Continental Philosophy of Science

Edited by

Gary Gutting

Blackwell Publishing

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Continental Philosophy of Science

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INTRODUCTION: WHAT IS CONTINENTAL PHILOSOPHY OF SCIENCE?

Gary Gutting

Philosophy vs. Science, Continental vs. Analytic

The subdiscipline we call "philosophy of science" originated in the nineteenth century in the wake of Kant's critical philosophy. It derives from the challenge posed by modern science to the very idea of a distinctively philosophical enterprise. The "scientific" achievements of Galileo, Descartes, and Newton realized long-sought philosophical goals of answering fundamental questions about the nature of planetary and terrestrial motions. Over the next two centuries, however, it became apparent that the empirical methods that produced the seventeenth-century revolution could and should be separated from the a priori methods of traditional philosophy; and the question gradually arose of what, if anything, there remained for philosophy to do. This question became entirely explicit with Kant and has continued to be at the center of the philosophical enterprise ever since.

As a rough but useful categorization of philosophies of science I propose distinguishing three basic attitudes to scientific knowledge. The first, which I will call empiricist or positivist, regards science as the only knowledge worthy of the name. Philosophy is at best a metareflection that makes explicit the conclusions of science and the methods whereby it has produced them. The second, Kantian or critical, attitude is that science provides the only first-order knowledge, while philosophy reveals a distinctive domain of truth by deriving the necessary conditions for the possibility of scientific knowledge. The justification of philosophical claims requires the assumption of the validity of science, but the claims themselves (unlike those of positivist philosophy of science) constitute a domain of "transcendental" truth that is of a different order than that of science. The third, ontological or metaphysical, attitude claims access to a domain of philosophical truth that is entirely independent of (and, indeed, in some sense superior to) science. This autonomous philosophical truth provides a more general, more fundamental, or more concrete vision of reality, of which science is just one subordinate part and in terms of which it must be understood.

The positivist attitude is typically found among reflective scientists and philosophers deeply involved in science. The most famous proponents were (in Germany) Ernst

Mach and (in France) Poincaré and Duhem.[1] During the first two decades of the twentieth-century, positivism was overshadowed by a revival of Kantian thinking (neo-Kantianism): in France by Lachelier, Boutroux, Brunschvicg, and Bachelard; in Germany by the rival Marburg (Cohen, Natorp, Cassirer) and Southwest (Windelband, Rickert, Lask) schools. Later the Frankfurt School produced what can be regarded as a version of neo-Kantian philosophy of science (Habermas). The ontological attitude arose first through *Lebensphilosopie* (e.g., Bergson and Dilthey) and, later, through phenomenology (Husserl) and existentialism (Heidegger and Merleau-Ponty). It continued in France through varieties of poststructuralism, particularly the philosophers of "difference," Deleuze and Irigaray.

This quick review of philosophy of science on the European continent covers much more than "continental" philosophy of science. The reason is that the split between what we call continental and analytic philosophy emerged from the decline of the neo-Kantianism that dominated French and German universities in the late nineteenth and early twentieth centuries. Before that, even the deepest philosophical divisions (say between a Bergson and a Poincaré or between the early Husserl and the early Carnap) did not prevent informed and fruitful discussion. For all its manifest inadequacies, the continental–analytic divide is grounded in the undeniable fact that, sometime around the end of the 1920s, philosophers split into two camps that, in short order, had nothing to say to one another.

