Workshop

The Origin of Concepts: Philosophical analyses and historical accounts

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Käte Hamburger Kolleg: Cultures of Research (c:o/re); RWTH Aachen University;

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The origin and nature of concepts was a central issue in the debate between Rationalism and Empiricism in the seventeenth century, particularly between John Locke (1632–1704) and Gottfried Wilhelm Leibnitz (1646–1716). Rationalists believe that concepts are based on innate ideas, whereas Empiricists hold that concepts are human products based on empirical (mainly sensory) data. Both positions regard the inquiry into the origin of concepts as a key to determine whether it is possible for humans to attain certainty or not. Innate ideas seem to guarantee a God-like knowledge, certain and comprehensive knowledge, whereas empirical products of the mind can only allow for a limited, pragmatic kind of knowledge. While these two schemes capture some relevant aspects of the formation of concepts, they neglect crucial aspects of actual concepts and their historical contexts. Rationalism cannot successfully account for either the making of new concepts or the fading of others in certain contexts. To deny the historical aspect of concepts amounts to denying the vitality and development of human understanding and the progress of science. By contrast, traditional empiricism leads to either relativism or skepticism, neither of them provide a productive framework for science. The proposed workshop will examine such problems as well as alternative possibilities that allow for a broader understanding of the origin and nature of concepts.

ABSTRACTS

Paradoxes and the origin of concepts

Ruth Lorand (University of Haifa)

Along the history of western philosophy, paradoxes have been considered an indication of a flaw of reason. Theories of the origin of concepts propose ways to avoid paradoxes and arrive at clear and correct thinking. Two basic schemes were presented: either concepts are innate ideas or based on sense data directly experienced. I argue that both schemes have failed to account for the occurrence of paradoxes. I further argue that paradoxes are inevitable not because of some flaw of reason, but because concepts are created in order to solve problems and as such carry within them traces of inherent conflicts. Concepts are neither true nor false; rather, they are effective or ineffective in their relevant context. In everyday life, the inherent tension that concepts carry does not normally interfere with the concept's function. However, in the philosophical laboratory, where the concept is detached from its functional context, it faces severe demands for coherence and consistency. It is then that the inner tension surfaces and paradoxes emerge. Given the amount of literature devoted to paradoxes in any philosophical field, the unavoidable conclusion is that no concept is immune to paradox. I claim that it is not the fault of the intellect nor the result of concepts' imperfection; rather, it is a manifestation of the history of human experience, its conflicts and creative solutions. Like any human product, concepts may lose their effectiveness with changing circumstances, new problems arise, new aspects of old problems that demand revisions—sometime slight changes, sometime drastic turns. This is apparent when reviewing history of science, social structures, or advance in technology. I illustrate these claims with cases from the history of philosophy.

Concepts as material and performative constructs

Arianna Borrelli (Technische Universität Berlin and Bielefeld University)

Scientific concepts are accessible to historical and philosophical analysis only insofar as they are expressed and communicated in specific ways in situated contexts, and as such necessarily possess a material and performative character which can only be neglected at the risk of analysing not scientific practices, but their idealized, disembodied reconstructions. While in the last decades the intimate link between concept formation and the material, performative aspects of knowledge production has been recognized for notions with a closer link to experiment, conceptual practices involving physical-mathematical formalisms are still usually approached as if they were disembodied and could be distinguished from their possible representations. Yet science is a collective enterprise and so all its conceptual practices are necesssarily embodied in a broad range of media like symbols, words, images, formulas, measurement units, instruments or standard procedures. These can also be variously interconnected: a concept emerging within a specific experimental set-up can come to be expressed in words or formulas, and eventually regarded as embedded in other instrumental practices.

Approaching concepts in this way allows to better grasp the interplay between theory and experiment, which often remains unexplored by historians and philosophers focusing exclusively on one or the other topic. It also helps to overcome artificial distinctions between epistemological and socio-cultural analyses of scientific practice. Moreover, in this way one realizes that many fundamental scientific concepts cannot be captured by a single, coherent definition, both because their different medial expressions are not necessarily fully equivalent and because even the same expression can mean differently to different actors or in different contexts. In my paper I will demonstrate and support this thesis by discussing concrete examples of scientific concepts, their origin and there transformation. I will also address the tension arising from this approach between a practice-oriented historical epistemology and analytical-philosophical attempts to provide normative definitions or ontological interpretations of scientific theories.

The role of concepts in scientific practice: Kepler's concept of path that transformed astronomy

Bernard R. Goldstein (University of Pittsburgh) and Giora Hon (University of Haifa)

It is hard for us to imagine that before Kepler (d. 1630) astronomers did not track the path of a planet; rather, the practice was to develop methods for finding the position of a planet at any given time. This is what is called "positional astronomy". Up to Kepler, astronomers did not associate planets with a path. In this long-standing tradition astronomers only considered two dimensions, celestial longitude and latitude. The third dimension, distance from the center of motion (or depth), was considered in a different domain, namely, cosmology, where the geometric models were transformed into a system of orbs—solid spherical shells to which the planets were attached. In sum, before Kepler no one had traced the path of a planet in three-dimensional space. We ask: What led to the change by which astronomy and cosmology were set on a new foundation where a planet was associated with a trajectory? What was the problem that Kepler recognized that made him rethink astronomy and cosmology, producing a "new astronomy" whose practice is entirely novel? We show that, by introducing the concept of path into astronomy in response to a new problem, the goal of astronomy was henceforth to give a causal account for the path of a planet in terms of forces. Kepler undermined traditional astronomical and cosmological theories, and singlehandedly revolutionized the practice of astronomy.

