

*The Present Situation in the Philosophy of Science.*

**Report of the Conference “The Philosophy of Science in a European Perspective”, ESF-Research Networking Programme, University of Vienna, December 18-20, 2008.**

*Friedrich Stadler* (University of Vienna, and Institute Vienna Circle),

*Donata Romizi* (University of Vienna), *Miles MacLeod* (University of Vienna)

The University of Vienna saw witness to the Opening Conference of the ESF-Research Networking Programme “The Philosophy of Science in a European perspective” (PSE) which was organised by the Vienna Circle Institute and took place on the 18-20 December at the Campus of the University of Vienna, 2008. Its overarching aim was to set the background for a collaborative project organising, systematising, and ultimately forging an identity for, European philosophy of science by creating research structures and developing research networks across Europe to promote its development. As such under the general rubric of ‘the present situation in the philosophy of science’, the emphasis was on as a first step identifying traditions and research structures already present, and the directions in which this research was leading.

The conference was organised in this vein according to five pre-established groupings, each represented by speakers from a team. These were as follows in the order of the schedule:

Team E: Foundational and Methodological Debates  
Team A: Formal Methods and their Applications to the Philosophy of Science  
Team B: Approaches to the Foundations of Science: the Place of the Life Sciences  
Team C: The Present Situation of the Philosophy of the Cultural and Social Sciences: The “Naturalist Turn”, the “Social Turn”, and the Discussion on Scientific Realism  
Team D: Philosophical Foundations of the Physical Sciences

Each session was chaired by a member of the Steering Committee (Team A: *Theo Kuipers*, Team B: *Gereon Wolters*, Team C: *Adrian Miroiu*, Team D: *Miklós Rédei*, Team E: *Maria Carla Galavotti*).

To start with a broad overview of the talks themselves, and the accompanying discussion, we can characterise the general themes that were pursued and issues that emerged within the frame of ‘European philosophy of science’. One aspect that came readily to the fore was the strong historical aspects of the ‘European perspective.’ As the opening conference it was of

course important for the philosophers involved to define what could be meant by a European identity, and naturally they focused on the deep historical roots and their continuing traditions in modern philosophy of science. As such there was a strong attention to the historical relations and origins in European history of modern issues, and how in fact this context presented an ongoing influence on the modern practice.

The conference also revealed that this historical dimension is complemented by the evident broad scope of European philosophy of science which embodies not only a strong tradition of history of philosophy of science, but also philosophy with respect to the cultural and social sciences as part of (not separate to) the discipline, combined with more traditional philosophical issues and approaches, such as the application of formal methods, the problem of realism, determinism and chance or the natural kinds debate. This consideration of general philosophical questions in science is married to a strong tradition of engaging naturalistically with the particular philosophical issues in individual sciences where there exists a prerogative of being closely schooled in the relevant scientific theory and research context. Additionally, one can refer to particular positions, like 'structural realism', as 'European', having their origin and their centre of pursuit, and indeed their historical links, in the context of European research.

Combining these elements is the quintessentially European self-reflection on the aims and values of philosophy of science in itself and the right methodology with which to do it. This is an ever-present theme, which traces its roots strongly also in the history of European philosophy. This was raised directly with respect to discussions on 'naturalism' but arose in the context of discussion over formal methods, natural kinds, and the relations between social and cultural sciences and the natural sciences.

In this regard the conference was organised around sessions involving 3 papers with commentaries. The Team Leaders (*Dennis Dieks, Wenceslao Gonzalez, Stephan Hartmann, Thomas Uebel, Marcel Weber*) introduced the sessions elaborating generally on its theme. (The paper by *Marcel Weber*, who became ill shortly before the conference, was read by the chair of session III *Gereon Wolters* (Konstanz)). Each of the 15 papers (with a length of 30 minutes) were followed by 15 prepared commentaries from one invited commentator and a general discussion of 15 minutes.