We still do not entirely understand how the division arose, but, as Michael Friedman has suggested, its root is in two opposing views of the role of logic in philosophical thought. On the one hand, there was the idea that logic, particularly the new mathematical logic of *Principia Mathematica*, was the privileged tool for formulating and resolving philosophical problems. On this view, most fully and powerfully developed by Carnap, philosophical questions could be resolved (or dissolved) by insisting on the highest standards of logical clarity and argument. On the other hand, there was the idea that logical categories and techniques are themselves abstractions from the fullness of lived experience and therefore are severely limited for the purpose of understanding concrete existence. This, for example, was the view of Heidegger in *Being and Time*, where he deployed Husserl's phenomenological method to describe aspects of the human situation regarded as inaccessible to merely logical analysis. Adapting some of Derrida's terminology, we might formulate the analytic–continental division as one between logocentric and nonlogocentric philosophy. It is, however, important to emphasize that the continental rejection of logical analysis as the privileged instrument of philosophical understanding is not equivalent – as some analytic philosophers seem to think – to a rejection of logical principles (e.g., noncontradiction) as a necessary condition on the intelligibility of discourse. Nor is it – as some continental philosophers seem to think – an abrogation of the philosopher's duty to be as logically clear and rigorous as the subject at hand permits.

It is not surprising that philosophers committed to the analytic approach have often been sympathetic to positivist philosophy of science. The analytic ideal is modeled on a commonly accepted ideal of scientific thought, so that those who hold to the analytic ideal may well privilege scientific knowledge, and those who privilege scientific knowledge are likely to prefer the analytic model of philosophy. Similarly, we might expect that continental philosophers will embrace the centrality of nonscientific modes of

knowing and so reject positivist philosophy of science in favor of the ontological attitude. But none of this is logically entailed. Analytic philosophers (for example, in the ordinary-language movement) can and have contested the positivist assertion of science's cognitive privilege. Correspondingly, a continental philosopher (I will suggest Foucault as an example) may hold that it is less logically rigorous sciences, such as history, that offer the best philosophical perspectives on human existence and, accordingly, endorse a distinctively continental version of positivist philosophy of science. Moreover, some important but now often neglected strands of continental philosophy are based on what I have called the critical stance toward science.

There is also an important, if less emphasized, split within the domain of continental philosophy: that between philosophy in France and philosophy in Germany. The great and obviously important exception has been the significance, from the 1930s on, of Husserl and Heidegger for French philosophy (though even here it is important to appreciate the large extent to which the French did not simply import phenomenology but appropriated it for purposes arising from their own distinctive philosophical tradition). But other important German developments, for example, Marburg neo-Kantianism and the Frankfurt School, had very little impact in France, even on philosophers with parallel interests and approaches. And, until a late twentieth-century interest in French poststructuralism (mostly, however, for the sake of refuting it), German philosophy has on the whole been indifferent to most French developments.

In what follows, I offer a survey of the major treatments of science by French and German philosophers of the twentieth century. The discussion will, of course, be very schematic, but I hope it provides a useful background for the more detailed essays that follow.

France: Neo-Kantians and Bergson

For nearly the first third of the twentieth century, French philosophy, the philosophy of the Third Republic, was dominated by a distinctive version of neo-Kantian idealism, which combined a particular reading of Kant's critical philosophy with the French "spiritualist" tradition going back to Descartes and Maine de Biran. Spiritualism was sympathetic to the Kantian idea that the mind constituted its objects of knowledge but strongly resisted idealistic extensions of Kant that undermined the metaphysical and moral autonomy of the individual human agent. There was, for example, never any serious French sympathy for the Hegel of absolute idealism. Nor was there much interest in romantic versions of idealism that challenged science as the paradigm of knowing. Like Kant himself, the French neo-Kantians took the cognitive authority of science as a given and developed their philosophical systems by deducing the conditions necessary for this authority. Jules Lachelier and Émile Boutroux were important early representatives of this approach, with Lachelier offering an elegant transcendental derivation of the principles of induction and Boutroux developing a revised Kantianism that allowed for freedom (indeterminacy) in the phenomenal world. But the most important figure, both for French neo-Kantianism in general and for French philosophy of science, was Léon Brunschvicg.

