

Why Are the Laws of Physics the Way They Are? A Question in Natural Philosophy

Rev Dr Stephen Ames
University of Melbourne

*Room 209-Old Arts
Session 2: Philosophy of Physics*

Abstract

I briefly review the work of people who engage this question: W. Stoeger (1999), P. Davies (2005, 2010), L. Smolin and R. Unger (2015), while not ignoring the challenge that ultimately the universe is a 'brute fact' without explanation. I then discuss three scientific results and how they point to a possible way to answer the question.

(i) P. Davies explains how our knowledge of the universe in part depends on the linearity and locality that are extensive features of the universe, while leading to the more pervasive non-linearity and non-locality. Following James Hartle (1989) Davies thinks these are due to fine tuning of the physical laws and constants.

(ii) S. Braunstein and M.C. Caves (1994) derive an unexpected connection between the fluctuations in observed results endemic to empirical inquiry and the Hilbert space structure of quantum mechanics. The connection turns on a quantity known as Fisher Information.

(iii) Independently, B. R. Frieden (1998, 2004, 2007) works with Fisher information (I) which arises naturally in the context of parameter measurement where the parameter is subject to fluctuations (W) and measurements are conducted under ideal conditions of empirical inquiry (E). Within such parameter measurement scenarios and with other assumptions (A), Frieden derives the mathematical form of a great many of the laws of physics L and explains their operation in terms of Fisher information. Thus, $E, W, I, A \rightarrow L$.

An Ontography of Broadband on a Domestic Scale

Dr Michael Arnold
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*South Lecture Theatre (Room 224-Old Arts)
Session 9: Humans and Nonhumans in a Technological Age*

Abstract

An ontograph of broadband on a domestic scale is drawn by first constructing a list of objects found in the domestic environment, then setting out the arrangement of these objects in place, and finally, by setting the objects in relation to one another. The purpose of the ontograph is to decentre the humanist perspective – that is, to complement and counter the historical emphasis on human agency and responses in studies of household media, and from the perspective of things, contribute to our understanding of the changing configurations of media and communications technologies in the home. In this paper we aim to provide an ontography of broadband in the contexts of domestic space. This research draws from ethnographic data in homes and develops an object-oriented approach to ethnography. At one level the purpose of conducting an ontography is to contribute to our understanding of the changing configurations of media and communications technologies in the home, and at another level, the purpose of our ontograph is to complement and counter the historical emphasis on human agency in studies of media in the home.

Realism and Instrumentalism in the Metaphysics of Biology

Dr Sandy Boucher
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*South Lecture Theatre (Room 224-Old Arts)
Session 1: Scientific Realism and the Manifest Image (Panel)*

Abstract

According to the manifest image species are classes, but many think that according to evolutionary theory they are individuals. Thus the case for the species-as-individuals thesis has always rested on a principle of theory dependence (PTD) which states that the metaphysical status of entities is determined by our best science, even if this conflicts with the manifest image. But there is a version of the PTD which supports anti-realist pluralism, according to which the metaphysical status of species shifts with context and theoretical framework, and is a pragmatic, rather than an objective matter. If that is right the manifest image of species may be partly vindicated, rather than undermined, by way of principles of theory-dependence. The anti-realist view constitutes a new kind of instrumentalism, which contrasts with more familiar forms of instrumentalism in the philosophy of biology (for example that defended by Rosenberg), having more in common with contemporary versions of metametaphysical anti-realism and deflationism.

Scientific Imperialism, Pluralism and Folk Morality

Dr Sandy Boucher (co-authored with Dr Adrian Walsh)
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*Room 209-Old Arts
Session 8: Philosophy of Science*

Abstract

Current debates over so-called 'scientific imperialism', on one plausible reading, explore significant general issues about the proper boundaries between distinct disciplines. They raise questions about whether some forms of territorial expansion by scientific disciplines into other domains of inquiry are undesirable. Clearly there is a strong normative undercurrent here, as the use of the pejorative term 'imperialism' would indicate. However, we face a genuine puzzle here: why should we regard some forms of expansion as illegitimate? Why should any particular boundaries between various disciplines be regarded as sacrosanct? In response we note that one striking feature of the examples upon which opponents of scientific imperialism focus (such as the use of economics for sociological explanations) is that that they involve cases where folk conceptions of morality and philosophical anthropology appear to be threatened. We suggest that rather than seeking a more general pluralist account of the proper boundaries between disciplines, we should consider the epistemic and normative implications of particular expansions.

Prisoners' 'Pathogens': Yellow fever, Incarceration and Quarantine in the Bermuda Convict Establishment (1824-1863)

Angeline Brasier
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Room 209-Old Arts
Session 6: History of Medicine

Abstract

The islands of Bermuda remain an isolated paradise, surrounded by the beautiful vastness that is the Atlantic Ocean. It seems almost ironic that this idyllic island paradise was once witness to repeated epidemics of the haemorrhagic arbovirus, yellow fever. Situated at the western tip of Bermuda is Ireland Island; the location of a former leper quarantine station. Naturally separated from the main islands, it served as a home to a convict hulk establishment from 1824 to 1863. At a time when both the aetiology of yellow fever, and indeed, an effective treatment, continued to elude medical practitioners, the quarantine practices in the Bermuda convict hulk establishment, did little to mitigate outbreaks of the disease. Indeed, it was not until 1901 that results of a blind experiment in Cuba, confirmed that the *aedes aegypti* mosquito was the vector for yellow fever. This paper will document the impact that these epidemics had on the convict hulk establishment in Bermuda, the difficulties of the practice of quarantine in an incarcerated population, and how failed efforts in quarantine led to the eventual supposition that this devastating haemorrhagic fever was neither a contagion nor a miasma. While the empirical data of the Bermuda epidemics collected by convict medical officers, Christopher Harvey, William Smart, and others, considered all possibilities of contagion and miasma, as origins of the disease, their narratives into quarantine practices aided future research into the disease's aetiology. In this sense, memory of quarantine was a means to facilitate medical research.

Who Is Leading Australia's 'Gene Revolution'? Patterns in Industry and Public Collaborative Research on Genetically-Modified Crops

Dr Heather Bray (co-authored with Dr Rachel A. Ankeny)
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South Lecture Theatre (Room 224-Old Arts)
Session 8: Science and technology in Social and Political Context

Abstract

One of the primary critiques of genetic modification is that research in this domain is largely industry driven and for profit (even when performed by public institutions such as universities), and hence potential benefits to society or the environment are not prioritized. This paper explores historical patterns in funding of research on transgenic crops (intended for use as food, animal feed, or fibre) in Australia using licensing applications submitted to the Commonwealth's Office of the Gene Technology Regulator between its establishment in the early 2000s and the present. Our analysis is based on data about the types of organizations seeking licensure, collaborations among different types of organizations, crops being modified, and types of traits under investigation (e.g., enhanced nutrition, herbicide tolerance, insect resistance, and so on). We focus on collaborations performed in or between public institutions (such as universities and governmental scientific organizations which have high levels of public trust in Australia) in order to assess patterns in what types of modifications are being pursued, and to explore whether public institutions have research trajectories that are distinct from those of industry. Unlike results of a similar analysis performed previously in the US in a previous decade (Welsh & Glenna 2006), we argue that a significant proportion of research by Australian public institutions over the past 15 years reflects clear commitments to shared public values rather than profit motives alone, and highlight specific case studies where less commercially relevant or 'orphan' crops are being pursued in part because of their importance to Australian agriculture and public commitment to it.

