Melbourne University Research Conference on the History and Philosophy of Science

February 21st, 2013

Conference Program
HPSGA Welcome

The study of the History and Philosophy of Science has a long tradition at The University of Melbourne. Established in 1946 as the Department of General Science and Scientific Method within the Faculty of Science, the department’s interdisciplinary fundamentals ensured the development of a strong pedagogical connection with the Faculty of Arts into which it eventually merged. The school was formally renamed in 1957 into the History and Philosophy of Science, and subsequently Sociology of Science and Science and Technology Studies were added to the areas studied within the department. We are delighted to have Kristian Camilleri with us today to present our keynote on this epistemic marriage between the disciplines. The University of Melbourne remains one of the few Universities worldwide which offer dedicated degrees in the History and Philosophy of Science.

Recent years have been a tumultuous time for the HPS program, but thanks to the committed and generous efforts of staff the school continues to produce innovative and groundbreaking research and maintain an excellent teaching program. We, the postgraduate association felt that a one day conference highlighting the range of research currently being conducted by our PhD, Masters and undergraduate Honours students would be beneficial for highlighting the ongoing success of the discipline at the University and also provide staff, fellows and friends the opportunity to reflect and provide advice. We are further delighted to have some current staff at the University present their work, as well as postgraduate students from the University of Sydney and the University of Wollongong.

Organization of this day would not have been possible without the generous assistance of the School for Historical and Philosophical Studies and the Faculty of Arts, University of Melbourne.

The venue for the day will be the Geoff Opat Seminar Room, on the sixth floor of the David Caro Building. Morning and afternoon tea will be provided in the seminar room on the seventh floor of the same building. Lunch is not provided, but the organisers will lead all those interested to Prince Alfred’s, a local institution. At the end of the day, from 5:00 pm, drinks and tapas will be served in the Common Room on the first floor of the Old Quad building.

- Alison Marlin, Gordon Dadswell, Morgan Stanley and Marcus Carter
# Conference Timetable

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<td>Of Methodology and Metaphysics: The Contested Scene of Early Relativistic Cosmology</td>
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Paper Abstracts

What is the History and Philosophy of Science? (Keynote)  
Kristian Camilleri

In 1973 Ronald Giere announced that the relationship between the history of science and the philosophy of science was more a “marriage of convenience” than an “intimate relationship”. In the forty years since then, historians and philosophers have hotly debated the question of the relationship. But for the most part they have tended to ignore one another. In the last 10 years, there appears to have been a renewed interest in scholarly work which brings together the historical and philosophical analysis of science, as evidenced in a new wave of conferences and special journal issues devoted to “integrated approaches” and “historical epistemology”. In this talk I will revisit some of these issues, both past and present, before looking at the ways in which the new integrated approaches (some of which are exemplified in current work of our postgraduate students) seek to go beyond the disciplinary divide. Finally I will offer some reflections on the obstacles to a fruitful and constructive dialogue between historians and philosophers of science.

Kristian Camilleri is a Lecturer in the School of Historical and Philosophical Studies at The University of Melbourne.

The Exception that Proves the Rule. The Mohists and Genetic Epistemology  
Mark Winstanley

Genetic epistemology as conceived by Jean Piaget is a science for the acquisition of knowledge. It contends that cognition develops in a universal sequence of equilibria, called stages, due to the action of equilibration. The last of these stages is the formal-operational stage. One of the core cognitive acquisitions at the formal-operational stage is propositional logic. Chinese thought, on the other hand, has been characterised as illogical in comparison to Western thought. Even Chinese mathematics, though very advanced, gives no sign of developing a propositionally based deductive mathematics analogous to Euclidean geometry. In addition, there is little evidence that Chinese thinkers were troubled by the logical validity of their philosophies. In fact, there is no evidence of an equivalent to the Aristotelian analysis of forms of reasoning in Chinese thought. One school of thought is, however, a notable exception to this otherwise valid rule, namely the Mohists. I will attempt to show that the Mohists had attained the formal-operational stage.

Mark Winstanley is a PhD Candidate in History and Philosophy of Science at The University of Melbourne.

Prisoner’s Veins: Failures and Advances in the Treatment of Cholera  
Angeline Brasier

In December 1831 Dr. William O’Shaughnessy presented a paper to the Westminster Medical Society, where he proposed a new treatment for cholera, where patients would be administered intravenous injections of oxygenated nitrogen and saline. This proposal was a remarkable departure from the traditional antiphlogistic paradigm of treatment for inflammatory diseases. In recent historiography much has been written about the
contributions of O’Shaughnessy (and Thomas Latta) to the development of intravenous saline. There has, however, been very little research into the work of Dr. William Stevens, who trialled his saline mixtures on patients in Coldbath-Fields Prison. What followed was a series of therapeutic trials on convict patients aboard the hulks at Chatham and Woolwich, which enabled physicians to better understand the affect of this proposed treatment (and variations thereof) on the human body. This paper will place the researches of Dr. William Stevens into the context of O’Shaughnessy and Latta, and will show how the successes and failures of his trials on convict patients contributed to the development of ingredients that we still use to this day in the treatment of cholera.