Brunschvicg combined a general neo-Kantian philosophical perspective with a strong emphasis on the importance of the history of science. In this latter emphasis, he was continuing the strong French tradition, beginning with Comte and continuing with Duhem, Poincaré, and Meyerson, that insisted on understanding science through its historical development. His own distinctive contribution was to join this historical approach to a critical philosophy of science, in contrast to the earlier thinkers' predominantly empiricist viewpoint. While rejecting a naive empiricism that sees knowledge as the result of what the mind passively receives from a predetermined world, he likewise denies that knowledge arises simply from the mind's reflection on itself. Truth is expressed in "mixed judgments" that combine what is given in experience with intellectual frameworks developed, through scientific investigation, over the course of human history. In a sense combining positivism and idealism, Brunschvicg sees our knowledge of the world as the outcome of the mind's historical reflection on scientists' continually more successful interpretations of experience. He rejected Kant's assumption that, from a particular stage of science (the Newtonian), he could deduce final truths that would regulate all subsequent accounts of the world, and saw Einstein's theory of relativity as a clear refutation of Kant's "dogmatism" on this point.

Brunschvicg's approach was continued, although in a much less idealistic manner, by Gaston Bachelard. This is reflected, first, in his insistence, contrary to Brunschvicg, on radical discontinuities in the history of science. Over 30 years before Kuhn, Bachelard read the history of physics as a series of epistemic "breaks" whereby one conception of a natural domain is replaced by a radically different conception. He also emphasized an initial "break" that introduces a scientific vision of the world in opposition to the common-sense categories of ordinary experience. Second, Bachelard insisted that philosophy, which always has to "go to the school of the sciences," must develop new conceptions corresponding to each new historical stage of science. The philosophy of an age of relativity and quantum physics has to be essentially different from a philosophy of the Newtonian era, since Newtonian concepts are now "epistemological obstacles" to an adequate understanding of nature. Bachelard accordingly worked to develop a philosophical standpoint (a non-Cartesian and, in some ways, non-Kantian epistemology) that would mirror the radically new conceptions of physics. He also offered striking insights into the power of the images through which common-sense and outdated scientific views maintain their attraction, even after they have lost their scientific value. He also pursued the positive role of such images in the nonscientific contexts of poetry and art, and he developed what he called a "psychoanalysis" of the attraction of primordial images such as earth, fire, air, and water.

Bachelard's position remains broadly rationalist (indeed Kantian) in that it emphasizes an active role of the mind in knowledge and sees an irreducible role for philosophy in reflecting on the epistemological significance of scientific results. But his view is, in his terminology, an "applied rationalism" in two senses. First, as we have seen, the categories the mind constructs are relative to the historical situation. Second, Bachelard sees the mind's "constitution" of its objects as mediated through scientific instruments, which are "theories materialized." (For more on this topic, see Mary Tiles's essay on Bachelard below.) Given the priority of the scientific accounts that

correct and replace the categories of common-sense experience, what we need is not Husserl's phenomenological descriptions of the constitution of everyday objects but a "phenomeno-technics" describing how instrumental technology constitutes scientific objects.

Despite the dominance of neo-Kantian idealism, the greatest philosopher of the Third Republic, Henri Bergson, did not share its privileging of science as the unique source of our knowledge of nature. Kant, on Bergson's reading, starts from the early modern rationalist vision of a world made intelligible by the relational power of mind, but asks why this cannot be the human rather than the divine mind. Even more important, Kant goes on to make a distinction between the forms and the material of knowledge, a distinction no doubt tied to the fact that the human mind does not have the creative power of the divine mind. The crucial question for Bergson concerns the status of this "matter" from which the objects of knowledge are constituted. For Kant, it is merely the vehicle for the mind's structuring of the world by the imposition of its forms. But, according to Bergson, this neglects the possibility, opened up in principle by Kant's approach, that this matter of knowledge is something with significance in its own right, beyond what it is given by the forms of the intellect. Kant, unfortunately, uncritically assumed that knowledge could be only scientific knowledge; given this, since the realm of science is defined by intellectual forms, there could be no knowledge beyond these forms (no "extra-intellectual" knowledge).