Darwin's "Mr. Arthrobalanus": Tales of Sexual Differentiation, Evolutionary Destiny and the Expert Eye of the Beholder

Dr Roderick D. Buchanan
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Room 209-Old Arts

Session 7: Nineteenth Century Darwinian Thought

Abstract

"She walked up to me and she asked me to dance..." Lola, Ray Davies
Darwin's Cirripedia project occupied a lengthy eight year interregnum between his 1844 species essay and the publication of *The Origin of Species* in 1859. It was his longest single sustained study. Historians initially tended to dismiss the project as an arcane and inexplicable detour. However, concentrated attention to his journals, notebooks and correspondence demonstrated that Darwin had a long-standing interest and expertise in marine invertebrates. On face of it, the project was a hugely exacting exercise in systematics. But an abiding curiosity in the reproductive arrangements of these little sea creatures ran like a scarlet thread through the dry taxonomic descriptions. The strange varieties of sexual differentiation Darwin uncovered both surprised and reassured him. While he had already sketched a transformist framework for this process, the barnacles provided a revealing and paradoxical set of instantiations to bolster his species theorizing. In the distance, the barnacles gestured toward even more profound questions about the mysterious origins and myriad effects of sexual reproduction. But Darwin's 'road to discovery' was hardly straightforward. His research was both helped and hindered by the tacit expectations generated by his transformist thinking. Victorian assumptions about gender and sexual roles also probably added to the confusion. Significant observational backtracking was required to correct several oversights and misapprehensions, none more so than those relating to the chronically misunderstood "Mr. Arthrobalanus." With careful attention to chronology, this paper highlights some of the more curious and ironic aspects of Darwin's epic project.

What is the Copenhagen Interpretation?

Dr Kristian Camilleri
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Room 209-Old Arts

Session 3: Histories of Twentieth Century Physics

Abstract

It is still commonplace to refer to Niels Bohr's ideas as having formed the central plank in a unified and widely shared view of quantum mechanics that emerged in the late 1920s, commonly known as the 'Copenhagen interpretation'. Yet extensive historical scholarship over the past thirty years has challenged, if not seriously undermined, the notion that any such consensus among the founders of quantum mechanics ever existed. In this talk, I trace the proliferation of meanings that have been associated with the 'Copenhagen interpretation' from the origins of the term in the 1950s until the present day, situating these meanings in the various ideological and intellectual contexts of the post-war era. Here I argue that we should abandon the view that Bohr and his followers ever subscribed to 'the Copenhagen interpretation', but rather see it as a label for a loose, incoherent assortment of views, which only emerged after the war, as the product of repeated attempts by physicists and philosophers to reconstruct some imaginary version of the 'orthodox view'. The historical myth of the Copenhagen interpretation has remained remarkably persistent, because every renewed effort to define 'what it really is', has only served to reinforce the idea that there was such an interpretation of quantum mechanics.

Four Meta-Approaches to the Study of Qualia

Lok-Chi Chan and Andrew James Latham
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South Lecture Theatre, (Room 224-Old Arts)
Session 6: Philosophical Problems in Scientific Naturalism

Abstract

In this paper we categorise four broad philosophical and scientific meta-approaches to the study of qualia. These are the theory-centred meta-approach, the property-centred meta-approach, the theory-centred meta-approach and event-centred meta-approach. We argue that the event-centred meta-approach can lead to a more comprehensive scientific conception of qualia. Other meta-approaches, associated with authors such as the Churchlands, Dennett and Lewis fail to do it justice. We also show why a reconsideration of meta-approaches to the philosophical and scientific study of qualia has considerable value for the study of consciousness.

Techniques Used by Australian National Forest Products Laboratories to Transfer Knowledge and Expertise to the Secondary Timber Industry and General Public: 1920-1945

Gordon Dadswell
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Room 209-Old Arts
Session 10: Histories of Australian Science and Industry

Abstract

On Christmas Eve 1915, William Hughes, Prime Minister of Australia telegraphed various representatives of Universities, Government Departments, and Industry to a conference in Melbourne on 5th January 1916. The conferences' aim was to discuss the possibility of a national science laboratory for primary and secondary industries. At the conference Hughes promised an extraordinary £500,000 and also insisted that the laboratory ensure the development of processes to publicise the value of science to industry and the general public. Following the conference the newly formed Advisory Committee was approached by many interest groups including that of the timber industry. This group sought the immediate establishment of a forest products laboratory to conduct research into waste wood, wood pulp, and wood identification. The first forest products laboratory, Forest Products Investigations, was created in 1920 in Perth. It was followed by the Forest Products Laboratory in 1922, and the Division of Forest Products in 1928. With the creation of these laboratories there was an imperative to establish their role. This paper discusses seven broad techniques including publications, lectures and classes, conferences, exhibitions, and visitors to the laboratories. The most ubiquitous methodology however, was the newspaper. What emerges from the discussion is that there were a variety of formats that targeted a broad audience spectrum: the general public to other researchers. The conclusion reached is that the effect of these techniques resulted in a better understanding of the role played by the laboratories for Australia. Also acknowledged by their governing bodies, the Institute of Science and Industry, and the Council for Scientific and industrial Research.

Bashing Climate Change Experts: A Sociology of Cool in a Warming World?

Dr Darrin Durant
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South Lecture Theatre (Room 224-Old Arts)
Session 2: Science and its Publics

Abstract

Bashing experts appears to be fun. Across multiple publishing formats my fellow Science and Technology Studies (STS) scholars have criticized experts involved in climate change public policy formation. In newspaper op-eds, Hulme and Ravetz (2009) criticized experts for not 'showing their working' and for being unreflexive about how they create, validate and mobilize scientific knowledge. In blog posts, Curry (2010) accused climate change scientists of having failed to adapt to the policy relevance of climate science. In journal articles, Beck (2012) lambasted the Intergovernmental Panel on Climate Change (IPCC) for relying on a deficit model of publics. Taking Beck (2012) as representative of this particular brand of STS commentary, experts scientific and political are presented as particularly unreflexive: experts view publics as suffering from a deficit of knowledge, which hard science can remedy, trust thus flowing from quality science, with experts disappointed if direct political action does not result from their word. The only trouble with this STS characterization of climate change scientists is that it might be flat wrong. This talk presents the results of a pilot project on climate change experts in Australia (a series of interviews with experts on the government Climate Change Authority and the (recently out of government) Climate Council). I do not find them to be as quixotically unreflexive as my fellow STS travellers make out. What's going on? A hint: maybe the experts are heirs to Alvin Gouldner and my fellow STS travellers the heirs to Howard Becker?

