

Thursday, June 24 PM 1:30-4:30

Session 3 (room 140): **20th Century Philosophy Science I**

Anastasios Brenner, "Bachelard and Kuhn on Rational Criteria"

Angela Potochnik, "The Shift in Wittgenstein's Position on Syntax"

Chris Pincock, "From Philosophy to Psychology and Back: The Role of Richard Semon in Russell's *Analysis of Mind*"

Mathieu Marion, "A New Look at Wittgenstein on the Surveyability of Proofs"

"Bachelard and Kuhn on rational criteria"

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Bachelard and Kuhn were both advocates of a historical approach in philosophy of science. They are considered to be the leading figures of such an approach respectively in France and North America. Their conceptions present several similarities. Most obviously, Bachelard and Kuhn put forth a discontinuism with respect to experience (*rupture épistémologique* and gestalt switch) and historical development (scientific revolutions). But there are notable differences: Bachelard's technical materialism lacks a counterpart in Kuhn. In order to draw a precise comparison of these two thinkers, I focus on the theme of scientific rationality.

This was a major topic for Bachelard, and Kuhn in the development of his thought came to place more and more importance on the rational criteria of choice. He was seeking to explain that theory choice is not entirely subjective. A basic list of criteria can be drawn up: accuracy, consistency, scope, simplicity and fruitfulness. These criteria play an important role in scientific activity. They guide the scientist in the process of reaching a decision and provide a means for ensuring communication between proponents of different paradigms. At the same time it must be acknowledged that rational criteria may come into conflict and are not unambiguous. The criteria admit of several interpretations, and Kuhn was intent on placing them within the framework of his theory of scientific change.

It should be noted that the criteria are not unrelated to notions of truth. Accuracy suggests the idea of a correspondence between thought and thing. Consistency points in the direction of a coherence theory. Fruitfulness is a pragmatic criterion. The need to resort to a whole array of rational criteria means that truth is multifarious; scientific rationality leads to a philosophical pluralism. This brings us close to Bachelard. It enabled Kuhn to differentiate: gestalt switches and conversions concern individuals; the acceptance of a paradigm by a community is a social phenomenon. Rational criteria are share values. Likewise for Bachelard scientific rationality was embodied by the community of scientists (*cité scientifique*). A careful study of Bachelard's and Kuhn's conceptions of scientific values should help us understand better the differences between French and American styles of philosophy of science.

The Shift in Wittgenstein's Position on Syntax
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This paper addresses the changes in Ludwig Wittgenstein's position regarding the nature and status of logical truth from the *Tractatus* to the early 1930s, when he was in conversation with Friedrich Waismann and Moritz Schlick of the Vienna Circle. In the *Tractatus*, logical truths are merely tautologous propositions. By 1930 though, Wittgenstein had significantly expanded his notion of logical truth to include the relations among senses of words. This changed position regarding the nature of logical truth seems to force a change in the status accorded to these truths. Thus the question is raised for Wittgenstein as to whether logical truth—and the syntax comprised thereof—is a matter of convention. Characteristically, Wittgenstein's remarks from this time fail to explicitly settle the issue, yet they are of course extremely suggestive. He has certainly moved toward a greater conventionalism regarding syntax since the *Tractatus*, but at least in some moods he seems unwilling to embrace a full-blown conventionalism. Indeed, his remarks to Schlick and Waismann seem to indicate a more conventionalist view of syntax in general, yet they also include clear departures from this conventionalism. I suggest that his position might be seen as an unwillingness to embrace conventionalism in the sense of the wholly arbitrary determination of syntax. Instead, he may have in mind a combination of limitations due to the logical properties of the world and pragmatic selection. Thus, while Wittgenstein is led by his expanded notion of logical truth to accept some role for conventionality in the determination of syntax, he stops short of full conventionalism. It is questionable, though, whether such a stance is allowable, given his position on related issues.

From Philosophy to Psychology and Back: The Role of Richard Semon in Russell's *Analysis of Mind*

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One of the most vexing issues for Russell scholars is to explain what could be called Russell's 'psychological turn' in the *Analysis of Mind* of 1921. In this paper I examine the role of the German psychologist Richard Semon (1859-1918) in Russell's thinking between 1913 and the *Analysis of Mind*. While Slater has recognized the "profound effect" (*Collected Papers of Bertrand Russell*, volume 9, xx) that Semon had on Russell, no sustained investigations of this effect have yet been made.