But, according to Bergson, this assumption ignores the obvious limitations (incompleteness) of scientific knowledge, particularly as we move from the inanimate through the vital to the psychological. If we avoid Kant's mistake, we will recognize "a supra-intellectual intuition" of reality that gives us knowledge of reality in itself, not just the phenomenal constructions of the intellect. For Bergson, of course, the object of this intuition is the duration (lived time) that science excludes from its purview but which is in fact the "richer" whole from which scientific objects are abstracted. Kant's idealistic successors (Fichte, Hegel) recognized the need to find intuitive knowledge beyond the forms of the intellect that would put us in contact with reality in itself. But they wrongly sought this in a *nontemporal* intuition, which is really just a reformulation of the pre-Kantian mechanism (Leibniz, Spinoza) in mentalistic terms. Abandoning these intellectual constructions for the concreteness of experience brings us back to duration.

Science's abstraction from the concreteness of duration, results in what Bergson calls its "cinematographical method," whereby science views reality not as a continuous flux (the duration that it in fact is) but as a series of instantaneous "snapshots" extracted from this flux. In terms of a simple but fundamental example, science derives from the mindset that makes Zeno's paradoxes both inevitable and unsolvable. Such a view is essential for science, given that its goal is control of nature and therefore more effective action in the world. For, Bergson maintains, action is always directed from a starting-point to an end-point and therefore has no concern with whatever comes between the two. The practical (instrumental) nature of science leads to its abstraction from the reality of duration, and a full philosophical account of the world *in concreto* must restore what science omits. Indeed, the heart of Bergson's philosophical effort was to show, for a succession of key philosophical questions

(concerning freedom, the mind–body relation, the nature of existence, the truth of religion) how answering them requires supplementing the abstractions of science with the intuition of duration.

Germany: Neo-Kantians and Phenomenology

Twentieth-century German philosophy through the 1920s runs roughly parallel to the course of French philosophy. But French neo-Kantianism was a general spirit informing a group of thinkers who, despite disagreements, saw themselves as part of a common enterprise, as illustrated by the remarkable collaborative venture of the *Vocabulaire critique and technique de philosophie*, coordinated by André Lalande. By contrast the German neo-Kantians were divided into fiercely competitive schools that thrived on controversy with one another. (The difference may correspond to the centralization of French philosophical education in the related Parisian institutions of the Ecole Normale and the Sorbonne, in contrast to the separate university centers of German philosophical education.) Also, far more than the French discussions, the German debates were rooted in close textual disputes over the meaning of Kantian texts.

There were two dominant neo-Kantian schools, one associated with the University of Marburg and the other with the University of Heidelberg (or, more generally, the southwest region). Both schools adopted the critical (Kantian) attitude toward science, accepting it as the primary instance of knowledge and developing a distinctive realm of philosophical knowledge through reflection on the conditions of possibility of science. They also accepted Kant's basic idea that knowledge of an object requires the structuring of the "matter" of pure sensation by the conceptual "forms" of the understanding. The classic Kantian problem, of course, is how this structuring is achieved. According to Kant himself the structuring is possible only because there is an intermediate epistemic domain, the a priori forms of sensibility (space and time), that allows the application of pure logical concepts to preconceptual sensibility. Both neo-Kantian schools, however, rejected such intermediate forms. There is, according to them, no intermediary between the pure logical forms of the understanding and the preconceptual matter of sensation. How, then, are the pure conceptual forms able to structure the preconceptual matter?

This is the key point over which the two schools disagreed. The Marburg school in effect denied Kant's sharp distinction of epistemic form and matter; or, rather, it maintained that the distinction is merely an abstraction from the concrete reality of objects of knowledge that have both formal (conceptual) and material (sensible) aspects. By contrast, the southwestern school maintained the distinction and offered new ways of bridging the gap between the two extremes.