Psillos vs. van Fraassen on the Existence of Atoms: Defending Scientific Realism without Resorting to Inference to the Best Explanation

Dr Michel Ghins
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South Lecture Theatre (Room 224-Old Arts)
Session 7: Scientific Realism and Inference to the Best Explanation

Abstract

Standard defenses of scientific realism (SR) are based on a version of inference to the best explanation (IBE), namely the "no-miracle argument" (NMA) as it was called by Putnam in 1975. IBE and NMA have been the focus of much debate and critique. Moreover, IBE is often used to substantiate specific claims about the existence of unobservable entities the existence of which is supposed to causally explain certain phenomena. This paper proposes an alternative defense of SR grounded on a parallelism between the justification of ordinary experience realist claims and the justification of existence claims in science. As an example, I will discuss the arguments adduced by Perrin for the existence of molecules at the beginning of the 20th century, making reference to the current controversy between Stathis Psillos and Bas van Fraassen about this important episode of the history of science. I will conclude by specifying epistemic criteria which, if satisfied, would warrant claims about the existence of some unobservable entities posited by empirically successful scientific theories. I will also address some objections against such an alternative defense of scientific realism.

Documenting Australia's flora: Ferdinand Mueller's taxonomic use of Ludwig Leichhardt's specimens

Dr Linden Gillbank
University of Melbourne

Room 209-Old Arts
Session 10: Histories of Australian Science and Industry

Abstract

During his few Australian years in the 1840s, Ludwig Leichhardt explored beyond the European invasion frontier and collected plants in areas un-botanised or little-botanised by Europeans. Leichhardt disappeared in 1848, but his substantial herbarium remained in Sydney. The Colony of Victoria's government botanist, Dr Ferdinand (later Baron von) Mueller, was particularly interested in Leichhardt's plant collections. He was pleased to join an expedition along much of the route of Leichhardt's 1844-45 expedition to Port Essington but in the opposite direction – the 1855-56 North Australian Exploring Expedition (NAEE). Mueller examined Leichhardt's collections when he was documenting his NAEE collections in Sydney in 1857 and later when he 'borrowed' them to examine in Melbourne. The locations and times of Leichhardt's collections shaped their taxonomic importance. Especially in un-botanised and little-botanised areas, Leichhardt collected many undescribed species; and Mueller, and also George Bentham, used such specimens to name and describe many new taxa. Many of their names are still in current use. Currently accepted names listed in the Australian Plant Census include over 80 taxa based directly or indirectly on Leichhardt specimens.

Resilience in Ecology and Economics: Competing Ontological Metaphors

Dr Karey Harrison
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South Lecture Theatre (Room 224-Old Arts)
Session 4: Ontological Metaphors and Epistemological Rhetorics

Abstract

This paper will examine the competing ontological metaphors that structure resilience research in ecology and economics. In this analysis I draw on the one hand, on the role of gestalt perception (Kuhn 1962, 114) and concrete analogies in science (Masterman 1970, 77); and on the other from research in cognitive linguistics which treats semantic categories and ontologies as fundamentally metaphoric in character (Mühlhäusler 1985, 2). When we 'pick out parts of our experience and treat them as [if they were] discrete entities or substances of a uniform kind' we have created an 'ontological metaphor' (Lakoff and Johnson 1980, 25). The ontological commitments of ecology and climate science are based on a topological metaphor whose entailments lead to a view of resilience in terms of an unstable balance (Holling 1973, 15) between competing forces and provides ecology and climate science with an ontology consistent with complex systems theory. The ontological commitments of economics and engineering are based on a spring metaphor whose entailments lead to a view of resilience as the stable equilibrium of an entity due to its inherent properties and characteristics, to which it will return to once stress is removed. Mandelbrot and Hudson (2010, 19) show that equilibrium models do not model price changes in financial markets, and Holling (1973, 18) shows that stability is opposed to resilience in ecological systems.

Constitutional Therapy and Clinical Racial Hygiene in Weimar and Nazi Germany

Dr Michael Hau
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*Room 209-Old Arts
Session 6: History of Medicine*

Abstract

The presentation examines the history of constitutional therapy in Weimar and Nazi Germany. Focusing on Walter Jaensch's "Institute for Constitutional Therapy" at the Charité in Berlin, it shows how an entrepreneurial scientist successfully negotiated the changing social and political landscape of two very different political regimes and mobilised considerable public and private resources for his projects. During the Weimar period his work received funding from various state agencies as well as the Rockefeller foundation, because it fit well with contemporary approaches in public hygiene and social medicine that emphasized the need to restore the physical and mental health of children and youths. Jaensch successfully positioned himself as a researcher on the verge of developing new therapies for feeble-minded people, who threatened to become an intolerable burden on the Weimar welfare state. During the Nazi period he successfully reinvented himself as a racial hygienist by convincing influential medical leaders that his ideas were a valuable complement to the negative eugenics of Nazi bio-politics. "Constitutional therapy", he claimed, could turn genetically healthy people with "inhibited mental development" (*geistigen Entwicklungshemmungen*) into fully productive citizens and therefore made a valuable contribution to Nazi performance medicine (*Leistungsmedizin*) with its emphasis on productivity.

Botanical Diplomacy of Sir Joseph Banks (1743-1820)

Ekaterina Heath
University of Sydney

*Room 209-Old Arts
Session 5: Cultural and Political Contexts of 18th and 19th Century Science*

Abstract

The paper will argue that botanical diplomacy was an important contribution to the spread and development of the science of botany in Europe. This paper will analyse Sir Joseph Banks's use of botany to strengthen the ties between the British Empire and countries like Russia, Austria and Prussia in the end of 18th and beginning of the 19th centuries. Gifts of live plants were extremely fragile and the success of the present relied heavily on the expertise of Joseph Banks and Kew gardeners who accompanied them. Such gifts were symbols of growth and flourishing of relationships between the countries hence the tremendous pressure to make sure they travel and acclimate perfectly. The knowledge of Kew gardeners was shared with local botanists and gardeners thus such gifts constituted major developments in botanical science in respective countries. The paper will assert that Joseph Banks carefully constructed the contents of the gifts so as to promote the size and potential of the British Empire as well as its desire for economic independence. The types of plants included in each shipment constituted a meaningful message to the crowned gift recipient who was normally knowledgeable about botany and politics of the day. The paper highlights the particular importance of Australian plants for such transfers and compares Joseph Banks's activities with Governor Macquarie's attempts to grow his international prestige through the gifts of plants to European royals like the Empress of Russia and others.

The Cognitive Integration of Scientific Instruments: Information, Situated Cognition, and Scientific Practice

Dr Richard Heersmink
Macquarie University

Room 205-Old Arts
Session 5: Philosophy of Scientific Practice

Abstract

Researchers in the biological and biomedical sciences, particularly those working in laboratories, use a variety of artifacts to help them perform their cognitive tasks. This paper analyses the relationship between researchers and cognitive artifacts in terms of integration. It first distinguishes different categories of cognitive artifacts used in biological practice on the basis of their informational properties. This results in a novel classification of scientific instruments, conducive to an analysis of the cognitive interactions between researchers and artifacts. It then uses a multidimensional framework in line with complementarity-based extended and distributed cognition theory to conceptualize how deeply instruments in different informational categories are integrated into the cognitive systems of their users. The paper concludes that the degree of integration depends on various factors, including the amount of informational malleability, the intensity and kind of information flow between agent and artifact, the trustworthiness of the information, the procedural and informational transparency, and the degree of individualisation.

