Philosophy of Science

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Continental philosophies of science tend to exemplify holistic themes connecting order and contingency, questions and answers, writers and readers, speakers and hearers. Such philosophies of science also tend to feature a fundamental emphasis on the historical and cultural situatedness of discourse as significant; relevance of mutual attunement of speaker and hearer; necessity of pre-linguistic cognition based in human engagement with a common socio-cultural historical world; role of narrative and metaphor as explanatory; sustained emphasis on understanding questioning; truth seen as horizonal, aletheic, or perspectival; and a tolerance for paradoxical and complex forms of expression.

Philosophy of science in the Continental tradition is thus more comprehensive than philosophy of science in the analytic tradition, including (and as analytic philosophy of science does not tend to include) perspectives on the history of science as well as the social and practical dimensions of scientific discovery. Where analytic philosophy is about reducing or, indeed, eliminating the perennial problems of philosophy, Continental philosophy is all about thinking and that will mean, as both Heidegger and Nietzsche emphasize, making such problems more not less problematic. Continental philosophy of science engages not only the world of the scientist (Heelan 1965: 4; see contributions to Babich 2002 as well as Knorr-Cetina 1999) but the scientists themselves: 'I cannot conceive myself,' Merleau-Ponty writes in his *Phenomenology of Perception*, 'as nothing but a bit of the world, a mere object of biological, psychological or sociological investigation' (Merleau-Ponty 1962: viii). For Merleau-Ponty, the scientist-in-the-world is the condition, *sine qua non*, of scientific inquiry. Continuing in this deliberately first-person voice, he writes, 'I cannot shut myself up within the realm of science. All my knowledge of the world, even my scientific knowledge, is gained from my own particular point of view, or from some experience of the world, without which the symbols of science would be meaningless.' (Merleau-Ponty 1962: viii; see too Husserl 1970: 258–261, 295) Like Merleau-Ponty, both Edmund Husserl and Martin Heidegger were deeply responsive to (and Husserl was arguably influential upon [Neumann 1999; Gethmann 1991, 28–77]) then-current developments in natural science. And in the case of Ernst Mach, Pierre Duhem, Gaston Bachelard, Georges Canguilhem, Bernard d'Espagnat, and Patrick A. Heelan, Continental philosophy of science features philosophers trained as scientists just as Edmund Husserl was formally trained as a mathematician and Martin Heidegger was a student of both logic and physics.

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Like other areas of Continental philosophy, Continental philosophy of science is not limited to a geographic locality (Prado 2003). But if mainstream philosophy of science is pursued in an analytic tradition that prizes universality and univocity, Continental approaches to the philosophy of science celebrate a plurality of traditions, including post-colonial perspectives, in terms of differing cultures and contexts in the collision between the interests of global capitalism and industrial development understood in terms of scientific management and its technologies and the living earth. Although the original authors of the Frankfurt School addressed the full range of these questions, this techno-scientific focus is less evident in recent critical theory (Honneth 2005; Babich and Cohen 1999a; but see Bohman 1991, as well as Nandy 1988, and Davison 2002.)

It is important to note that although it remains chary of Continental philosophy of science, analytic philosophy of science is changing to accommodate history of science (Anapolitanos 1998: 196–231; Golinski 1998). If Steven Shapin's and Simon Schaffer's *Leviathan and the Air Pump* (1985) illustrates this changing history (an illustration even more radically on offer in Lawrence Principe's *The Aspiring Adept* [1998]), such studies arguably have their high point in A. C. Crombie, *Styles of Scientific Thinking in the European Tradition* (1995), continuing a shift that had begun with Herbert Butterfield's *The Whig Interpretation of History* (1968), and with Pierre Duhem's study of the medieval origins of modern cosmology (1913) – just as historiographical approaches to the physical sciences date back to the nineteenth century (Gregory 1992). Articulations of the history of science vary across cultural-linguistic divides (cf. Crombie 1995; Serres 1995; Böhme 1989). Moreover, as analytic philosophy of science traces its own history (Giere and Richardson 1996), the common origin of both analytic and continental philosophies is plain (Friedmann 2000).