What may seem to be merely technical disputes within the Kantian tradition in fact turned out to have major significance for the understanding of science. This becomes especially clear in the work of the Marburg school, which, particularly in the area of philosophy of science, was brought to its fullest development by Ernst Cassirer. For one thing, the rejection of Kant's forms of sensibility avoided the objection that Kantianism was refuted by the development of non-Euclidean geometry and the theory of relativity. For it was only these forms that committed Kant to Euclidean

geometry and absolute time. Further, denying the sharp distinction of epistemic form and matter led the Marburg school to the idea that the constitution of empirical objects was something carried out in the course of the history of science, with each stage of development corresponding to a new articulation by scientists of the precise formal stuctures required to understand the world. This genetic view led to the position, similar to that of Brunschvicg and Bachelard, that science can be understood only through its history. Finally, the Marburg refusal to isolate pure formal structure allowed Cassirer to argue that mathematics has a synthetic character that prevents it from being reduced to pure logic, which is itself only an abstraction from the concrete generative process whereby the mathematical methods of science constitute the objects of the world.

The Neo-Kantian schools were eventually defeated by challenges from three directions. The first, which lies outside our concerns here, was that of logical positivism, particularly the work of Schlick and Carnap. Recent historical scholarship has shown how the founders of logical positivism began working from within neo-Kantianism and only gradually developed a distinctively different standpoint. This shows that, contrary to Ayer's account in *Language, Truth, and Logic*, logical positivism was not a simple return to Hume combined with the tools of the new logic. It – and therefore the analytic philosophy it engendered – needs to be understood in terms of its neo-Kantian origins.

The other two challenges came from phenomenology, first from Husserl's original version and second from Heidegger's radical transformation of Husserl's project. Both Husserl and Heidegger rejected critical philosophy's privileging of empirical science on the grounds that its objectivizing methods could not take adequate account of what we actually encounter in experience. Beyond science, there was need for phenomenology, a rigorous and complete description of "the things themselves"; that is, of what we find in experience prior to the objectifying abstractions and idealizations of science. In Husserl's case, the appeal to experience was primarily for the sake of certainty. He saw phenomenology as a source of absolute certainty in its pure intuitions of essential meanings. As such, phenomenology would provide an unshakeable foundation for all other human knowledge, including science. According to Husserl, the alternative to such a phenomenological foundation is collapse into self-refuting relativism or historicism.

Husserl's claim is that (empirical) science must be grounded in a philosophical project that is itself scientific: with the highest standards of clarity, rigor, and objectivity. But the standards of "philosophy as rigorous science" (i.e., phenomenology) are quite different from those of empirical science. This is because the object of this science is not the natural world of material, sensible things – about which absolute certainty is not possible – but a realm of ideal essences, not existing as independent Platonic Forms but as the intentional objects of acts of consciousness and therefore exhaustively knowable through self-reflection.

Husserlian phenomenology has important similarities to both the conceptual analysis of logical positivism and the transcendental deductions of neo-Kantianism. Like the positivists, Husserl sees philosophy as reaching non-empirical, necessary truths through the analysis of meanings. But for the logical positivists, "analysis" is a matter of applying the categories and techniques of mathematical logic to common-sense and scientific

concepts. For Husserl, this is not sufficient, since both our logic and our concepts are based on unexamined presuppositions, which can only be uncovered through a phenomenological return to the immediate experience from which logic, science, and common sense are all abstractions. Similarly, like the neo-Kantians, Husserl wants to determine the necessary conditions of experience (eidetic truths implicit in experience). But he rejects the neo-Kantian project of deducing such truths from the (uncritical) assumption that empirical science is a valid body of knowledge. Instead, Husserl insists, these truths must be given in direct phenomenological intuition.

Heidegger shared Husserl's commitment to the primacy of the everyday world, but objected to Husserl's (and Dilthey's or Scheler's) attempts to express that in terms of experience or consciousness. He also objected to Husserl's aspiration to certainty as an epistemic ideal. There is a complex story to be told about his reasons for parting with Husserl on both these points, a story involving his critique of Husserl's subject–object distinction, his insistence on the need for our understanding of beings to be rooted in a fundamental understanding of Being, and his development of a hermeneutical method that aims at interpretation rather than pure description. The details of this story need not concern us here, but its outcome is that Heidegger replaces Husserl's eidetic analysis of ideal essences with an "existential analysis" of human beings (*Dasein*) as they exist in the everyday world. Science is then understood in its relation to this world.