The Future Life of the Evolutionary Epic

Dr Ian Hesketh
University of Queensland

Room 209-Old Arts
Session 7: Nineteenth Century Darwinian Thought

Abstract

Much has been written lately about the Victorian “evolutionary epic,” a genre of science writing that situated the emergence of humanity from within the context of the evolutionary story of all life. Historians such as Bernard Lightman and James Secord have argued that this genre worked to popularize a progressive and purposeful framework for evolution in contrast to the contingent and non-teleological version found in Darwin’s *Origin of Species* (1859). However, little has been said about how the genre responded to fears of degeneration and heat death that ramped up the stakes for humanity’s evolutionary future towards the end of the nineteenth century. There were some authors and evolutionary theorists, such as Edwin Ray Lankester and Francis Galton, who advocated taking control of the evolutionary processes to shape humanity’s destiny in an uncertain future. However, this was also a time when evolutionary spiritualism was at its height, and many spiritualists such as Alfred Russel Wallace and Frederic Myers took the opportunity to frame their promotion of an afterlife within the context of an overarching evolutionary narrative. For them, the future life was simply another stage of evolutionary progress. While these two models, the secular and the spiritual, represent very different visions for the evolutionary future, this paper will argue that both were developed to face the same challenge of an uncertain future by advocating the overcoming of contemporary evolutionary constraints, whether in this world or the next.

The Fukushima Effect: A New Geopolitical Terrain— an Overview

Dr Richard Hindmarsh
Griffith University

South Lecture Theatre (Room 224-Old Arts)
Session 8: Science and technology in Social and Political Context

Abstract

This presentation overviews the presenter's and his co-editor's (Rebecca Priestley) volume in press for late 2015: *"The Fukushima Effect: A New Geopolitical Terrain"* (Routledge, NY). The volume presents a range of STS perspectives from the Asia-Pacific, Europe and the US on the "effect" of the Fukushima meltdown on nuclear power development and management four years out from the disaster. Contributors examined the extent and scope of the Fukushima effect in paying particular attention to national histories and policy responses. Topics include the safety of nuclear energy, nuclear waste management, development of nuclear energy vis-à-vis other energy options, antinuclear protest movements, citizen reactions, nuclear power representations, and media representations of the effect. This volume follows on from the presenter's previous book *"Nuclear Disaster at Fukushima-Daiichi: Social, Political and Environmental Issues"* (Routledge Studies in Science, Technology and Society, 2015, NY), which was well received. In that book, a number of implications were identified in regard to managing future nuclear disasters, effective and responsible regulation and good governance of controversial science and technology, and for the future of nuclear power itself, both in Japan and internationally. This presentation on *"The Fukushima Effect"* summarises its main findings and implications from case studies of *Japan, Taiwan, Korea, China, India, New Zealand, Germany and Sweden, Belgium, Switzerland, UK, USA, Russia and other post-Soviet countries, Finland and France*; as well as reflecting on the implications and what progress there has been or not in addressing them from the earlier volume.

A Problem for Bayesians, for their Friends, their Allies, and even their Enemies

Dr Keith Hutchison
University of Melbourne

Room 209-Old Arts
Session 8: Philosophy of Science

Abstract

My title tells you very little, because I am unable to identify the precise doctrines you need to endorse to qualify as a paid-up Bayesian. But my talk is aimed at people who believe something like the following: there is a systematic and reliable procedure for updating the probability you should allocate to an event that has already occurred, as you acquire additional information about that event. Using a simple paradigm of probabilistic reasoning – coloured balls drawn from an urn – I show that if the supplementary information about the ball drawn is acquired after the draw, then any updating is invalidated by a serious infinite regress – because the transmission of information can be biased. It might seem that you can update, if you know how the supplementary information reached you. But you then need to know something else: how you found out about the information process. Yet to use this, you need to know the secondary process that told you how you found out about the primary information process. But then you need to find out how the secondary process was disclosed. Etc.

The Early Royal Society: A Scientific Innovation Commons?

Duncan Law
RMIT University

*Room 209-Old Arts
Session 4: New Perspectives on Early Modern Science*

Abstract

The Royal Society of the 1660s has often been taken as a central institution in the emergence and development of experimental science. In this paper I argue that recent work in political science and economic sociology can bring new light to bear on the governance structures of the early Royal Society. Specifically, I draw on the work of Elinor Ostrom, to argue that the early Royal Society can usefully be seen as a self-organised commons governance institution, analogous to those studied in Ostrom's 'Governing the Commons'. The early Royal Society, I argue, can be analysed as a scientific 'innovation commons', in which both material and intellectual resources were pooled within a self-governing community bound by collectively-agreed and -instituted norms, in the service of the creation of a common fund of scientific knowledge. I show how Ostrom's theoretical and analytic framework can illuminate the way in which Royal Society's governance structures operated. I then make the case that this approach can contribute to our understanding of how the Royal Society's governance structures underwrote the characteristic form of epistemic credibility associated with modern experimental science.

Panpsychism in Simple Robots

Tessa Leach
University of Melbourne

*South Lecture Theatre (Room-224-Old Arts)
Session 9: Humans and Nonhumans in a Technological Age*

Abstract

This paper is about the concept of panpsychism and its application to technological artefacts. Panpsychism is the controversial assertion that some aspect of mind, consciousness, experience or soul is present in all entities in the universe. That is, humans, animals, plants, computers and electrons all have a mind or something like it. Panpsychism has been mentioned in numerous contexts historically in philosophy, and it is occasionally used to avoid the problems associated with the interface between mind and body. More recently, it has become a possible answer to the question "can a computer think?" and has become a minor factor in the development of the nonhuman turn. This paper discusses some of these contemporary interpretations with particular reference to William Grey Walter's robot tortoises, one of the first modern robots. Of note here is the question of whether mind is inextricably tied to the recording of changes. Additionally, the attribution of mind to robots and AI entities is almost always done in association with a human way of describing the object; the robot as a whole might have a mind, but the wheels or batteries usually do not. The concept of the mind is a human idea, and in pushing it beyond the boundaries of organic emergence we encounter biases that remain problems in the study of nonhumans.

Diverse Receptacles of Being: Disability and Later Heidegger

Dr Martin Leckey and Simon Judd-Mole
University of Melbourne

South Lecture Theatre (Room 224-Old Arts)
Session 10: Rethinking Human Agency and Human Flourishing

Abstract

In this paper we consider the contemporary cultural attitudes to disability with reference to later Heidegger. Heidegger was concerned by what he saw as the increasing prominence of technocentric thinking, in which things are viewed as merely resources for human use, and the corresponding threat it posed in closing off other ways of engaging with the world. We discuss some of the ways in which the technocentric culture manifests in response to disability and human flourishing, including proposals to use biotechnology in order to eradicate disability and mould humans to fit a preconceived norm. As an alternative to this ideal, Heidegger offers a vision of a post-metaphysical future in which a variety of 'modes of revealing' the world are able to flourish. We consider how this understanding could be used to support a more inclusive and open attitude towards disability. We look at the commonalities of Heidegger's approach with contemporary theories of social justice, as well as in elements of culture and inquiry that illuminate the value of diverse modes of understanding and function, including those of people with disabilities. Finally, we consider some of the challenges that confront a Heideggerian approach to disability.