Social studies of science have also been influential. Ludwik Fleck's *The Genesis and Development of a Scientific Fact* (1979) emphasizes the role of superstition and error (as Ernst Mach spoke of error in his *Knowledge and Error* [1976]), as essential to the course of scientific discovery. For Fleck, apart from the error-driven and intrinsically *social* progress of research thought-collectives and thought-styles, the very scientific conceptualization and aetiology of a particular disease entity, namely, the spirochaete in the case of syphilis, could not have come to stand as it historically did (Fleck 1979; Babich 2003a). Thomas Kuhn's *Structure of Scientific Revolutions* is routinely cited as occasioning changes favorable to Continental philosophy of science. But Kuhn's work was dependent upon Continental thought and, as Kuhn himself attests, drew upon the conceptual resources of Fleck's study of the social and historical constitution of scientific facts (Kuhn in Fleck 1979: vi-xi). Following Kuhn, history of science and social studies of science became genuine and imperative concerns, and a review of the role of gender in scientific knowledge calls for further development (Rose 1994; Code 1991; Irigaray 2005).

In the Continental tradition, we may distinguish *critical* (Nietzschean), *phenomenological* (Husserlian), and *hermeneutic phenomenological* (Heideggerian) philosophies of science. Further possibilities with respect to future Continental philosophies of science may be elaborated on the basis of new impulses in the philosophy of nature as well as environmental philosophy in the spirit of the characteristic holism of continental philosophy (Serres 1995) and of newer appropriations of Gilbert Simondon's philosophy of technology (Stiegler 1998). In addition to Michel Foucault whose work has

also been signally influential in analytic philosophy of science (notably in the work of Ian Hacking), other influences in analytic philosophy of science may be expected to grow out of other Continental trends in French thought.

Scientism

Contrary to well-disseminated claims that science suffers from a lack of esteem in today's world, Tom Sorrell, at the conclusion of his study of scientism in analytic philosophy, warns that the problem is not to create respect for science but to dissuade people from worshipping it (Sorrell 1991: 177). A consequence of scientism is that any critique of science can be dismissed as anti-science and such a response tends to be a recurrent anxiety for would-be Continental philosophy of science – to the extent that one collection, *Continental Philosophy of Science*, promotes itself as refuting the view that twentieth-century Continental thought is anti-scientific (Gutting 2005).

Nevertheless, scientism is entrenched within Western culture as a whole, as Tzvetan Todorov has analysed it, starting:

> from the hypothesis that the real world is an entirely coherent structure. . . . [and] . . . can be known entirely and without residue by the human mind. The task of acquiring such knowledge is delegated to the requisite praxis, called science. No fragment of the material or spiritual world . . . can ultimately resist the grasp of science. (Todorov 2003: 19–20)

From the scientistic point of view, there will be 'no room for more than one version of scientific truth; errors are many, but the truth is one, and so pluralism becomes irrelevant.' (Todorov 2003: 21) Presupposing the distinction between scientism and science as he does, Todorov is no more anti-science than Husserl (or Heidegger or Nietzsche). Todorov thus echoes Nietzsche's original insight into the parallels between science and religion, and, like Nietzsche, he valorizes the still-unfulfilled promise of the ideal of science: '[W]hereas the general rule in scientific activity is to be as open as possible to criticism, totalitarian societies require blind submission and the silencing of all and any objections – *just as religions do*' (Todorov 2003: 20)

To the degree that Continental philosophy of science is critical of the tendency to attribute a quasi-religious authority to science, it continues the original mandate of the Enlightenment. Inasmuch as it excludes Continental philosophies from its own discourse, consequently inclining to dogmaticism, analytic philosophy of science tends to tend toward scientism. This is hardly an absolute claim. Certain Continental philosophies of science are dogmatically expressed (by Gaston Bachelard for one) and certain analytic philosophies of science are radically open in their articulation (consider Paul Feyerabend's affirmative receptivity) but scientism remains the primary pitfall in our scientific culture.