*Angeline Brasier is a PhD Candidate and Caroline Kay Scholar in the History and Philosophy of Science at The University of Melbourne.*

**From Scientific Specimen to Cultural Property: Postcolonial Legacies of 20th Century Biological Research in Indigenous Australians**

*Emma Kowal*

In the twentieth century, populations variously characterised as ‘primitive’, geographically-isolated, and - most recently - Indigenous were targeted for study by human biologists who saw them as portals to an earlier moment in the evolutionary past. This paper draws on ethnographic and historical research on a major collection of Indigenous Australian biospecimens formed in the 1960s and held in an Australian institution. For the first decades of its existence, samples were regularly thawed and used for research aimed at furthering biological understanding of Aboriginal Australians and the human species.

When the Human Genome Diversity Project unleashed a global wave of Indigenous anti-colonial sentiment against scientific practice in the 1990s, the institute came to view the collection as a liability making them vulnerable to ethical scrutiny. They recognised that some Indigenous people viewed samples not as scientific gifts but as inalienable cultural property and an extension of the collective Indigenous body. As the samples were collected prior to the bureaucratization of research ethics, the absence of evidence of informed consent left them open to accusations of coercive colonial power relations. The collection was closed down, leaving the samples doubly frozen: ethically and thermally immobilized, inaccessible to Indigenous claims and scientific inquiry.

Recently, I have been involved in a process I term ‘ethical rehabilitation’ that aims to reinsert old Indigenous DNA into the contemporary ethico-political environment. This paper tracks how scientists seek to manage emerging Indigenous ontologies of biospecimens and the genomic future, and refashion themselves into ethical scientists.

*Emma Kowal is a Senior Research Fellow in the School of Social and Political Sciences at The University of Melbourne.*

**What is the New Metaphysics of Science?**

*Cristian Soto*

In recent years there has been a revival of the question of the nature of metaphysics. There are some eminently theoretical issues, namely: is there any proper metaphysical knowledge? Does metaphysics have a particular research framework and a specific methodology? Does metaphysics merely belong to our anthropologically minded arts and humanities, or is it
instead a form of objective, truth-conducive theoretical science? In this paper I firstly examine the idea of a scientific, radically naturalistic metaphysics whose primary goal consists in the elaboration of a systematic view of reality based on our best scientific theories. From the standpoint of this radically naturalistic metaphysics, I secondly examine three widely accepted, although spurious, metaphysical problems, viz., those of parthood, persons, and nothingness. Third, I look into detail the possibility of assessing the epistemic value of metaphysical theories in comparison with the evaluation of scientific theories by using different argumentative strategies such as the under-determination of theories by evidence, the theory-change challenge, the cost-benefit analysis, and the explanatory power. I conclude that if there is any proper role for metaphysics in the search of the nature of reality, its problems must be motivated by, and restricted to, our best scientific research programmes in physical sciences.

Cristian Soto is a lecturer in philosophy at the Philosophy Department of the University of Chile, and is currently working on his doctoral research in the History and Philosophy of Science at The University of Melbourne.

The Megalithic Monuments of Arles and Astronomy in the European Neolithic
Morgan Saletta

The architecturally sophisticated Neolithic monuments of Arles/Fontvieille appear to have been at the center of a major local megalithic culture which extended its influence over the local territory. These monuments, are some of the largest, most impressive and probably among the most important Neolithic monuments in France and Europe

Based on my ongoing research into the sites, I will present evidence of a functional solar alignment of the Arles/Fontvieille monuments. I will also suggest a possible association with the Pleiades and the constellation of Orion of at least one of the sites. The talk will present evidence for both claims, including photographic documentation of a functional and hitherto undocumented purpose of the astronomical alignment of the sites. The functional nature of an equinoctial alignment can presently be demonstrated for three of the five sites, while the Grotte de Cordes, by far the largest of the sites, is oriented with respect to the winter solstice.

Thus on and around astronomically significant periods of the year a shaft of sunlight from the setting sun penetrates the long passages of these monuments and strikes the back wall, producing a striking display of light and illumination that was undoubtedly of ritual importance during the seasonally important periods of the equinoxes and the winter solstice.

The discovery of a functional phenomenon of the astronomical alignment of these sites is of fundamental importance. It may shed light on the relationship of these sites to other European monuments where similar astronomical alignments have been documented and contribute to an analysis of the way cosmological knowledge, ritual practice, belief and social power were constructed into the landscape and territory in the form of these monuments.