Emergency Framing and the Politics of Climate Change

Dr Adam Lucus
University of Wollongong

South Lecture Theatre (Room 224-Old Arts)
Session 3: Framing Action and Debate on Climate Change

Abstract

Over the last decade, there has been a growing awareness amongst climate scientists that international efforts to reduce greenhouse gas emissions (GHG) have got to be scaled up significantly to avoid dangerous anthropogenic interference (DAI) with the Earth's climate system. The threshold at which DAI has generally been agreed to take place is 2 degrees Celsius of atmospheric warming above pre-industrial levels, a target that was endorsed by most of the advanced industrialized nations at COP 2009. However, global GHG emissions have continued to track a business-as-usual pathway, indicating that current atmospheric concentrations of CO₂ at more than 400 ppm and of CO₂e at more than 450 ppm has already ensured that the 2 degree Celsius threshold will be crossed around the middle of this century. While the medium- to long-term consequences of such a scenario remain unclear, catastrophic outcomes cannot be excluded. Nevertheless, calls for emergency action to address what has been described as 'the climate crisis' by some environmental activists and eNGOs have received very little endorsement or attention from mainstream scientists, policy-makers and the media. This paper outlines the more prominent arguments for and against emergency framing of action on climate change in an effort to determine to what extent such framing may be counter-productive, or a potential motivator for more concerted efforts to tackle the problem at the scale and speed which appears to be required.

Of Science, Progress, and Chineseness: Writing about Mineral Use in Chinese History (1849-1920)

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University of Melbourne

Room 209-Old Arts

Session 9: Historical Perspectives on the 19th and 20th Centuries

Abstract

This paper is a critical examination of the changing modes of history writing about mineral use in China from 1840 to 1920. Before the nineteenth century, mineral use in China was neither historically nor scientifically significant, but after the Opium War, a new understanding of minerals arose in China, which highlights the significance of mineral resources for China's position in a newly discovered global world. At the same time, new knowledge of mining and minerals introduced from the West also generated a scientific approach to mineral use. This new approach brought about the confrontations between China's knowledge and Western knowledge, which contested not only the universality of Chinese science, but also the validity of Chinese historical experience of the acquisition and use of minerals in modern context. Once mineral use was integrated with the progress of science and technology, and with the stages of civilization, China's unscientific historical experience in the acquisition and use of minerals undermined its position in the hierarchy of human civilizations. This tension continued to exist, until the early twentieth century when the three-age system afforded China a way of securing its position in human civilization by projecting China's experience and knowledge as part of the continuous, integral, and progressive history of humans' use of minerals. By examining this change, this paper argues that this new way of writing about mineral use in Chinese history as a scientific, progressive, and Chinese issue should be understood in China's awakening nationalism within a global context.

Giving Place to Darkness': The Descent of Evolution and Ethics

Kristy Machon
University of Melbourne

Room 209-Old Arts

Session 7: Nineteenth Century Darwinian Thought

Abstract

T H Huxley's *Evolution and Ethics* is one of the great pieces of Victorian Darwinian literature. But how well has its argument been, historically, read and interpreted? Huxley is sometimes claimed as the progenitor of a so-called 'veneer theory' of ethics in which morality is viewed as having no authentic existence, but rather, as a cultural overlay opposing an essentially selfish and brute evolved human nature beneath. Huxley's refusal to derive ethical principles from the principle of evolution has also been linked to G. C. Williams' characterisation of the biological world as fundamentally immoral. I argue that Huxley's position in *Evolution and Ethics* is no straightforward ancestor of Williams' twentieth century sociobiological view. Nor is Huxley's view discrepant with the inferences Darwin drew from 'descent with modification': Huxley actually understood its implications well. Huxley's argument needs to be read in historical context, as a primarily epistemological position: a product of his agnosticism, his disavowal of materialist and positivist claims, and his view of science as a civilising mission. Sociobiological theories of ethics draw on a technical account of social behaviour regulated from within the organism, shaped by the logic of genetic inheritance. This is in spirit alien to Huxley's sceptical nineteenth century drama of 'man' pitted against an inscrutable, regulating cosmos utterly indifferent to the suffering of its own fallible productions. Considerable care needs to be taken when assessing Huxley's relationship to subsequent normative or descriptive biological approaches to ethics.

The Flames of Debate': The Relationship between Indigenous Fire Regimes and Western Science in Public Post-Bushfire Discussion in South-Eastern Australia

Daniel May
Australian National University

South Lecture Theatre (Room 224-Old Arts)
Session 2: Science and its Publics

Abstract

Public debate about environmental management in Australia has been faced with the challenge of reconciling Western and Indigenous environmental conceptions. This study investigates three post-bushfire debates in South-Eastern Australia in order to highlight the complex and at times uneasy relationship between Indigenous fire regimes and Western science. The aftermaths of the 1939 Black Friday fires, 1983 Ash Wednesday fires, and 2002-3 Alpine fires are examined through debate in both popular media and official forums. Different interest groups drew upon science to contest issues such as future land management jurisdiction, prescribed burning strategies, and blame. The legitimacy of science became a key battleground for different social groups and bureaucratic bodies, and changes and developments in Western science between 1939 and 2003 were reflected in the shift of authority from forestry to ecology. The concept of indigenous fire regimes presented both a challenge and opportunity to protagonists in these debates who sought to either extinguish, redirect or appropriate the firestick as a political weapon.

Why Popper Can't Resolve the Debate over Global Warming: Challenging the 'Un-Reflexive' Uses of Philosophy of Science in the Media and Public Framing of the Science of Global Warming

Dr David Mercer
University of Wollongong

South Lecture Theatre (Room 224-Old Arts)
Session 3: Framing Action and Debate on Climate Change

Abstract

A notable feature in the public framing of debates involving the science of Anthropogenic Global Warming (AGW) are appeals to uncritical images of the ideal scientific method. Versions of Sir Karl Popper's philosophy of falsification appear most frequently, featuring in many Web sites and broader media. These images of science are frequently used as strict ideals against which to critique mainstream AGW science. This use of pop philosophy of science forms part of strategies used by critics, mainly from conservative political backgrounds, to manufacture doubt in the veracity of AGW science. It will be shown that critics of AGW science are not alone in exploiting unrealistic images of science to challenge their opponents, and that prominent supporters of AGW science also make appeals to pop versions of philosophy of science. It will also be suggested that this pattern reflects longer traditions of the use/misuse of Popperian philosophy of science in controversial settings which has broader foundations than the aims of conservative political movements. It will be concluded that studies of the AGW science debate would benefit from taking greater interest in questions raised by un-reflexive public understanding(s) of the philosophy of science of both critics and supporters of AGW science.