*Friedrich Stadler* opened and introduced the conference on behalf of the organisers focusing on the pre-history and research background of the programme running for 5 years up to 2013. It is the beginning of a promising interdisciplinary networking and cooperation in the philosophy of science all over Europe with 17 participating countries and structured in 5 teams with more than 60 scholars coming from 22 countries – renowned scientists as well as younger gifted philosophers of science. This collaborative enterprise is based on two previous ESF-research networks on “Historical and Contemporary Perspectives of Philosophy of Science” and on “The Philosophy of Physics”. Together with the “European Philosophy of Science Association” (EPSA) which was founded in 2006 this programme seems a promising forum to improve the cooperation and interaction in the flourishing philosophy of science. Stadler referred to the long and powerful tradition, and the emergence of this research field and later on as a discipline emerging since the beginning of the 20<sup>th</sup> century in the capitals of Berlin, Prague, Warsaw and in Vienna (with the Berlin Group around Reichenbach to the Vienna Circle around Schlick), but also in France and Great Britain. The forced migration of the movements of Logical Empiricism before World War II led to a radical transfer and cognitive transformation, which he characterized as a turn “from *Wissenschaftslogik* (Logic of Science) to Philosophy of Science”. The institutional and academic discipline was a result of this transatlantic interaction and transition. In North America this move has led to an early institutionalization and professionalization of philosophy of science, as became manifest in 1934 with the founding of the Journal *Philosophy of Science* and later on the society PSA. Only decades later, in the 1960s we can recognize a return of these currents back to Europe and a pleasing mutual communication between Europe and the USA. In the meantime there exists a lively cooperation with the North American community, as is documented partly with the PSA meetings, the International Society for History and Philosophy of Science (HOPOS), even if this was not always a symmetric interaction.

Therefore the recent developments and inceptions in Europe are seen as a welcomed scholarly counterpart and a collaborative research activity which is reviving the European tradition and fostering to days’ increasing efforts and potentials in the philosophy of science, but without aiming at an exclusive “Euro-centric” approach.

Already the heritage of the Vienna Circle was not theoretical uniformity but plurality with the principle of tolerance and the acknowledgment of an integrated history and philosophy of science as a heuristic strategy completing the linguistic and semantic turns with a pragmatic-

historical dimension. The reformulation and diversification of philosophy of science was thus pre-coined, even if not yet fully elaborated.

Given this prehistory and intellectual context the Programme is designed as a further development based on earlier conceptions but also challenging from some well known historically determined dogmas. (like analytic/synthetic, theory/observation, context of discovery/context of justification, induction/deduction) incorporating recent European and global research results. Accordingly, the opening conference aimed at addressing the current situation of philosophy of science in Europe with reference to the main topics and recent results as a sort of description and critical account of the state of the art regarding the main foundational and methodological issues.

In the following years the 5 teams will focus in separate workshops related to annual topics from their specific perspective: “Explanation, prediction and confirmation” (2009), “Probability and Statistics” (2010), “The Sciences that philosophy has neglected” (2011). A large closing conference will be held in Bologna on “New Directions in the Philosophy of Science”. A strong interaction and cooperation between these groups with invited speakers in addition is intended and will lead to a series of at least 5 books as proceedings of the programme.

## **Description of the Sessions**

### **Session I: Foundational and Methodological Debates (Team E)**

The first session addressed the role of historical questions and historical traditions in philosophy of science, particular in a European context, to the modern practice. *Thomas Uebel* (“Aspects of Current History of Analytical Philosophy of Science”) drew out just such links by submitting that the history of (analytical) philosophy of science is itself philosophy of science, noting the necessity of some kind of normative criterion for evaluating and understanding these historical positions. Such an historical perspective is also useful for reflecting back on modern positions themselves, for instance on the ‘by-parted meta-perspective’ of science we can trace to Carnap and Neurath, who located the essence of science differently, the former in logic and the latter in its pragmatics, thus studying it from quite contrary perspectives. *Thomas Mormann* in his reply however, questioned the feasibility or even the desirability of distinguishing the history of analytical philosophy of science from

the history of philosophy of science generally, while also putting forward a sceptical position towards this 'by-parted meta-perspective' as a general historically enduring characterisation of philosophy of science.

