the table; or pragmatically by using the table. However our conscious apprehension of the table has a particular phenomenal character and is subjective. Nagel makes this point by saying that we can describe what it is like to be a bat, but we simply cannot know what it feels like, because we cannot access the bat's consciousness. The objective nature, he says, is out there but the conscious experience of someone else is unknown. He uses the example of a Martian who sees lightning and can describe it to another Martian (but not perhaps to a human or bat!) but we cannot know what s/he feels. Generally, we felt that consciousness was related to the brain, and it has a physical nature. We thought it is at present impossible to say exactly what it is. And this points towards reductive physicalism, not being wrong, but rather incomprehensible with respect to explaining the nature of the mind. We described the conscious experience and four conscious states: sleep, dream, lucid dream, and full waking. Other properties of consciousness we identified were: a feeling of 'what it is like', intentionality, the phenomenal nature (redness) narrative nature (stream of consciousness), instrumental nature of things remembered. We thought that many animals were conscious and possibly, that there were degrees of consciousness. We know personally what it is like to be conscious, but we only seem to be able to say what it is through some analogy and when making this analogical statement we lose the phenomenological aspects of the actual experience.

20th September 2016 Philosophy of Mind - Introduction

This was first of what is expected to be a series of studies of the philosophy of mind. We focused on an introductory guide (content similar to the first chapter of Simon Blackburn's "The Big Questions") and found it re-visited forward a number of concepts and philosophical ideas that the group has addressed in the past. Cartesian Dualism holds that mind and matter are different things, and we discussed why this idea was held and the difficulty of any other position, given the concept of an immortal soul. A significant problem for substance dualism is explaining how body and mind interact, whereas monism has to explain the difference in kind we see between mind and matter. We looked at qualia, the "what is it like" sensation and Wittgenstein's private language argument, touching on whether our thinking process is entirely learnt or partially hereditary. Gilbert Ryle's category mistake argument ("now show me the university") supports the view that we are not ghosts in the machine.The various forms of materialism led us to Searle's biological naturalism, closely related to property dualism.

4th July 2016 Science & Phenomenology

We read Chapter 50 of Southwell and the key philosophers discussed were Husserl, Heidegger and Merleau-Ponty. Husserl's project – though eventually abandoned, was to apply Descartes methods of doubt to experience to try to establish a basis for science in terms of the nature & structure of conscious experience itself. The application to how we experience music: a succession of notes and some expectation of future notes was helpful. He noted that there is no entailment either way between the logic of a fact, our belief or our duty. Heidegger asked not what it is to be human but what does it feel like? He used the hermeneutic approach to interpret experience. All our perception is influenced by our intention towards any object.

Being in the world allows no room for skepticism. He had a distrust of modern technology, which does not seem insuperable. Merleau-Ponty asserted that the mind is purely physical – refuting Descartes.

28th June 2016 Epistemology of Science

In what sense is a scientific theory or explanation "true" ? We started from Realism and discussed whether admitting that any theory may be wrong and subject to later revision could differentiate such Realism from Instrumentalism that holds our theory of unobservables is no more than an explanation and prediction of phenomena. This pragmatic approach generally had our sympathy. We discussed Feyerabend's argument - from Kuhn's observation that science moves in paradigm shifts - that anything goes, and we should embrace any viewpoint. This led to an affirmation of the role of creativity in science and of the art of science. The difficulty of teaching the rudiments of science as grounded in experimental demonstration while admitting theories could be modified or disproved was discussed.

15th March 2016 Space

We started with Simon Blackburn's paper and chapter on "What fills up Space", with the ideas of powers and dispositions (we only see the effects of things, not "things in themselves", so does the concept of things in themselves have any meaning or is it necessary – and what can we know of things in themselves? This linked in well to the scientific approach, essentially pragmatic and inductive – can it take us to reality? Space itself turns out to be difficult to comprehend, because it is so different from our intuitive ideas. It isn't Euclidean and infinite, it is closed and distorted by the matter in it, according to Einstein. the idea of a "rubber membrane" of space is supported by the very recent detection of gravity waves from the coalescence of two black holes a billion years ago. Space isn't empty, but made of of tiny (even on the atomic scale) quanta of space time. The space we experience may be an emergent property of the interactions of these tiny elements. Stephen Hawking holds that the energy to create the matter of the universe was "borrowed" from the gravitational energy of the universe, linking space intimately with the matter it contains. has science gone beyond the boundaries where its theories can be tested? Are they coherent? Can they take us beyond pragmatic truth?