The Experiment as Cultural Battleground: Burke, Barbauld and Priestley, 1770-1800

Dr Olivia Murphy
University of Sydney

Room 209-Old Arts

Session 5: Cultural and Political Contexts of 18th and 19th Century Science

Abstract

Much of Anna Letitia Barbauld's poetry demonstrates her keen interest in the scientific activities of her friend Joseph Priestley. Both Barbauld and Priestley belonged to a Dissenting culture that valued science and the spirit of free inquiry more generally. As Priestley's laboratory was in his home, the visiting poet was able to closely observe the conduct of his experiments. Barbauld had a lifelong interest in science and technology, and several of her better-known works have scientific themes. The reception of her poem 'The Mouse's Petition' (1773), addressed to Priestley from the imagined perspective of one of his experimental subjects, fed into an anti-experimental discourse that appears to have blindsided the poet, and foreshadowed the increasingly ferocious political attacks on Priestley. This paper uses evidence drawn from the competing discourses surrounding experimentation in late eighteenth-century Britain, to show that—partly due to Edmund Burke's counterrevolutionary rhetoric—the experimental method became a focus for the increasingly violent cultural conflict of the 1790s. Its aim is to make sense of the entangled issues of religious Dissent, science, literature, politics and gender as they play out in Barbauld's, Priestley's and Burke's writing about experimentation in the years surrounding the Birmingham Riots of 1791. Ultimately this research seeks to discover what role experiments—and attitudes towards them—played in the violent attacks on Priestley prior to his emigration in 1794.

Supervenience and Physicalism: Improving Wilson's Case against Supervenience-based Formulations of Physicalism

James Otis
University of Rochester, USA

South Lecture Theatre (Room 224-Old Arts)

Session 6: Philosophical Problems in Scientific Naturalism

Abstract

In this paper, I look at Jessica Wilson's (2005) argument against supervenience-based formulations of physicalism. I ultimately agree with her analysis, but I suggest she has not gone far enough in making her case. She argues that formulating physicalism in terms of any supervenience relation will not adequately distance physicalism from non-physicalist rivals. This, Wilson rightly thinks, is a failure to satisfy the criterion of appropriate contrast. The truth of physicalism should entail the falsity of non-physicalism. Karen Bennett (2008) responds to Wilson by suggesting that strong global supervenience plus an additional and not vice versa proviso can satisfy Wilson's criterion. I argue that Bennett is wrong on this count, but that Bennett's schema (what I call a supervenience(+) schema represents a potential avenue by which to satisfy Wilson's criterion of appropriate contrast via supervenience. To show what is wrong with this schema, I argue that even if the account satisfies Wilson's criterion, it fails to satisfy an additional criterion that should be included in Wilson's argument to bolster her position. I call this the criterion of appropriate resemblance: any formulation of physicalism must be compatible with historically physicalist positions. As it turns out, Bennett's attempt to satisfy Wilson's criterion leads her to violate my criterion. As a result, I present a dilemma for supervenience-based accounts of physicalism: attempts to formulate physicalism in terms of supervenience will always fail to satisfy either the criterion of appropriate contrast or the criterion of appropriate resemblance. I conclude by suggesting that Daniel Stoljar (2010) and Wilson (2011) have appealed to formulations of physicalism that can satisfy both criteria.

Picturing the Real: Brassier on Sellars

Ross Pain
La Trobe University

South Lecture Theatre (Room 224-Old Arts)
Session 1: Scientific Realism and the Manifest Image (Panel)

Abstract

In an attempt to generate a naturalised account of meaning Ray Brassier utilises a number of concepts developed by Wilfrid Sellars. In particular, he endorses (i) the 'Myth of the Given' (ii) metalinguistic nominalism, and (iii) the concept of 'picturing'. For Brassier, these three together allow us to generate an understanding of meaning that rejects both the appeal to first person intentionality and the claim that thought is fundamentally propositional. This move, it is claimed, moves us closer to scientific realism. I will present a number of problems for Brassier's account, and argue that there are aspects of Sellars' systematic thought that are antithetical to Brassier's realist goals.

The Life and Works of John Charles Buckmaster (1819 - 1908) and Nineteenth Century Science Education

Dr Bill Palmer
Curtin University

Room 209-Old Arts
Session 9: Historical Perspectives on the 19th and 20th Centuries

Abstract

John Charles Buckmaster had a deprived childhood in which he suffered grievous abuse. His primary education was limited and his secondary education was non-existent. His 'real world' education was as a self-taught public orator, working mainly on behalf of the Anti-Corn Law League. Later he trained as a teacher being extremely successful in his chemistry course at the School of Mines. He eventually obtained employment with the Science and Art Department, where he served for more than thirty years as Science 'Organising Master'. He was passionately interested in education especially technical education, promoting agricultural education for boys and cookery for girls and wrote on both these curriculum areas. His first venture into authorship was writing the book *The elements of inorganic chemistry*. His successful career in science from humble beginnings through hard work can be seen as a model of social mobility that became possible in the Victorian era.

Why These Laws?' — Multiverse Discourse as a Scene of Response

Jacob Pearce
University of Melbourne

*Room 209-Old Arts
Session 2: Philosophy of Physics*

Abstract

This paper traces the emergence of 'why' questions in cosmological discourse. By the end of the 20th century, many prominent cosmologists had become fascinated by questions such as 'why these laws of physics?', 'why is the universe the way it is?' and 'why does the universe appear to be just right for life to emerge?' The shift to posing questions beginning with 'why' rather than 'what' or 'how' is a relatively recent development in modern cosmology. In response to these 'why' questions, this paper examines the proliferation of a new cosmological discourse around the notion of a 'multiverse'. Multiverse-related proposals in cosmology have generated much unrest. Critics who see speculative theorizing as delving into the metaphysical are not hard to find. I argue that the charge that multiverse proposals are nothing but speculative metaphysics should not necessarily be considered in terms of Popperian criteria. Rather, I present a historicist reading of what 'metaphysics' means in this context. According to this perspective, cosmology is often charged with delving into metaphysics when it attempts to grapple with questions where there is no agreement on the methods and techniques for getting to grips with such questions. In cosmology during this period, what we see is a well-defined 'scene of response', rather than of fully-fledged inquiry. Thus, intelligible questions may be considered 'metaphysical', but not timelessly so. This conception makes it a rational pursuit for the inquirers to pursue such questions, even if the means of inquiry are contested.

Public Participation and Expertise: Is a Focus on Expertise Elevating Marginal Scientific Credibility?

Aleksandar Petkovski
University of Wollongong

*South Lecture Theatre (Room 224-Old Arts)
Session 2: Science and its Publics*

Abstract

In the past decade there has been a growing concern by some members within the STS community that the STS push for 'opening up' scientific decision-making to the wider public should be constrained by focusing on expertise, consequently excluding some publics from participation. These arguments come in the context of a cultural and political milieu where marginal scientific claims that could potentially shape public policy are rampant. The arguments hinge on the idea that current public participation in scientific decision-making is at an all time high and that expert decisions are giving way to popular decisions that have marginal scientific credibility. In the following paper, I will argue that such a representation is inaccurate and that public participation still puts first the views of experts as opposed to the wider public. The primary site of investigation will be a Australian Federal Senate inquiry conducted in 2011 that explored, primarily, the claim that the positioning of Wind Turbines in rural areas could potentially impact the health of residents living within their proximity. Using this as a quasi-public participation setting I will argue that renewed focus on expertise by some within STS is based upon an incomplete appreciation of the strategies utilised by participants and the settings in which such strategies are conducted. I will argue that participants were drawn into using a pattern of discourse that very much reflects the elevation of expertise and consequently strengthened the scientific credibility of claims that in other, less formal, settings have been poorly received. The implications of these findings will be discussed.