Morgan Saletta is a PhD Candidate in History and Philosophy of Science at The University of Melbourne.
Science and Cultural Memory
Gerhard Wiesenfeldt

More than any other cultural activity, physical science is the art of forgetting. A central element of the epistemology applied in physics consists in blanking out everything that is not or no longer relevant – whether it is data that has already been sufficiently interpreted, instruments that are no longer used or cultural practices that are regarded as unproblematic. Yet, as the French sociologist Maurice Halbwachs has noted: Things that are forgotten are not necessarily lost, but continue to be present in collective memory. Jan and Aleida Assmann have used this idea to develop the notion of cultural memory as the archive of symbolic forms that function as traditions in society.

In this paper I want to explore how the concept of cultural memory can be utilised in the study of science. In particular, I want to look at ways the use of cultural memory as analytic category can help our understanding of practices within science that are otherwise difficult to analyse.

*Gerhard Wiesenfeldt is a Lecturer in the School of Historical and Philosophical Studies and Chair of the History and Philosophy of Science program at The University of Melbourne.*

Science and Policy: ‘Science for the People’ vs. The Autonomy of Science
Susan Crase

Science is frequently employed in the development of public policy, although the precise nature of the interaction between the two is contested. Fleshing out the character of the relationship between science and policy has the capacity to create improvements in policy formulation and can enhance the deployment of science. This paper is based on my current honours thesis and will explore the relationship between science and policy.

The paper uses a historical lens by appealing to a debate that arose in the 1940s following WWII. The large-scale mobilisation of science during WWII drew attention to the fact that, under certain circumstances, science could be organised to produce outcomes to the greater benefit of society. It was against this background that scientific philosophers, such as J.D. Bernal, advocated the organisation of ‘science for society’. In opposition, many, including Michael Polanyi, expressed concern that attempts to control scientific outcomes would only serve to stifle prospective growth in science. Notwithstanding the historical nature of this debate, many of the arguments on both sides hold significance in the current political milieu.

The paper concludes with an exploration of the different approaches to modelling the relationship between science and policy. A simplistic and linear model, for example, assumes that science will compel particular political outcomes. I advocate the use of more complex approaches, such as those invoked by Pielke and Brooks, wherein science and policy are intertwined, or even “co-produced”.

*Susan Crase is an undergraduate student at The University of Melbourne, currently completing her Honours degree in the History and Philosophy of Science.*
Australia’s Vaccination Policies and the Scientific Medicinal Model of Health
Judy Wilyman

The aim of this research is to evaluate the ethics of coercive strategies in the Australian government’s vaccination policies. In Australia vaccination policies have been linked to $2,100 in welfare benefits and mandated for health students seeking clinical positions. These coercive measures have been implemented even though the threat from infectious diseases in Australia was reduced by 1950. Historically social medicine was used to control infectious diseases however since the mid-twentieth century the government has adopted the scientific medical model. Adopting this model changed the focus of disease prevention from the environment to a medical intervention: vaccines. The scientific medical model is a paternalistic system that removes individual autonomy and encourages the public to believe that the experts are right. At a time when a doctors’ education is influenced by industry sponsorship and financial incentives it is essential that technical experts are not given power over individual’s lives. Public health policies must also be developed with the participation and consent of the community. This is because a ‘scientific consensus’ on any topic is influenced by the political process. Australian vaccination policies recommend the use of multiple vaccines in infants and adults and this requires accurate knowledge of the long-term health effects from combining these vaccines. This knowledge is unavailable in 2013 because the research has not been done. Coercive strategies in vaccination policies are unethical if they are not founded on evidence-based science.

Judy Wilyman is a PhD Candidate in the Social Science Department at the University of Wollongong.

Racial Prejudice in the Medical Profession? The Case of Refugee Jewish Doctors in Australia 1930-1945
Fallon Mody

The medical profession’s attitude towards Jewish migrant doctors arriving in Australia leading up to World War II can be – according to Rutland and Weaver – largely attributed to racial prejudice: only British migrant doctors were acceptable. These studies, defined by an exploration of a specific race/nationality, have paid inadequate attention to the question of why non-British doctors were almost wholly prevented from practising in Australia. My paper will examine racial prejudice in the medical profession, focussing on how the issue of liberalising registration for these migrant doctors reflected the fraught political relationship between the British Medical Association and the Federal Government in Australia.

The Australian public’s reaction to the influx of migrants following World War II was at best ambiguous and often hostile, however, I argue that attributing the negative reaction to migrant doctors solely to racial prejudice because of broader prevailing sentiment is too simple. By examining the history of organised medicine in Australia and the debate over the impending National Health Scheme, I will discuss the relative unimportance of the question of migrant doctors to the profession when compared to its fight over a federal scheme that threatened the lucrative private practices of Australian practitioners.