Critical Philosophy of Science: From Kant to Nietzsche

The exposition of the critical dynamic of questioning is the keystone of Kant's philosophy of science. This is Kant's reflection on the constructive or framing activity

that is active questioning. Such questioning supports the possibility of a progressive and secure science of nature. It is the design of the scientific question that ensures its judgement power (*Critique of Pure Reason*: Bxiii). Rather than a science based on observation (inductive regress) which would be no science at all (understanding science in the image of logic and mathematics), Kant is able to resolve the Humean problem of induction in the experimental practice of questioning because the experiment (conceived as a question) both concedes and at the same time exploits the epistemological limits of reason (Bix) and experience (cf. A124–6). Just as mathematics owes its scientific integrity to the axiomatic character of its conceptual groundwork, so physics operates with axioms or defining assumptions on both theoretical and objective levels, that is, in both its fundamental concepts and its experimental processes (B241/A196); A713/B741–A727/B755). Thus analytic philosophy of science and its focus on realism, on probability, and causality in terms of the inductive warrant for claims about the real world (Giere 1996: 341), is to be contrasted with the different orientation of Kantian epistemology which asks for its part – as Continental philosophy of science continues to ask – how is objective scientific knowledge possible?

A recent reading of the role of explanation in Carnap and in Kant emphasizes the importance of both the apodeictic and the hermeneutic in Kant's own understanding of the respective roles of science and philosophy (Boniolo 2003: 297–8). Beyond prototypically analytic readings of Kant's philosophy of science (Buchdahl 1992; Friedman 1992, Pierre Kerszberg's *Critique and Totality* (1997) argues for an interpretation of Kant and science that draws on Heidegger's reading of Kant. Kerszberg's *Kant et la nature* (1999) further articulates the difference between the object of today's natural sciences and the German tradition of *Naturphilosophie* (again, contrast Böhme 1989 and Latour 2004).

Critical philosophies of science pose the question of the possibility of knowledge and truth and thereby reflect upon the possibility and working of scientific inquiry and law. Both Nietzsche and Heidegger shift the focus to the question itself as the constituting constraint of intuition. Thus Nietzsche's philosophy of science radicalizes Kant's critique. An inveterate reader of the natural science of his own day (including Ernst Mach), Nietzsche's critical contributions to a philosophical analysis of science have been the subject of review both by philosophers concerned with science and transcendental philosophy in Kant's sense (most notably Hans Vaihinger) as well as scientists (most notably the chemist Alwin Mittasch) since the start of the twentieth century and this tradition of reflection on Nietzsche and the sciences continues to this day and has recently drawn further readers in this same tradition (see Babich 1994; Babich and Cohen 1999a/1999b, Moore and Brobjer 2004).

Nietzsche would argue, utterly in the spirit of science and its own sense of progressive evolution, that the laws of physics might be regarded as no more than interpretation, a claim offered not only on the basis of the evolving character of scientific thought but in terms of what might now be seen as theoretical underdetermination, in the manner of Quine or, better said, Davidson. Ultimately for Nietzsche, mathematics and logic were humanizations which he did not hesitate to call *fictions*, invented truths imposed for the sake of cognizing a fundamentally nonhuman but exactly real world (compare with Badiou 2003: 165).

Husserl's Phenomenology of Science

Beyond Descartes and bringing his Archimedean spirit down to earth, consciousness, and the body, Husserl proposes a new phenomenological method. By means of the *epochē* or phenomenological reduction, a properly philosophical (and not merely linguistic or scientific) reflection becomes possible for the first time, thereby permitting nothing less than a newly Copernican critique of reason. What we notice in such properly philosophical reflection is an already given engagement of knower and known, which for Husserl circumscribes the *givenness* of things to consciousness. Like Brentano's, Husserl's account of intentionality recovers the scholastic and Aristotelian insight into the ideational essence of mental phenomena: the eidetic heart of consciousness as object to itself. Seeking what is immanent in consciousness itself or as such, the phenomenological *epochē* is the 'necessary operation' or method rendering '*"pure" consciousness accessible to us, and subsequently the whole phenomenological region*' (Husserl 1975: 103). As a remainder, or '*"phenomenological residuum,"*' consciousness is that very 'region of Being which can become the field of phenomenology' (Husserl 1975: 102).