*Cristina Chimisso* ("Aspects of Current History of Philosophy of Science in the French Tradition") argued for an exceptionalism in regard to French philosophy of science and its history, by virtue of its historical approach to epistemology and the intertwined identity of the historian and philosopher in the French tradition. This marks out a strong historical distinction between the French and analytical traditions. *Anastasios Brenner* however pointed out the strong historical relations between logical empiricism and French philosophers such as Duhem and Poincaré, and also the fact that post-positivists relied on the French tradition to assign the historical perspective a more important role in philosophy of science.

*Michael Heidelberger* ("Aspects of Current History of 19th Century of Philosophy of Science") took up directly the question of the identity of European philosophy of science and its essential dependence on developments in the 19<sup>th</sup> century, arguing for in fact a closer identification today with its historical roots, than could be said 40 years ago, by virtue of the revival of the realism debate (with its acknowledged connection to Mach) and the more modern acceptance of metaphysics and metaphysical discussion (materialist and free-will debates for instance), with their *Weltanschaulich* overtones. *Massimo Ferrari* stressed the importance of comparative studies for making these kinds of connections in order to overcome national and nationalistic narratives and historiographies. Understanding the transfer of ideas is a critical aspect of this. Ferrari pursued this briefly in respect of neo-kantianism and neo-pragmatism, and their historical connections, particular with regard to the development of pragmatism in Italy.

## **Session II: Formal Methods and their Applications to the Philosophy of Science (Team A)**

The second session presented a survey more or less of the general issues occupying European philosophers of science in formal methods, including not just the natural and formal sciences, but also the social sciences. *Stephan Hartmann* ("Formal Methods in General Philosophy of Science: The State of the Art") in this regard drew out as central the continuing problem of

justification, referring to confirmation and the outstanding problems with Bayesian accounts, and ‘coherence’ and its relation to truth and scientific explanation. Hartmann ended by discussing the relatively recent developments and prospects for formal social epistemology. *Vincent Hendricks* in this regard specifically addressed the importance of a notion of ‘agency’ and thereby the need for an epistemic logic (axiomatising knowledge, belief, certainty etc).

In his talk on “Formal methods in the Philosophy of Natural and Formal Sciences” *Hannes Leitgeb* focused on the central notion of “proof”, noting that attention has recently shifted from ‘incompleteness’ questions such as whether there exist absolutely unprovable statements and in general the criterion of ‘closeness to truth’ as a model for proof, to probability instead. *Thomas Müller* emphasised the link between probability and modality in this respect.

The last paper from *Franz Dietrich* (together with *Christian List*) on “Formal Methods in the Philosophy of Social Sciences” dealt with the central problem of providing a theory of propositional attitude formation amongst groups: namely, how the propositional attitudes of several individuals become aggregated into overall collective propositional attitudes. Dietrich and List gave an outline of just such a theory with generality across a spectrum of different attitude types (preferences, judgements, utilities, etc). *Gabriella Pigozzi* raised the importance of ‘models’ in this respect, suggesting the prerequisite of matching a problem with a model choice, in order to define or identify a group judgement on a set of propositions.

### **Session III: Approaches to the Foundations of Science: The Place of the Life Sciences (Team B)**

The session covered some more or less classical questions in the philosophy of the life sciences – the status of ‘natural selection’ as a law, reductionism and natural kinds – but witnessing an evident shift in the discussion of these issues towards considerations of the complexity of actual practice in these fields, rather than with philosophical idealisations.