In conclusion, a careful examination of existing primary and secondary sources shows the unacknowledged possibility that a set of historical coincidences resulted in a situation that
allowed the medical profession to use Jewish migrant doctors to set an example, where the issue of their nationality was a convenience not the profession’s sole motivation.

Fallon Moody is a PhD Candidate in the School of Historical and Philosophical Studies at The University of Melbourne.

Of Methodology and Metaphysics: The Contested Scene of Early Relativistic Cosmology
Jacob Pearce

This paper looks at the contested conceptual space of modern cosmology during an important early period in relativistic cosmology. Relativistic cosmology was established as a distinct line of inquiry by the early 1930s after the community had accepted that the universe was governed by non-static geometry. Throughout the 1930s and 1940s, the bounds of the conceptual space were highly contested and questions of legitimacy were major concerns for the community.

Throughout this period, explicit philosophical considerations influenced the trajectory of modern cosmology. There was no major theory or even competing theories of cosmology at this point, but a plethora of cosmological possibilities. Several cosmologies and cosmogonies were on the table. First, the debates centred on the best way of proceeding in cosmological inquiry, with a dispute between rationalists and empiricists at its core. Second, questions of metaphysics influenced the legitimate bounds of the conceptual space; metaphysical considerations which will be demarcated into two categories—metaphysical assumptions (connected with methodologies), and metaphysical speculation.

This space is initially opened up by the new possibilities created with the non-static geometric and historical styles of reasoning. Questions, such as notions of origin, which were previously reserved for the realm of metaphysics or theology, explicitly enter cosmological discourse. By 1937, the legitimation debate became quite vehement and scathing, before a new equilibrium is reached by the late 1940s. This middle ground, based on what were deemed legitimate methodological and metaphysical bounds sows the seeds for the Steady State and Big Bang research programs.

Jacob Pearce is a PhD Candidate in History and Philosophy of Science at The University of Melbourne.

A Sketch of the Evolution of the Dark Matter Entity
Katia Wilson

Dark matter makes up 25% of the Universe and yet its precise constitution – the particular esoteric particle that makes up the bulk of the matter – is undiscovered. Nevertheless, most scientists seem to agree that there exists something with certain specific attributes that they call dark matter. This paper will sketch out the evolution of such an entity so far. To do this, the metaphor of a silhouette is employed as a historiographical tool. Doing this emphasises the key feature of the dark matter story – the unknown identity of dark matter – as well as allowing us to see the extent to which dark matter is defined by its outline, that is, by the characteristics and properties assigned to it.

This outline comes about in roughly three stages: first, from the 1930s to the 1960s, dark
matter gained acceptance by representing one explanans for several explananda. In the second stage, from the 1970s to 1980s, particle physicists brought in new candidates for dark matter, which despite their aim, shaped but did not ‘fill in’ the silhouette-entity. In the third stage, from the 1980s to the present day, dark matter is not only being continuously refined, but also acting as if it were an entirely known entity. Dark matter has become predictive, generating new knowledge external to itself. This paper aims to show how, through this process, it has become unnecessary to know the precise identity of dark matter to employ it as a useful entity, as long as the silhouette (the criteria that define the entity) is sharply enough defined.

Katia Wilson is a PhD Candidate in History and Philosophy of Science at The University of Melbourne.

**String Wars: The Scientific Establishment Strikes Back**
Sophie Ritson and Marcus Carter

Blogs have opened up a new form of discourse in physics. We claim that blogs represent a new battleground for epistemic authority, but their status as a form of scientific communication is devisive. A shift into the popular sphere has been argued to be typical in cases of disputed epistemic boundaries (Gieryn 1983) however this very notion of a ‘move’ into the popular sphere is problematic. Correspondingly, so is an attempt to draw a boundary between formal and informal communication. Blogs confound these domains; they represent the public and permanent sharing of communications.

The tag ‘string wars’ belongs to the press who identified the raging and often exceptionally nasty and personal online controversy. Those involved in the string wars often demarcate between the popular and the scientific and the entity of the blog becomes a point of contention within the controversy. In a case where the significant online players do so with established identity the stakes revolve around authority – a concept inextricably and intentionally tied to the demarcation of popular communication from scientific communication.

Existing research into the impact of the internet on scholarly communication has been mostly positive. Technologies such as VoIP applications (such as Skype), email and the bulk online sharing of data traditionally have been neatly conceptualized within the informal domain of scientific communication. This includes, ephemeral communication conducted between private networks for the purpose of developing raw information into scientific knowledge before transition into the permanent, public formal domain of journals, conferences and books. We claim that this distinction is shown to be untenable in the case of the string wars.

Sophie Ritson is a PhD Candidate in the unit for History and Philosophy of Science at the University of Sydney.

Marcus Carter is a PhD Candidate in the Department of Computing and Information Systems at The University of Melbourne.