Scientific Realism, Speculative Realism, and Phenomenology

Dr Jack Reynolds
Deakin University

South Lecture Theatre (Room 224-Old Arts)
Session 1: Scientific Realism and the Manifest Image (Panel)

Abstract

Since the work of Ray Brassier and Quentin Meillassoux in critiquing phenomenology via science and mathematics, there has been a renewed interest in understanding whether phenomenology is antithetical to scientific realism and instead supports versions of anti-realism, whether instrumentalism, constructive empiricism, etc. This paper works through the options here, and argues against views (like Meillassoux's and Brassier's, but also endorsed by many phenomenologists) that hold that phenomenology and scientific realism are mutually exclusive.

Institute of Field Physics, Inc: Private Patronage and the Renaissance of Gravitational Physics

Dr Dean Rickles
University of Sydney

Room 209-Old Arts
Session 3: Histories of Twentieth Century Physics

Abstract

The Institute of Field Physics was established at the University of North Carolina, Chapel Hill, in 1955, primarily to study gravitational physics. It was, in no small way, behind the shift from what Jean Eisenstaedt has labeled "the low water mark of general relativity" (1925-1955) to what Clifford Will has labelled "the renaissance of general relativity". The Institute of Field Physics was the brainchild of Agnew Bahnson (closely guided by John Wheeler), a wealthy industrialist with a love physics (and physicists). It followed closely behind another such venture, the Gravity Research Foundation, established and underwritten by Roger Babson, again a wealthy businessman with a taste for physics (primarily all things Newtonian). Though seemingly unlikely, together these two businessmen transformed the research landscape of gravitational physics. In this talk I describe the evolution of gravity research (primarily quantum gravity) as driven by these and other forces, from 1947-1957. In so doing I aim to fill in what I take to be incompletenesses in other discussions of this important transition in the status of general relativity.

The Clinical Anecdote as Sceptical Form

Dr Alan Salter
University of Sydney

Room 209-Old Arts
Session 6: History of Medicine

Abstract

A new form of anecdote appeared in the medical writings of 17th century England, a form whose credibility was grounded not in its clinical authenticity but in its literary structure, language and style. Adopted by authors who lacked first-hand knowledge, these anecdotes came to represent a shared conviction that the norms of medical empiricism weakened in the face of testified experience. I discuss the epistemological conditions under which this form came into being and what function it performed when cited in the conversations and texts of the period.

Between Triviality and Falsity: On Phenomenology's Ambiguous Relationship with Scientific Realism

Dr Ricky Sebold
La Trobe University

South Lecture Theatre (Room 224-Old Arts)
Session 1: Scientific Realism and the Manifest Image (Panel)

Abstract

On the issue of scientific realism, it is often difficult to determine just where the various forms of phenomenology stand. At times phenomenologists seem openly hostile to the very idea of realism and instead embrace some type of idealism, most often of the transcendental variety. Yet at other times phenomenologists proudly proclaim that there is no more realist philosophy than their own. In this talk, I intend to make sense of phenomenology's ambiguous relationship with scientific realism. To do this this, I will frame the issue in terms of Quentin Meillassoux's discussion of correlationism in his *After Finitude*. While I agree with Meillassoux that phenomenology in general counts as an example of correlationism, I qualify this acknowledgment by describing three forms a phenomenologist's correlationism might take: metaphysical, sematic, and epistemic. Depending on which type of correlationism is embraced then determines whether phenomenology is consistent with or antagonistic towards scientific realism. I argue that where phenomenology isn't opposed to scientific realism, its substantive philosophical claims relevant to the issue of realism amount to little more than trivialities; where there is conflict, the claims of phenomenology turn out to be false. Thus, with respect to scientific realism, phenomenology faces the choice of either triviality or falsity. Beyond this, I intimate a way in which the entire debate can be recast as one over the viability of reductive scientific naturalism rather than scientific realism despite first appearances thereby providing a way out of the above unsavoury dilemma.

Is Internet Gaming Addiction Fact or Fantasy?

Gemma Lucy Smart
University of Sydney

South Lecture Theatre (Room 224-Old Arts)
Session 9: Humans and Nonhumans in a Technological Age

Abstract

'Videogame Addiction' is one of the most problematic psychiatric disorders to be recently proposed. It has been placed in Appendix III of the DSM-5 as 'Internet Gaming Disorder' and identified as likely to be included in future editions of the DSM pending further research. Though it is likely that some individuals do experience a clinical addiction similar to that of gambling while engaging in particular activities within videogames, it is the broader conception of videogaming as socially undesirable that is problematic. The scope of games and gamers is partially the limiting factor to our understanding of the complexities of gaming. It could be said there are as many types of games as there are types of gamers, and the research is yet to reflect this diversity adequately. The narrative of addiction provided by the psychosciences encourages gamers to self-define as disordered – both individually and in community. It touches on the issues of identity, selfhood, autonomy and individuality both within and outside of games. It is argued that by pathologising game playing the psychosciences are in part postulating a homogeneous conception of self which is inaccurate and potentially harmful.

Do Plants Feel Pain? Packet InterNet Groper From Little Things Big Things Grow

Cobi Smith
Australian National University

South Lecture Theatre (Room 224-Old Arts)
Session 10: Rethinking Human Agency and Human Flourishing

Abstract

The timing of this paper allows for reflective analysis of the author's experiences returning to Australia in a time of changing laws related to technology and health ethics. Drawing on scholars including Ankeny and Haraway, this paper is a narrative of implications of changing laws for the health of human rights defenders and disaster first responders. It questions what a "reasonable person" does in response to limits on freedom of expression. This relates to global negotiations about safeguarding communities' rights in climate governance. Resilience may depend on interdependence across non-state and intra-state networks, however this is challenged by communications laws. Nonsensical and satirical methods of communication may be a response to changing digital rights - this paper's title is deconstructed showing how knowledge can make sense of nonsense. Haraway (2015, p159) asked "when do changes in degree become changes in kind, and what are the effects of bioculturally, biotechnically, biopolitically, historically situated people (not Man) relative to, and combined with, the effects of other species assemblages and other biotic/abiotic forces?" In a time of unstable domestic science and technology policies and an unstable climate, what happens when people's core values are disassociated from federal governance? Did the Prime Minister eating a whole onion relate to agricultural markets, traditional medicine, The Onion satire or the Tor Project? Or did chaos lead Australians to put out their onions for a fifth Prime Minister in five years? This paper was refined at the "Rethinking Law, Economy and Environment" workshop at UNSW Law in September 2015.

The Use of Concepts in Experimental Practice: Examining the Analogy between Conceptual Structures and Material Instruments

Eden T. Smith
University of Melbourne

*South Lecture Theatre (Room 224-Old Arts)
Session 5: Philosophy of Scientific Practice*

Abstract

Investigations into the active role of material instruments in experimental practice can be further developed to investigate whether the structured use of concepts similarly contribute – outside the control of human intention – to the knowledge generated by scientific experiments. To explore this extension, Andrew Pickering's descriptions of conceptual structures as analogous to material instruments will be examined in relation to recent scholarship around the use of concepts in experimental investigations. This intersection allows Pickering's notion of conceptual structures to be examined in relation to diverse accounts of concept-use actively contributing to experimental scientific knowledge. In doing so, the notion of conceptual structures will be built upon to offer a productive analytic tool for exploring the role of concepts – as used within structured disciplinary systems – in scientific experiments.