Husserl remained scientifically minded throughout his life, speaking of the phenomenological description of the object (or *noema*) as *noematic analysis*. The phenomenological self-awareness of experience would accordingly be a *noetic analysis* with *noesis* as the corresponding mental activity (see Drummond 1990 and, more generally, Sokolowski 1999). Description, better perhaps, reflective description, then links the method of phenomenology with that of the empirical sciences. Such descriptions correspond to regional ontologies specific to the regionality of intentional concern, be that a physicist's concern with the physical world, a biologist's or an anthropologist's concern with living things or with other human beings or bodily self-presence. Such ontologies include historical and social realms of culture as well as the traditional philosophic concern with the analysis of the human perception or consciousness of space (of Euclidean measure and habitation) and time (past, present, future).

Husserl's most debated (and for some scholars most important contribution [Kockelmans and Kisiel 1970: 33–40, 45–67]) is *The Crisis of European Sciences and Transcendental Phenomenology* (1970). Based on lectures first offered in 1935, Husserl addressed the question of meaning – or meaninglessness – at the heart of any 'rigorous' philosophy, that is, any philosophy worthy of being so named. The extraordinary success of the Enlightenment project of the West in the guise of Galilean science (or what Heidegger called calculative rationality) presupposed, qua rigorous science, the exclusion of 'all valuative positions, all questions of the reason or unreason of their human subject matter and its cultural configurations' (Husserl 1970: 6). This crisis at the heart of scientific reason relegated the normative and evaluative realms of the human dimensions of the life-world to the irrational. The same crisis is manifest in the vulnerability of universal European culture to the fascism, or racism, or consumerism, and so on, characterizing globalization today.

The Galilean distinction between primary and secondary properties privileges the measurable, leading, with Descartes, to the theoretical division of subjective

experience (mind) and objective world (body). Only the objective, or measurable, world came to be regarded as the 'real' world whereby the subjective remainder of 'meaning' and 'value,' 'mind' or 'spirit' was reduced, as mere phenomenon, to the domain of the unreal. The scientific worldview excluded 'in principle precisely the questions which human beings, given over in our unhappy times to the most portentous upheavals, find the most burning: questions of the meaning or meaninglessness of the whole of this human existence' (Husserl 1970: 6). For Husserl, as he writes in the 1935 Vienna Lecture, the greatest danger to science is to fail to take up what he calls the 'enigma of all enigmas,' that is, 'the taken-for-grantedness in virtue of which the "world" constantly and prescientifically exists for us, "world" being a title for an infinity of what is taken for granted, what is indispensable for all objective science' (Husserl 1970: 204). The universal natural scientific project presupposes a dualistic vision: 'One causality, simply split into two sectors, encompasses the one world; the sense of rational explanation is everywhere the same, yet in such a way that all explanation of the spirit . . . leads back to the physical' (Husserl 1970: 294). Paradoxically, Husserl argued, the very objectivity of the natural scientific standpoint is grounded in an 'approach that is itself totally lacking in rationality' (Husserl 1970: 295). To the extent that 'the intuitively given surrounding world, this merely subjective realm, is forgotten in scientific investigation, the working subject is himself forgotten; the scientist does not become a subject of investigation' (Husserl 1970: 295). No antipathy to science speaks in this reflection, instead, Husserl's logical claim is that 'no objective science can do justice to the [very] subjectivity which accomplishes science' (Husserl 1970: 295). For Husserl, 'intentional phenomenology has made of the spirit *qua* spirit for the first time a field of systematic experience and has thus brought about a total reorientation of the task of knowledge' (Husserl 1970: 298).

Hermeneutic Phenomenology of Science

Although Martin Heidegger cannot be understood apart from Husserl, the difference between them is likewise key. With Heidegger, we leave the Enlightenment idealization of clarity as the highest expression of philosophic thinking in and through language to meditate or reflect philosophically on the meaning of thought itself and the nature of language as such. For Heidegger, philosophy is no longer a matter of theoretical reflection or scientific analysis but an active questioning. The Heidegger who repeatedly claimed that 'science does not think' (Heidegger 1968; cf. Salanskis 1995 and Babich 2003b) opposes thoughtful and sense-directed reflection (*Besinnung*) to the rational, calculative project of Western technologically articulated and advancing science. The philosophic task of thinking is not that of 'problem solving' as Karl Popper famously defined philosophy but rather, in the attempt to learn thinking (recommended by the later Heidegger in opposition to the technical culture of problem-solving, manufactured knowledge, usable practical wisdom, and so on); 'we must allow ourselves to become involved in questions that seek what no inventions can find' (Heidegger 1968: 8). For Heidegger, in the spirit of Nietzsche's critical philosophy of science, what matters in a philosophical question is 'to keep the question open and that is to say: to make the question problematical' (Heidegger 1968: 159).

