

ISPC 2007 third editorial

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The papers by Joseph Earley, Klaus Ruthenberg and Rom Harré are the last to be published from the 2007 International Society for the Philosophy of Chemistry Symposium held at the University of San Francisco. The previous papers from the symposium can be found in *Foundations of Chemistry* v11.1 and v10.3. Together these three papers form a conversation on the epistemology and ontology of element and substance, a subject of on-going interest to philosophers of chemistry.

Earley and Ruthenberg, two well-known chemist-philosophers, directly engage one another on the use of the terms '*einfacher Stoff*' and '*Grundstoff*' by Fritz Paneth (an important early twentieth century chemist-philosopher). Earley uses a linguistic framework to dissect Paneth's terminology and explicate its polysemic underpinnings. Translated as 'simple substance' and 'basic substance' respectively, he suggests that these provide "alternate meanings of the term element", where *einfacher Stoff* is an element in the Lavoisierian sense, while *Grundstoff* encapsulates the conceptual notion of an element (i.e., within a compound, bound to other elements) that chemists actually use, and is therefore not 'a substance' in either the vernacular or philosophical sense. To prove this he tracks the etymological progression of the word 'substance' from Aristotle onward, ultimately proposing that *einfacher Stoff* be translated into 'elementary substance' and 'element' be "available for exclusive use as an English translation of *Grundstoff*".

While Earley separates Paneth's philosophical understanding of element and substance from Kant's transcendental schema of phenomena and noumena, Ruthenberg argues that Paneth's philosophy is directly grounded in Kant's epistemology and that therefore a linguistic analysis is insufficient. By reframing *einfacher Stoff* as *observables* and *Grundstoff* as *non-observables* he tracks Paneth's shifting conception of element/substance from that of the purely phenomenological (1916) into the realm of the transcendental (1931). Once tied to Kant's philosophy, Ruthenberg untangles the intricacies of the connection by showing that whereas Paneth's empirical view on simple substances does not, in fact, quite square with Kant's (as expressed in the *Critique of Pure Reason*), his notion of basic substances as "theoretical concepts rather than existing things" accords well with

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Kant's and other antirealists (like Frantisek Wald, a chemist and Paneth's contemporary). This epistemological perspective also leads Ruthenberg to take exception with Earley's substitution of 'elementary substance' for 'simple substance'. He finds both terms equally ambiguous (i.e., both empirical and transcendental), and instead suggests that modern chemists embrace such linguistic ambiguity as a truer reflection of the conceptual nature of chemical entities themselves.

Rom Harré is a distinguished philosopher and author of more books than most of us have had hot dinners, to use the delightful British expression. In his article in this issue Harré discusses three alternatives to the traditional ontology of chemistry, which assigns attributes to substances. These alternatives include two approaches which Harré calls 'dynamism' and which are based on such notions as causal powers and dispositions that Harré has written about extensively. Different versions of these ontological approaches have been developed by Joseph Earley and Harré himself and are collectively known as the Georgetown ontology given the association of both authors with Georgetown University in Washington DC.

A third alternative to the traditional substance/attribute ontology is trope theory. The main purpose of Harré's article is to provide a critical examination of tropism. His conclusion is that trope theory is not as applicable to chemistry as the various ontologies of dynamism that are currently on offer.