The paper of Team Leader *Marcel Weber* was read by the Chair *Gereon Wolters*: “Life in a Physical World”. Weber tackled specifically Rosenberg’s interpretation of natural selection as an empirical law underwritten by a notion of propensity. He argued on the contrary that natural selection is not an explanatory concept, but rather a family of models that cannot be universally instantiated. He further challenged Rosenberg’s presumption that biology is normally reductionistic (natural selection being at worst an aberration), arguing that biological

traits are identified functionally and this identification is theory-laden. There is no independence of evolutionary biology from the mainstream in this respect. *Claude Debru* somewhat agreed arguing that biology makes use of models rather than laws, while questioning the need to continue posing ‘reductionism’ as a biological methodology: one can condition natural selection to physical properties without inferring that it is a universal law. Further it should be recognised that biology is a diffuse discipline and cannot be confined in this way by overarching methodological presuppositions.

*Thomas Reydon* (“How special are the Life Sciences? A View from the Natural Kinds Debate”) revisits the problem of natural kinds and their relation to problem of demarcating fields particularly in the life sciences. The discussion itself has stagnated into two extreme viewpoints, the ‘essence’ viewpoint which defines natural kinds by essences and which seem to capture no kinds in the life sciences, and the ‘law’ view which captures almost all kinds (depending on your definition of law), by considering a natural kind a predicate bearing law-like relations. Fodor of course took functional kinds to satisfy this definition and thereby contradict reductionism. However neither are particularly satisfactory theories of natural kinds, leaving us it seems with a moribund concept. However according to Reydon we can at least pose a heuristic for initially recognising potential natural kinds (to help in the future perhaps resolve the natural kind question) and also thus provide a tool for resolving the demarcation question, by identifying those kinds as natural that have succeeded in many different generalisations. *Miles MacLeod* agreeing in general with the direction of Reydon towards an epistemology-first viewpoint of natural kinds, proposed we give up, for the purpose of questions regarding scientific practice such as ‘how are fields constituted’, any kind of metaphysical presumptions about natural kinds, and instead pursue an epistemology-only approach where natural kinds are defined by their use as epistemic tools and ‘natural’ is understood in terms of the beliefs scientists have in them (their underlying existence and so forth) and the influence this has on how they use the associated concepts.

*Mehmet Elgin* (“Reducing Function to Structure: An Example from Biochemistry”) again raised reductionism posing it to be a regulative constraint on biochemical practice. He backed this up partially with scientometric and bibliometric data on the number of papers published which pursued a reductionistic agenda, and also an argument against the multi-realizability argument on the basis that low-level kinds are defined in biochemical contexts by their causal powers and not their structures. Biochemistry pursues reductionism by seeking out and

grouping the objects carrying these powers. These claims were questioned however by *Raffaella Campaner* who pointed to the pluralism of practice in biochemistry much of which she argued is not driven solely by reductionism or has been unsuccessful in the pursuit of it. For the former she cites the organicistic approach to cancer research and for the latter drug-discovery and vaccine research. Reductionistic explanation is just one of the goals of biochemistry and not always possible.

**Session IV: The Present Situation of the Philosophy of the Cultural and Social Sciences: the “Naturalist Turn”, the “Social Turn”, and the Discussion on Scientific Realism (Team C)**

This session dealt with the way in which issues traditional to philosophy of natural science translated to the philosophy of social and cultural sciences and its status, generally and relative to the natural sciences. *Wenceslao Gonzales* in “Trends and Problems in the Philosophy of Social and Cultural Sciences: A European Perspective” set out the prospective avenues of research for the analysis of the status of the social and cultural sciences and what that might mean but with the ambition of trying to formulate a particularly European approach in which this could be done. One can indeed approach this question of status historically and/or thematically. In this regard he underlined the importance of methodological and foundational questions in both respects and their European connection, pointing to ‘naturalism’, the ‘social turn’ and realism as having strong histories and thematic development in Europe. Gonzales perceived this then the investigative framework for Team C towards a European perspective on the question of the status of these fields. *Arto Siitonen* raised two specific questions relevant to this project: to what extent are the social sciences explanatory or predictive, what role does mathematics play in this regard, and the meaning that should be given to the concept ‘European’, i.e. is it cultural or geographic etc..?