What's 'Methodological' about Methodological Naturalism?

Timothy Smith
University of Otago, New Zealand

*South Lecture Theatre (Room 224-Old Arts)
Session 6: Philosophical Problems in Scientific Naturalism*

Abstract

The great barrier supposedly protecting modern science from the scourge of creationism and ID theory is methodological naturalism; the thesis that science, as Eugenie Scott argues, 'is limited to explaining the natural world using natural causes.' This popular view holds that science is committed, a priori, to avoiding supernatural explanations. But this concept of methodological naturalism has recently been contested by Maarten Boudry, who argues that methodological naturalism is not an a priori principle. Instead, supernatural explanations are avoided because of an a posteriori rule of thumb. The chronic failure of previous supernatural explanations in the history of science gives us reason to avoid futures ones. I argue that both Scott and Boudry have got it wrong. Methodological naturalism does not decide what hypotheses scientists should appraise, but how scientists should appraise hypotheses.

Minimalism, Selective Realism, and the Retrospective Strategy

Christian Soto
University of Melbourne

South Lecture Theatre (Room 224-Old Arts)
Session 7: Scientific Realism and Inference to the Best Explanation

Abstract

In this talk, I advance a minimalist approach to selective realism. First, I briefly outline the desiderata of what I call minimalist metaphysics of science, deriving some of its consequences for the defence of standard scientific realism. Second, I look into three versions of selective realism that seek to clarify the scope of realism about scientific theories: epistemic structural realism, the divide et impera strategy and semi-realism. I shall briefly consider a case study from optical theories of light in order to substantiate our analysis of the selective realist debate, looking at the shift from Fresnel's luminiferous aether theory to Maxwell's electromagnetic field theory, and from the latter to the photon theory in quantum electrodynamics. And third, I advance the view that I call retrospective selective realism, which holds the following claims: (i) selective realism should favour a retrospective rather than a prospective approach when it comes to interpreting scientific theories; (ii) the selection criterion for identifying those parts of scientific theories which are likely to survive theory change is to be grounded in science-based considerations rather than in mere philosophical analysis; and (iii) the case study taken from optical theories poses a challenge to the viability of selective realism. In brief, among the questions I shall raise are these: To what extent can realism be recommended regarding the transition from one of the theories of light examined to its successor? Shall we profess uniform belief toward every component of such theories? Or do we have reasons for endorsing degrees of belief about specific theoretical components, varying from acceptance, through tolerance, to outright rejection?

The University in the City: Practical Needs, Urban Culture and Science in Leiden in 1600

Dr Gerhard Wiesenfeldt
University of Melbourne

Room 209-Old Arts
Session 4: New Perspectives on Early Modern Science

Abstract

Early modern Europe witnessed a strong urbanisation process. While this process is sometimes related to the rise of modern science, this is predominantly interpreted as a side effect of the emergence of the bourgeois public sphere. In my talk, I will aim at a broader look at the role of urban culture for the intellectual developments in the seventeenth century by looking at the relations between the University and the City of Leiden. The central argument will be the Leiden formed an exception in Europe, as the foundation of Leiden University was the only one that happened in a large city in early modern Europe. It will be shown that this exceptional status played a pivotal role in the development of science at this university and in the Dutch Republic in general. Through its peculiar setting, Leiden served as a laboratory catalysing developments that would happen in other parts of Europe later on.

Scientific Management Comes to Australia

Dr Ian Wills
University of Sydney

Room 209-Old Arts
Session 9 Historical Perspectives on the 19th and 20th Centuries

Abstract

In 1924, shortly after Lenin's death, Joseph Stalin declared that "The combination of the Russian revolutionary sweep with American efficiency is the essence of Leninism".¹ Stalin's vision of "American efficiency" focused primarily of Henry Ford's mass production techniques and Frederic W Taylor's Scientific Management.² Stalin and Lenin so admired Scientific Management that it became a key feature of soviet centrally planned economies until the 1990s. Given this communist enthusiasm, it is ironic that elsewhere Scientific Management was vigorously opposed by left wing radicals and embraced by conservative capitalists. As had happened in the United States, when it was introduced to Australian workplaces Scientific Management met with employee opposition and, in the case of the New South Wales Railways, became the catalyst for one of Australia's largest strikes, the Great Strike of 1917. With its stop watches and card system to record workers' smallest movements, Scientific Management had the seductive appearance of precision and science yet, it will be argued, and it failed as science in its basic propositions and in its methods. These were not trivial problems. They contributed to employee resistance and meant that, when adopted, Scientific Management was of limited effectiveness in achieving its stated aims.

1. Joseph Stalin, *The Foundations of Leninism: Lectures Delivered at the Sverdlov University in the Beginning of April 1924*, Little Stalin Library (London: Lawrence & Wishart, 1940).

2. Thomas P Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm 1870-1970*, 2nd ed. (Chicago: The University of Chicago Press, 2004), 250.

Representing Simulation as Experiment

Katia Wilson
University of Melbourne

South Lecture Theatre (Room 224-Old Arts)
Session 4: Ontological Metaphors and Epistemological Rhetorics

Abstract

HPS literature varies on the extent to which computer simulation is understood as an experimental activity. Certain commonalities in methodology have lead some scholars to claim that simulation either is, or is strongly analogous to, experiment. It has been speculated that in non-experimental disciplines, like astrophysics, simulations may even 'take the place' of experiment. This presentation explores how the 'simulation as experiment' interpretation is encouraged by rhetorical devices in astrophysical literature. The explicit use of experiment as a metaphor allows simulation to be placed in a narrative where simulation is differentiated from theory – simulated results are the 'other' to which theoretical results are compared. Images from simulations accompany the text in order to enforce this interpretation; first by validating the simulation, and second by inviting the audience to understand the pictures as 'observations' of the 'experimental' system. Through such rhetoric, astrophysics is (re)constructed as an experimental science. This is only temporary, however, as simulation is also widely interpreted as a theoretical modelling technique, a comprehensive way to test theory against observation. The small example of Toomre's criterion shows that appropriate positioning of simulation with respect to both 'experiment' and 'theory' allows simulation to play a role in both prediction and confirmation.

Inference to Unobservables without Inference to the Best Explanation

Dr John Wright
University of Newcastle

South Lecture Theatre (Room 224-Old Arts)

Session 7: Scientific Realism and Inference to the Best Explanation

Abstract

"One common argument for scientific realism appeals to inference to the best explanation: the truth, or approximate truth, of our theories is the best explanation of their success. However, it is far from clear that we are entitled to say that the best explanation is true, or likely to be true, or even (in its theoretical components) true in part. In the paper it is argued, however, that there are some inferences (called "Eddington inferences") which do give us good reason to believe in unobservables." It is possible to establish some form of scientific realism without inference to the best explanation.