9th February 2016 Time

Time is known to be difficult to imagine. We differentiated subjective time and objective time. We did talk about different senses of "now" analogously to "here" for me being "there" for you. We cannot meaningfully express the rate at which time "passes" second by second. Linking to consciousness, we noted that subjective time moves at different rates: it stretches out just before an inevitable collision, stops altogether while we sleep and passes more quickly with age! There seems to be a relation to the intensity of brain activity. We think of time as a river, but is it carrying us along, or does it flow towards us, carrying the future? Is this metaphor misleading? McTaggart's contradiction – that "now" exists in the present but also in the past and future may be countered by a "block universe" view, that all moments in time exist but in a similar sense to the way that a film strip captures movement. This could link to objective time: the theory of relativity links time (through the velocity of light) to space. It shows that simultaneity is lost if two observers are moving relative to one another. Stephen Hawking discusses the arrow of time - the seeming impossibility of going back in time, even though physical processes are all said to be reversible in time*. He gives one simple if non too helpful definition that time moves in the direction of increasing entropy (disorder). There was plenty left to discuss on Scruton's comparison of the temporal and the eternal – a future session perhaps?

12th January 2016 What is Mind?

We watched a MOOC: "What is a Mind" led by Mark Solms of University of Cape Town. Our discussion started from Paul Davies' "God & the New Physics", which describes a progress from life through mind to self. Mind is emergent from complexity as the anthill lives by the unconscious action of individual ants. Some dates noted were: life 525 million years ago, vertebrates 200 million, thinking (intentionality & agency) a mere 200,000 years ago, and 12,000 years ago we found an alternative to living as hunter- gatherers. We discussed consciousness and Tononi's theory that it correlates with complex interconnected networks. We discussed the unconscious, including confabulation to compensate for a painful emotional state and depression as failure of the social bonding system.

8th December 2015 Some Issues for Science

We discussed some criticisms of or objections to scientific method and how science progresses. We discussed Godel's Incompleteness Theorem and accept that as in maths there may be elements of science which though true cannot be proved. There are several objections to Popper's Falsification theory: claims that scientists "prop up" existing theories until they are no longer tenable, that experiments cannot show that it is the variable of interest that is the cause, that experiments throw doubt on the whole set of scientific theories, etc. We enjoyed discussing and in turn criticizing these objections, particularly the attack on experimental method, which, properly understood, addresses many variables in a series of tests. We accept that phenomenology has a wide application beyond science, but within its critique of science the complaint that technology is no longer comprehensible and thus alienating seems defeatist , and an engineering "intension" to make use of what is around us to improve our lives seems perfectly respectable.

18th November 2015 Philosophy of Science - Causation & Universals

Universals are basically predicate words in sentences that apply to Particulars, generally the subject. Universals may be adjectives like "red", or nouns like "a horse". The big question is whether universals are real or, as Nominalists claim, just words for talking about individuals. The "extreme realism" of Plato, who said that Universals are not only real, they exist outside the world as ideal forms has generally been abandoned in favour of a more Aristotelian view that the qualities do really exist in various individuals – strong realism. The main Nominalist contender is trope nominalism, where a trope is a sort of token of the type indicated by the universal word. So individuals are described by bundles of (individual) tropes. While we saw the value of such a concept, it was thought that universals such as "red" and "horse" could be real, because they could be explained in scientific terms (so only insofar as science reflects reality – see below!), but maybe words like "tasty" were culture dependent and perhaps better described by tropes.his topic arose fro the discussion of metaphysics.

One main tenet of causation is that causes are events rather than facts. "He threw the stone and it broke the window". Bertrand Russell was a flamboyant Eliminatvist, declaring that "the notion of causation is seen as a scientifically retrograde relic of Stone Age metaphysics. Science gives us laws: "in the motions of mutually gravitating bodies there is nothing that can be called a cause.....merely a formula." We felt more sympathy with causation based on facts, and the events route leads clearly to Hume's position that all we see is events in succession. We acknowledged Kant's view that we impose causation on the world to make sense of it, and that science can only be a pragmatic truth.

13th October 2015 Philosophy of Science - The Metaphysics of Science.