Heidegger distinguishes science and philosophy but emphasizes the critical and cognitive priority of philosophy in what is regarded as the philosophy of science. Theoretical competence in science precludes thought on science itself: '[T]he sciences are not in a position at any time to represent themselves to themselves, by means of their theory and to the modes of procedure belonging to theory' (Heidegger 1977: 177; see Husserl 1970: 56–7) Such an observation posits no deficiency in science inasmuch as science is concerned with its object rather than its ground.

For Heidegger the world of modern scientific research technology is the world in which alone the truths of science are articulable: 'Within the complex of machinery that is necessary to physics in order to carry out the smashing of the atom lies the whole of physics' (Heidegger 1977: 127). What is at issue is the *constitution* of the object of scientific investigation, understanding constitution in both the Husserlian phenomenological sense as well as in the mechanically explicit sense of standardized manufacture and institutional technology (compare social studies of science and technology). This delimitation of a specific domain proper to each science is what makes modern science possible in its comprehensiveness and its capacity for novelty. It also means that the most obscure consequences of science, the paradoxes of quantum mechanics, are not matters of mystery as much as they are reflections of the essence of modern science as measurement (Heelan 1989). Whether we are speaking of classical physics or of quantum physics, Heidegger can say that 'nature has in advance to set itself in place for the entrapping securing that science, as theory, accomplishes' (Heidegger 1977: 172–3). This entrapping-securing is measurement or what Heidegger called calculative thinking or machination (Babich 2003b, Glazebrook 2001). But this also means that Heidegger's philosophy of science cannot be conducted apart from concerns that are ordinarily identified with social and political philosophy (Elden 2003).

Hermeneutic Philosophy of Science: Contemporary Expressions

The hermeneutic process at work in science and to which a hermeneutic philosophy of science must attend is a matter of perception and consciousness. Hermeneutics in this sense is not limited to texts alone, rather, the interpretive presuppositions of being- and working-in the life-theoretical world of our scientific understanding are built into the laboratory world of instrumentation and its praxis (as Heidegger and Merleau-Ponty have argued), including conceptual models, narrative schemes and linguistic metaphor. This field is a growing one, as is witnessed by the work of Dimitri Ginev and others. Moreover, the appeal of its legacy beyond the disciplinary borders of philosophy, be it analytic or Continental, can be seen in the work of the late physicist, Martin Eger, who draws on Hans-Georg Gadamer as well as Heidegger, Husserl, and Heelan.

Joseph J. Kockelmans has written extensively on phenomenology and natural science, including existential and hermeneutic phenomenology of science, which Kockelmans approaches from a historical and systematic perspective (Kockelmans 1993). In a philosophically rigorous fashion, Kockelmans (like Glazebrook [2000] from an Aristotelian perspective), defends the ultimately realist perspective of hermeneutic Continental approaches to the philosophy of science and argues these in a manner similar to Merleau-Ponty as propadeutic to the perspectives assumed in analytic

philosophy of science. Unlike Heidegger who was clear about the limitations of what he called logistics (which we can plausibly translate as analytic philosophy especially of the scientistic kind), Kockelmans does not see antipathy between the traditions in philosophy but much rather the failure of analytic philosophy to recognize the historical and cognitive offerings of existential and hermeneutic phenomenology in the Continental tradition (Kockelmans 1999). Although Kockelmans's hoped-for recognition may still be some way off, analytic philosophy has recently taken to appropriating the themes and especially the figures of Continental philosophy, not only with respect to Husserl but now Heidegger and Foucault as well as Nietzsche, Deleuze, and Badiou. But just because this turn is conducted on the terms of analytic philosophy, still held to be the only respectable style of doing philosophy, the analytic appropriation of Continental thought has only muddled the stakes without as yet leading to mutual respect and dialogue (Babich 2003b).