*Matti Sintonen* in his “Realism in Social Science. Ontological, Causal, Structural or What?” pursued directly the realism question by attempting to answer the question ‘what’s real in social science?’ In the context of psychology and linguistics we can answer that it is the physical mechanisms underlying linguistic processes and perceptions which carry the reality of those processes and perceptions and which allows us to treat these ‘realistically’. As such it is with mechanism that realism for social science should be given meaning. He applied this in the context of action theory and the debate between causalists and intentionalists to argue that



von Wright's intentionalism can be also given a realist spin in terms of causal mechanism, and we can talk therefore of the causal power of sentences, in so far as they mechanistically linked to beliefs. *Bengt Hansson* responded however by underlining that realism and mechanism are not the same, and 'mechanism' itself has many problematic aspects that prevent its easy theoretical elaboration. To formulate laws one must specify a set-up in advance. Mechanisms are standardized set-ups, but different mechanisms can be used to explain the same things. Mechanism needs to be specified, otherwise many problems are left open, for example: (i) how to specify set-ups; (ii) how to describe composition principles for mechanisms; (iii) how a theory of mechanism should look like: should we describe mechanisms structurally or substantially? (iv) What kind of function do we describe in terms of mechanisms?

Finally *Daniel Andler* raised the question "Is Naturalism the Unsurpassable Philosophy for the Sciences of Man in the 21st Century?" taking the core meaning of the term 'naturalism' to be; 'take natural sciences utmost seriously.' Andler distinguished different forms of naturalism (hard-core naturalism, liberalized naturalism, etc.) and different kinds of questions on naturalism, for example: descriptive ("Is naturalism true or false?"), normative ("Is naturalism right or wrong?") and performative. He argued that we should with respect to the human sciences pursue a minimal naturalism, pushing it as far as it will go but not thinking of it as unsurpassable, noting that anti-naturalists in mind and language for instance have good reason for being anti-naturalistic, but there exist successful naturalistic programs like cognitive science which give us justification for pursuing it provisionally. With respect to the social sciences the situation is more complex, not least deciding what this would mean, i.e. do we mean to make social science akin to the natural sciences or rather to share with the natural sciences the mutual goal of causal explanation. Andler again poses however that in either case it is a methodology that is at least worth trying.

## **Session V: Philosophical Foundations of the Physical Sciences (Team D)**

Team Leader *Dennis Dieks* pursued a principally historical topic in the spirit of forging an historical and European perspective on the philosophy of physics under the heading "The Philosophy of Physics in Perspective". He argued that we need to be more aware of Kant's

importance to the development of logical empiricism, rather than simply attributing it solely to a stream of thought passing from Hume through Mach. This is illustrated through Reichenbach's own rather complicated route to conventionalism which was originally coextensive with the notion of *a priori* in the sense of constitutive of thought (rather than necessary or universal) as an elaboration of Kantianism. Schlick however convinced Reichenbach to drop all Kantian associations and treat conventions as *a posteriori* and alterable when required. Dieks argues that Schlick had in fact misunderstood Poincaré as saying *all is conventional* when in fact Poincaré must have taken some things like the homogeneity and isotropy of space to not be (or simultaneity would have turned out non-conventional). The meaning of conventionalism is thus not an historically concrete notion, but complex which should have ramifications for how we interpret it today. *Mauro Dorato* agreed with Dieks in this respect arguing that "conventional" is an ambiguous word that needs to be qualified. "Conventional" can be conceived of as: (i) opposed to "factual", (ii) constitutive; (iii) more changeable; (iv) non-definable in terms of a physical (causal) relation. While Dorato believes some aspects of Kantian philosophy to have been confirmed by relativity theory, he underlined that neo-Kantianists forget something important: what is constitutive in science must not necessarily coincide with what is constitutive in our experience. Indeed Dorato considers it a main task of philosophy of physics to inquire into the compatibility between physical theories and experience. As to the "conventionality of simultaneity", Dorato argues that this expression is misleading unless one specifies which one of the mentioned meanings is assigned to "conventional".