We discussed Metaphysics. Physics and all science insists that theories be tested to see if they can be falsified. Metaphysical assertions cannot be tested. Metaphysics deals with ontological questions – the ultimate nature of reality, causation, theology and the nature of being. We discussed realism and anti-realism. given the difference between physics and metaphysics, what happens where they meet: when scientists try to explain the mysteries of quantum

mechanics, for example? We all came down on the side of realism. While our view of reality is filtered by our senses – and we found useful Kant's theory that causation, time and space are our constructed mental framework – we believed that science corresponds to a reality out there rather than being merely "convenient fictions" to explain predictions. The most likely explanation is that our complex minds have evolved to help us deal with the reality of our world– and might not work as well for things that are very small or move very fast! So is a metaphysical approach to science just not worth doing? Richard Feynman might suggest we just understand the equations and use them for practical predictions? And isn't thought beyond the pragmatically useful let alone demonstrable not worth the effort? But we are driven to explain the next level of causation, and some speculations have then been developed and verified long after. Perhaps most important is to recognize the difference between scientific explanation and speculation and what can and cannot be demonstrated.

15th September 2015 Philosophy of Science - Science and Gender, Postmodernist Criticism

We discussed the postmodernist and feminist criticisms of science. Postmodernism in summary points out that language is a closed system – the definition of any word is just more different words – and as well as the meaning, a word carries a whole baggage of metaphors and meanings, power values and marginalizing statements that the individual has absorbed from his / her culture: indeed it is almost as if the individual is merely a "node" in the on-going existence of a language or culture. Postmodernists deny that language represents reality and reject explanatory "metanarratives" such as religion, history – and science. They attack the claims made by scientists that they can (1) describe accurately, truthfully and universally the physical reality that surrounds us, and (2) that scientific enquiry is a disinterested pursuit of knowledge. We disagreed with the attack on scientific facts (that can be empirically demonstrated), but this position does provide a critical framework for examining scientific beliefs (see below) and the motives for scientific investigations and projects. The postmodernist approach has underpinned much feminist philosophy, and we considered whether science has a masculine bias. Four propositions from "Science – Key Concepts in Philosophy" by David French suggest that gender bias influences (1) the proportion of men & women in science, (2) what science investigates, (3) how science investigates and (4) the content of scientific beliefs. We could appreciate factors inhibiting women progressing in science – the competition to publish to get on, and inhibiting girls studying science at school. An example of male interest prioritizing scientific investigation was the comparison of the contraceptive pill and Viagra in their launch and attention to side effects. Science should have a discipline, but the male dominated organization often sanctions a "seat of the pants" approach. Excellent examples of gender bias in beliefs was provided by primatology studies by men & women and whether human evolution was driven by man the hunter or woman the gatherer.

4th August 2015 Philosophy of Science - Science & Ethics.

We discussed Science and Ethics, helped by a paper concerning a patient paying for her cancer to be replicated on mice to test possible treatments. There were plenty of issues to go at: the ethics of the providers asking patients to pay for their research through to animal rights. We concluded first that science cannot exclude itself from ethical considerations: We noted the various ethical criteria on the BBC website and this appears to prompt good questions about any scientific activity . That said, we recognised that actually answering the questions is not trivial in many cases: while the engineering of gas chambers is a chilling reminder of the consequences of refusal to look at the moral issues involved, it can be too easy to give in to the simplistic popular demands. GM food crops are perhaps not anathema to the starving, and good weapons are unfortunately essential to defence against aggressors. We accepted that science has moved us far more positively in the direction of Utopia than into Dystopia, but

there is still the need for careful anticipation of outcomes. We did start to consider whether Science can tell us anything about ethics, and concluded there is maybe a whole discussion thread here?