Beginning with a Husserlian philosophy of Heisenberg's physics in his *Quantum Mechanics and Objectivity* (1965) and a hermeneutic elaboration of the relevance of Husserl and Merleau-Ponty's phenomenology to spatial perception in the everyday-, the scientific-, and the art-world in *Space-Perception and the Philosophy of Science* (1983), Patrick A. Heelan's approach to the philosophy of science was conditioned by his training in mathematics and science, and his work with scientists such as Erwin Schrödinger, John Wheeler, and Eugene Wigner. Heelan recognizes the important subjective role of 'intentionality' in 'constituting' what is known by using theoretical models to construct/describe empirical data given to observation and measurement, arguing that all inquiry works through what he calls 'cognitive search-engines,' disclosing the perceptual and scientific invariants of group-theoretic transformations of the sensory flux. Heelan's philosophy of science thus integrates a phenomenology of experiment with the theoretical expression of science, holding with Husserl's eidetic project the possibility of approximating the essence of a scientific object through successive profiles. The hermeneutic dimension of such a *horizonal realism* reflects the necessity for considering the historical, social, and disciplinary circumstance of the researcher (Heelan 1998). Theoretical descriptions denominate the experimental profiles that would be perceived under standard laboratory conditions (and thereby the thus-emergent scientific life world) and, following upon a hermeneutic of experimental work, become descriptive of what is eidetically perceived in the laboratory (Heelan 1989). Heelan's perspective thus shares the same focus as analytic readings of experimental science while avoiding the alienation from history (and from the actual and current practice) of science limiting analytic philosophy of science.

Prospects

Whereas the positivists in the person of Auguste Comte (see Allen 2003; Kremer-Marietti 1983; Canguilhelm 1991) and the logical empiricists endorsed the scientistic unity of the sciences, Bachelard maintained the unity of science and poetry, as did Eugene Minkowski (1970) and as we find Badiou arguing today. Indeed, if science is *poiesis*, as *techne*, as Heidegger reminds us, its products or 'phenomeno-technologies' are a kind of poetry. Such a psychoanalytic play of symbols and concepts bears on

Bachelard's poetics of science (Tiles 1984; Babich 1989), eliciting the mythic mathemes of science in the spirit of Paul Veyne's analysis of myth and recurring in newer instaurations in Badiou (2003). As Pierre Duhem retraced the relevance of the poet's voice in his *German Science* (1991) with reference to his Provençal-language encounter with the poet, Frederic Mistral, and as Bernard d'Espagnat has called attention to the significance of Paul Valéry in Bachelard's scientific poetics (d'Espagnat 1990, see also Robinson-Valéry 1983), so Badiou calls upon the poet to speak if only for the sake of setting the French Mallarmé or Celan or even, by way of Ireland, Beckett in place of Heidegger's Hölderlin. As Badiou reads Heidegger's critique of modern technoscience (we recall that Badiou is closer to Irigaray's Lacan rather than to Bernard Stiegler's or even Jacques Ellul's Simondon), he makes the point that, 'if the proposition, commanding the interpretation of the spirit as pragmatic intellect, governs the ravage of the earth, then the only real recourse lies in the poem' (Badiou 2003: 60).

Badiou's arguments are conducted on the terms of an axiomatic systematicity. This is his point of departure as he binds the process of truth to the event in its singularity. For Badiou, 'an event is linked to the notion of the undecidable' (Badiou 2003: 62). In his 'quadratic' illustration (Aeschylean tragedy, Galilean mathematical physics, a life-transforming erotic encounter, the French Revolution), 'a wager has to be made. This is why truth begins with an *axiom of truth*. It begins with a groundless decision – the decision to say that the event has taken place' (Badiou 2003: 62).