*Roman Frigg* dealt with the problem of "Chance in Deterministic Systems", namely how it is possible to define chance or interpret probability when systems, as often in physics, strictly obey mechanical laws. Given that the epistemic interpretations are not very convincing the challenge is to formulate a theory of objective chance. For Frigg the question is how to marry the mechanistic viewpoint on events with probability distributions over initial conditions, where of course the issue is making the two meet. Frigg takes as a starting principle 'Humean supervenience', whereby chance is taken to supervene on the class of event that actually happen, or on the totality of facts. The adequacy of the system is measured by the probability it assigns to the actual course of the world. With this we can have compatibility. The mechanist's calculations should not be seen to be determining chance, but as a compatibility test with the information provided in probabilistic terms by the macro-statistician. *László E. Szabó* pointed at some alleged inconsistencies, particularly with the "Principal principle", Frigg's definition of chance and his notion of "credence".

The final paper of the conference was given by *Holger Lyre*'s ("Structural Realism and the Metaphysics of Physics") who introduced structural realism as a dedicated European position. Structural realism as such has developed into numerous positions, with epistemic, ontic, eliminative and non-eliminative versions, all however with rather intransigent problems. Two particular metaphysical problems stand out, namely Newman's problem (which seems to collapse epistemic versions to phenomenalism) and 'Quidditism' (which threatens to make ontological versions contentless if rejected but create indistinguishable worlds if accepted). Lyre proposes a way through these problems with what he calls an 'intermediate structural realism', which admits (structurally defined) intrinsic properties without thus accepting an entity realism with properties independent of structure. Regardless of the success of this however two other glaring problems persist. Namely whether or not structural realism is really a solution to the underdetermination problem (one of its original motivating aspirations) given there are 4 empirically, but not structurally, equivalent formulations of general relativity, and whether an adequate definition of structure can be found. In his commentary *Fred Müller* argued that structural underdetermination is a problem only for dogmatic empiricists, but that nonetheless structural realism is limited in its extent to physics (rather than other sciences) where formulae remain valid even with a change of interpretation.

*Maria Carla Galavotti* the Chair of the Programme in her "Closing Remarks" to the conference drew from this the methodological lesson that a typical trait of European philosophy of science is attention to historical context and the use of history to identify trends in argumentation, and provide perspectives and interpretations on contemporary debates. Especially, she noted at least 3 important insights of the conference: (1) the importance of the historical research, (2) the roots of empiricism in Europe, and 3) the significance of pragmatism for the future investigations. The status quo of philosophy of science after the "historical turn" is characterized by plurality and specialization all over the world. As she put it, the European traits in philosophy of science are the inclusion of the historical roots of current debates and the focus on methodological problems that cross the various sub-disciplines.

As it is the conference was a serious attempt to open up the subject of European philosophy of science to real thought, and provide the structural basis for the interdisciplinary development of its specialist fields, but also to provoke reflection on the idea of 'European philosophy of science' and begin a contemporaneous reflection on what we might mean by it, and how in

fact awareness of it could assist philosophers interpret and motivate their research through a stronger collective identity.

[www.pse-esf.org](http://www.pse-esf.org): Research Networking Programme “The Philosophy of Science in a European Perspective (PSE), European Science Foundation

[www.epsa.ac.at](http://www.epsa.ac.at): European Philosophy of Science Association

[www.univie.ac.at/ivc](http://www.univie.ac.at/ivc): Institute Vienna Circle

Vienna, June 2009