16th June 2015 Philosophy of Science - Science & God

We set out to discuss Science and God, though the discussion was more about God than Science! We reviewed teleology and discussed various types of "purpose"; "designed-in" (or evolved), ascribed (e.g. farm animal) ultimate (? keeping the species going) and personal – either ordained or constructed (existential position). This last led us to Zen Buddhism (Japanese Existentialism) and with the thought that this might equate to prayer, we moved to religious and philosophical systems. Routes to enlightenment or God include Priests, Scripture, Meditation. In Hindu practice, the route may be any of devotion, action, knowledge. Element of Religion (from Ninian Smart?) include Doctrine, Religious Experience, Myth, Ritual, Morals an Organisation (maintenance and training). On Science and teleology and Religion, "Stargazers: Copernicus, Galileo, the Telescope and the Church" by Alan Chapman argues that the Church did not actually persecute Copernicus and Galileo as history tells us. CEM Joad's "Guide to Modern Thought" was actually written in 1933, when Vitalism and indeed Spiritualism were seriously studied and analysed. We discussed Dualism as an alternative to materialism and the argument that life is a phenomenon like the weather that emerges from a complex chaotic system. We noted we need to get into the differences between self mind, soul, consciousness, essence.....sometime. In discussing why science is displacing religion, it was suggested that science adapts: if a theory is falsified, it is actually necessary to seek a different explanation. Even Science is not immune from the tendency to resist change, but religious bodies find particular difficulties in changing – a problem when the objective is to convey eternal truth. So while science can never prove or disprove religious belief its explanations in its domain are perhaps generally seen as more relevant.

15th May 2015 Philosophy of Science - Teleology & Vitalism

We discussed some questions around Teleology and then Vitalism. We started by trying to ascribe a purpose to various natural things: for example bees pollinate flowers – though from their own point of view they gather nectar. We looked at the conflict of teleology with evolution, and discussed William Paley's idea of God as a watchmaker and David Hume's refutation – and refutations of Hume's argument by a Christian apologist. There was some consensus that living things could be ascribed a purpose only at some point in time and in the stochastic process of evolution. This ascribing of purpose is "internal" to us rather than the discovery of some external truth. We came on to the question whether a belief that life has a purpose affects the lives of humans, and this is a question that philosophers have answered in many ways, from Aristotle's "final cause" through Camus' otherwise depressing belief that we should embrace the meaninglessness of life. On Vitalism, it was generally accepted that science has shown that life is explained by material processes, albeit complex ones – and indeed there is not a clear boundary between animate and inanimate things. The idea again goes back to Aristotle and earlier, and shares a root with the Christian belief of the immortal soul. It was suggested that while Vitalism might not apply in science, perhaps it is too reductionist in some arguments, and it is a language that addresses the urge to life, the "life-force" we observe, just as Lovelock's Gaia theory is not scientifically true, but may be useful in advocating ecological issues. The question of alternative medicines was also discussed.

3rd March 2015 Philosophy of Science - Realism and Anti-Realism

We covered Explanations (Chapter 3 in the "Very Short Introduction" book). We looked at Hempel's Covering Law Model: an explanation that is a logical deductive argument with true premises where at least one of the premises is a general law. We discussed the asymmetry

issue and its relation to causation (which itself was discussed in depth). The height of a flagpole and the length of its shadow was a useful case. The discussion returned to the problem of induction and how we get to the axioms necessary to learn from deductive argument. This brought us back to Chapter 4 and our topics list via empiricism versus rationalism. Thence to the realism debate: is a scientific concept true (does it correspond to reality) when it is not observable but only detectable? We discussed the boundary and the consensus was that observable has a wide scope. Then is reality independent of us? Or is it personal, or does everything depend on there being an observer? There may be other routes to reality – mysticism for example. Science provides us with a way of predicting how things will operate, but, as we asked last time, does it tell us any more?

3rd February 2015 Philosophy of Science - What is Science?

The study of the Philosophy of Science will be base on the two books "50 Philosophy of Science Ideas You Really Need to Know" (50 Ideas You Really Need to Know series) by Gareth Southwell & "Philosophy of Science: A Very Short Introduction" by Samir Okasha. The first meeting essentially asked what science is, or in Wittgentein's approach – what are the "rules of the game" for doing science? We looked at the development of science from natural philosophy. From the earliest times the pre-Socratics were concerned with matter and form, and even before Plato and Aristotle preferred to trust their thoughts over their sensations. Only with the renaissance did empiricism come to the fore, and experiment and demonstration became key properties of scientific method. We noted Popper's observation that a scientific experiment should be designed to falsify a theory rather than demonstrate it: scientific theories rely on inductive logic – the generalization from what has been observed to happen to a prediction of what will happen - and falsification might be claimed to get round this problem by substituting a deductive argument. We noted falsification has its more general application in philosophy in logical positivism. We discussed experimental method: the importance of measurement systems, the problem of finding the truly relevant variables and probability. We discussed the language necessary to science – both ordinary language and mathematics. We debated the place of creativity in science – and compared it with the arts. One useful proposition was that science addresses the question of how things come about, rather than why. Are its truths just pragmatic, i.e. useful, or something more?