Based on correspondence, I date Russell's study of Semon to the summer of 1919. Just prior to this Russell had tried to give a largely physiological or even behavioristic analysis of belief. But upon reading Semon, Russell placed Semon's "mnemic images" at the heart of his approach and by 1923 he was prepared to criticize Ogden and Richards for not using images in their account of representation: "they pride themselves on not using images in their account of reference, yet it is difficult to see how anything except an image of a flame can have the requisite similarity to what

has been formerly caused by a flame” (ibid., pp. 136-137). The bulk of the paper presents the steps that led Russell to this conclusion. It is especially puzzling in light of Russell’s earlier claims that a subject can be directly acquainted with non-mental entities.

In the end, I conclude that Russell changed his views based on the confluence of philosophical and scientific factors. Philosophically, Semon’s images filled out his new conception of belief and so finally allowed him to overcome the problems with propositions that sunk the 1913 *Theory of Knowledge* manuscript. These developments in psychology, though, also fit in with Russell’s desire to use philosophy to give sophisticated interpretations of our best scientific theories. This responsiveness to science is at the heart of his later rejection of images, so that by 1926 Russell could claim ““images” should not be introduced in explaining “meaning”” (ibid., 140). By this time, though, the science that occupied Russell’s attention was physics.

A NEW LOOK AT WITTGENSTEIN ON THE SURVEYABILITY OF PROOFS

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In *Remarks on the Foundations of Mathematics* [5], Wittgenstein argues that in order to understand R :

$$R: [\exists!_{200}(Gx) \ \& \ \exists!_{200}x (Hx) \ \& \ \forall x \neg(Gx \ \& \ Hx)] \rightarrow \exists!_{400}x (Gx \vee Hx),$$

one must already have prior knowledge of the arithmetical equation $200 + 200 = 400$. It is usually assumed that there is no circularity in the fact that the numerals occur as indices in R , because one could avoid them by using sufficiently many variables. To use a terminology borrowed from Bolzano [4], one may further see R as the ‘ground’ for $200 + 200 = 400$. Here, Wittgenstein would claim instead that the ‘ground’ is rather the unabbreviated form of R and that it would be unsurveyable, since it would lack visual cogency (one would need to *count* the variables to see that R is true). If the unabbreviated R is unsurveyable and does not convince, then it is not a ‘ground’: “if you have a proof-pattern that cannot be taken in and by a change of notation you turn it into one that can, then you are producing a proof, where there was none before” [5, iii, § 2]. This argument can be made to work against obvious objections. (For details, see [3].)

Proofs must be (a) *reliable* (if there is a proof $\text{Pr}(s)$ of s , then s must be the case) and (b) *recognizable* (if there is a proof $\text{Pr}(s)$ of s , then it must be possible to recognize $\text{Pr}(s)$ as a proof of s). Wittgenstein’s argument is based on (b) and one can give it a radical anti-realist formulation [2]. Establishing a parallel between Bolzano’s grounds and Gentzen’s normalized proofs or proofs without cut, one draws dramatic conclusions. Cut-elimination causes a non-elementary increase in the lengths of proofs, e.g., in the case of predicate calculus it introduces an hyper-exponential increase. Results such as this show that normalization or cut-elimination are, typically, a matter of possibility *in principle* but also that cut-elimination destroys all intelligibility (i.e., (b) does not hold anymore) and, according to Wittgenstein’s argument, cut-free proofs could not be seen as proofs at all, let alone as ‘grounds’ for proofs with cuts. This suggests a study of the properties of surveyable (or short) proofs through, e.g., logical flow graphs as in [1].

- [1] A. Carbone, 'Cycling in Proofs and Feasibility', *Transactions of the American Mathematical Society*, vol. 352, 1999, 2049-2075.
- [2] J. Dubucs & M. Marion, 'Radical Anti-Realism and Substructural Logics', in A. Rojszczak et al. (eds.), *Philosophical Dimensions of Logic and Science*, Dordrecht, Kluwer, 2003, 235-249.
- [3] M. Marion, *Wittgenstein, Finitism, and the Foundations of Mathematics*, Oxford, Oxford University Press, 1998.
- [4] A. Tatzel, 'Proving and Grounding. Bolzano's Theory of Grounding and Gentzen's Normal Proofs', to appear.
- [5] L. Wittgenstein, *Remarks on the Foundations of Mathematics*, Cambridge Mass., MIT Press, 1978.