„…*wonach es wirklich realisierbare Spielvorgänge gibt*" – Richard von Mises' concept of probability, or how to axiomatize everyday experience

Dawid Kasprowicz (RWTH Aachen)

In the first 30 years of the 20th century, a considerable number of scientific publications addressed the concept of probability. While most of these publications sought to formulate a mathematically founded theory of probability (like, e.g., Hans Reichenbach 1891-1953), the approach of the Austro-Hungarian mathematician and Vienna Circle-associate Richard von Mises (1883-1953) begins with the everyday experiences of seemingly random events. These events could happen in a casino, in a dice game, in "social mass phenomena" like life insurances, but also in physical domains like thermodynamics. For von Mises, the common ground of his concept of probability was "a practically unlimited sequence of uniform observations".

I will argue in my paper that von Mises' concept of probability is more than an episode in the long history of the probability calculus. His two axioms (the *Grenzwert* of the collective and the *Regellosigkeit*) refer to everyday experiences that should deliver the empirical material for a so called "rational concept of probability". This criteria for "rationality" does not need a theory of scientific reasoning like in other positions of the Vienna Circle, e.g. Carnap's (1891-1970) "Logical Structure of the World" (1928).

I show in my talk that this neglect of von Mises can be explained by two factors related to his concept of probability: First, the non-formalistic and theory-free understanding of everyday experiences of random events and, second, his idea of the probability calculus as a discipline of applied mathematics that offers solutions to empirical problems with mathematical tools, but without an overarching theory of what mathematics could or should be. In this sense, I will give an outlook on Richard von Mises as an early operationalist when it comes to the impact of mathematical concepts in empirical sciences.

Hans Blumenberg's „Theorie der Unbegrifflichkeit" and its Relation to Historical Epistemology

Hans-Jörg Rheinberger (Max Planck Institute for the History of Science, Berlin)

What I would like to do in my contribution to this conference is to have a close look at Blumengerg's reflections that Anselm Haverkamp published posthumously under the title of a *Theory of Unconceptuality* (*Theorie der Unbegrifflichkeit*, Suhrkamp, Frankfurt am Main 2007). It appears to me that, insofar as historical epistemology can be looked at as a particular form of dealing with scientific concept formation – in the aftermath of Georges Canguilhem – Blumenberg's reflections about conceptual underdetermination can and will contribute to a better understanding of the scientific research process as a procedure in which conceptualization *in statu nascendi* plays a key role.

Mathematical concepts and background metaphors: A view from Hans Blumenberg

Michael Friedman (Tel Aviv University)

Mathematics is usually thought of as a discipline whose objects and concepts are abstract, independent of any sense experience, and whose truths are necessary. While this view is still accepted in the philosophy of mathematics, when examining the incessant changes and developments of mathematical domains, the question arises, how do mathematical concepts emerge and develop. Following Hans Blumenberg, I aim to discuss how can metaphors account for the formation of mathematical concepts or for changes in mathematical practices. In contrast to the above-mentioned view, I claim that the metaphorical frameworks accompanying conceptual changes in mathematics are essential for an understanding of how such changes have been accounted for and how mathematical concepts emerge. While Blumenberg himself did not develop a full-fledged philosophy of mathematics, I aim to show that one can nevertheless extract from his writings a unique position concerning the role metaphors play in mathematics.

Concept formation and epistemic automatism
Rethinking Michael Polanyi's concept of tacit knowledge

Gabriele Gramelsberger (Aachen) & Daniela Zetti (Lübeck)

Michael Polanyi's concept of tacit knowledge, which he outlined in his 1966 book *The Tacit Dimansion*, is still the most developed theory of tacit knowledge today. He outlined a differentiated concept of the formation of tacit concepts through the embodiment of procedural knowledge. The paper briefly introduces Polanyi's theory and develops it further into a critical consideration of epsitemic automatism, which is promoted today by digital technologies.

Lines of Force. Paul Valéry on Leonardo da Vinci and Michael Faraday

Caroline Torra-Mattenklott (Aachen)

In his early essay *Introduction à la méthode de Léonard de Vinci* (1894), Paul Valéry outlines the model of a universal mind. According to Valéry, the continuity of Leonardo da Vinci's intellectual operations, ranging from painting to theories of vision and to the invention of flying machines, lies in a method he calls *logique imaginative*. Valéry sees a similar imaginative logic at work in the thinking of Michael Faraday and Lord Kelvin, who, starting from observation, arrived at new concepts by developing visual representations and mechanical models. In my contribution to the workshop, I will explore Valéry's theory of imaginative concept formation with particular reference to Faraday's concept of *lines of force*. Drawing on Valéry's scattered reflections on lines of force in his notebooks (*Cahiers*) and with a view on the career of the concept in the theory and practice of Italian Futurism, I will show how the imaginative logic described and applied by Valéry leads to a further development of Faraday's physical concept into an aesthetic one, a transfer that exemplifies the idea of universality that Valéry elaborates with regard to Leonardo.

On the origin and development of scientific concepts:
Light rays and lines of force

Friedrich Steinle (Technische Universität, Berlin)

In studying the historical dynamics of scientific knowledge, concepts constitute central objects. Their study, however, poses difficulties and challenges that have to do with their specific character as basic components of scientific thought: Much as in everyday life, they are constantly used but scarcely addressed as such. While we speak about chairs, cats and cauliflower, or about temperature, bacteria, and oxygen, we rarely put those concepts themselves in question. At the same time, processes of their formation and development are shaped by a bewildering variety of factors, including wider cultural aspects. Historical studies help us understanding both the complexity of scientific concept formation and its implications, i.e. the historical baggage of scientific concepts. In my talk, I shall discuss those features and illustrate them by two cases from the history of physical sciences: light rays and lines of force.

Summing up and round-table discussion

Martin Carrier (Bielefeld Univeristy)