Luce Irigaray retraces the same fourfold interplay as a composite in the spirit of her own Lacanian psychoanalytic formation: 'What schiz or what rupture: pure science on one side and politics on another; nature and art on a third or as conditions of possibilities – love on a fourth?' (Irigaray 2005: 284). With Irigaray's symbolic turn, she pays all obeisance to the Lacanian claim that 'discoveries must be expressed in a formal language, a language that makes sense. And that means: expressing oneself in symbols or letters, substitutions for proper names, that refer only to intra-theoretical objects, and therefore never to any real persons or real objects' (Irigaray 2005: 286). Consequently the 'scientist enters into a world of fiction incomprehensible to all who do not participate in it' (Irigaray 2005: 286). Here we recall Badiou's allusion to '*the unnameable* of the situation . . . [Fixing] the limit of the potency of a truth . . . The unnameable is what is excluded from having a proper name' (Badiou 2003: 66).

As W. V. O. Quine had done in the pragmatico-analytic tradition of American philosophy, Badiou draws upon the resources of set theory to return Gödel's legacy to philosophy as a science in the same sense that Kant gives science to philosophy as a possible project. Given Gödel's proof that 'it is impossible to demonstrate, within a mathematical theory, that this very theory is non-contradictory,' Badiou argues that:

> a reasonable ethic of mathematics is to not wish to force this point; to accept that a mathematical truth is never *complete*. But this reasonable thing is difficult to maintain. As can be seen with scientism, or with totalitarianism, there is always a desire for the omnipotence of the True.

Like the more politically-minded sociologist and philosopher, Jean Baudrillard, Badiou does not hesitate to identify this nominative drive as the veritable root of

all evil. 'Evil is the will to name *at any price*' (Badiou 2003: 66). For Badiou: Philosophy is prescribed by several conditions that are the types of truth procedures. These types are science (more precisely the matheme), art (more precisely the poem), politics (more precisely, politics in interiority or the politics of emancipation), and love (more precisely, the procedure that makes truth out of the disjunction of sexed positions) (Badiou 2003: 165).

Using fiction, Badiou's Kantian (and Nietzschean) claim is that philosophy seizes truth for the sake of its constructions:

> Fiction of knowing, philosophy imitates the matheme. Fiction of art, it imitates the poem. Intensity of an act, it is like a love without an object, addressed to all such that all may be within the seizure of the existence of truths, it is like a political strategy without the stakes of power. (Badiou 2003: 166)

In Foucault's analyses of power/knowledge, the question is as much the discourse of power and its counter as it is strategy: more Lao Tzu than Machiavelli. Thus Vandana Shiva discusses the 'epistemological violence' that suppresses or discounts local knowledge and experience in favor of totalitarian and reductionist science deployed at massive environmental cost (Shiva 1988; and cf. both Winner 1978 and Davison 2002). Drawing attention to the 'genocidal' consequences of 'the logic of Western science,' Shiv Visvanathan muses on the implicit violence of the 'rational' conception of 'choice' which he illuminated via the nineteenth-century term '*triage*,' combining 'the concepts of rational experiment, the concept of obsolescence, and of vivisection – whereby a society, a subculture, or a species is labelled as obsolete and condemned to death because rational judgment has deemed it incurable' (Visvanathan 1988: 259). This is extended to the elimination of alternate epistemological perspectives: 'the nation state cannot permit ethnicities which serve as competing sites for power and modern science cannot tolerate the legitimacy of folk or ethnic knowledges' (Visvanathan 1988: 279).

To the range of names noted above, we may add Giorgio Agamben, Gunter Anders, Jean Baudrillard, Henri Lefebvre, Bruno Latour, and Jean-François Lyotard, in addition to the variety of readings of Bergson, Deleuze, Foucault hailing from *both* analytic and Continental orientations (see Keith Ansell-Pearson, Constantin Boundas, Manuel Delanda, Val Dusek, Ian Hacking, David Hyder, Dominique Lecourt, Rudi Viskers, and so on), as well as more traditional authors broadly incorporating hermeneutics and phenomenology, such as Ute Guzzoni, Dominique Janicaud, Jean Ladrière, Elisabeth Ströker; and some even argue the case for Jacques Derrida (Friedrich Kittler, Timothy Lenoir, Christopher Norris and Hans-Jörg Rheinberger). These (and, of course, many other) names attest to both the accomplishments and the promise of continental philosophy of science.

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