Of course, Husserl too, especially in the *Crisis*, emphasized the need to understand science in its relation to the everyday world (the *Lebenswelt*). Moreover, his analysis of science in these terms is in many ways similar to Heidegger's; both see science as an abstraction, for the sake of prediction and control, from the lifeworld, and both warn against the cultural dangers of substituting scientific abstractions for the fullness of human reality. For Husserl as much as for Heidegger, relating science to the lifeworld allows us to situate science in its historical context. Husserl, of course, continues to insist, even in the *Crisis*, on the need (for the sake of foundational certainty) to ground our historical experience of the lifeworld in an eidetic analysis of the ideal, ahistorical essences that define its ultimate meaning. But Heidegger's rejection of this further level of analysis does not alter his substantial general agreement with Husserl on the historical perils of scientistic misunderstandings of our world.

On the other hand, Heidegger's existential phenomenology of human life in the world (what he calls his *Daseinanalysis*) reveals dimensions of science that Husserl either ignores or denies. Whereas Husserl regards science as primarily a theoretical account of nature, developed by the scientist as a disengaged spectator, Heidegger sees the lifeworld in terms of our practical engagement with it, and so, in particular, sees science as fundamentally a set of practices rather than a theoretical vision. This, in turn, leads to Heidegger's emphasis on and critique of technology.

France: From Existentialism to Foucault

The French reaction against neo-Kantianism was less complex, and not only because French philosophers were not so heavily invested in scholastic disputes about the meanings of Kant's texts. There were also no developments parallel to the rise of logical positivism and no strong interest in anything like the Husserlian program of

foundational certainty through eidetic analysis. The former point has two main explanations. First, in France the spirit of positivism (which, after all, had been born there with Comte) had for a long time been channeled out of philosophy and into the social sciences. Second, most of the promising French philosophers of logic and mathematics – Louis Courturat, Jean Nicod, Jacques Herbrand, and Jean Cavaillès – who might well have developed along something like positivist lines, died at an early age.

There was, of course, considerable French interest in Husserl. But this interest arose from the fascination with concrete experience that characterized French existentialism. Contrary to a common opinion, philosophical existentialism did not first develop in France from Sartre's and Merleau-Ponty's readings of Husserl and Heidegger, but rather from Jean Wahl's existential interpretations of Hegel (1929) and Kierkegaard (1938).[2] Husserl and Heidegger were read with an eye to what they had to offer philosophers attuned to the need for a concrete immersion in the world, but with little interest in Husserl's foundational project or Heidegger's problem of Being. Husserl's strongly foundationalist *Cartesian Meditations* (given as lectures at the Sorbonne in 1929) were an unfortunate choice and not well received.

Lacking engagement with the issues raised by logical positivism and Husserlian "rigorous science," French existential phenomenology not surprisingly had little to say about the philosophy of the natural sciences (which then, as for so long, defined the main concerns of the philosophical study of science). The same, however, was not true of psychology and the social sciences, which were a major concern, particularly in the work of Maurice Merleau-Ponty.

His first important publication was *The Structure of Behavior* (1942; hereafter *S*), which uses Gestalt psychology to construct a scientifically detailed argument against behaviorist models and then goes on to show the deficiencies of even the Gestalt account. Phenomenology is explicitly mentioned only in the last chapter, where Merleau-Ponty suggests that it provides a superior standpoint for an adequate understanding of consciousness and its relation to the natural world.

Subsequently (particularly in *The Phenomenology of Perception*; hereafter *PP*), Merleau-Ponty develops in detail his claim of phenomenology's superiority to scientific explanation. The basic problem with a scientific approach is, he maintains, that the deployment of its rigorously empirical and quantitative methodology requires regarding the contents of our lived experience as fully determinate and totally objective (that is, in no way dependent on our experience of them). Science must conceive of its objects in a way that allows them to be understood entirely in terms of ideal mathematical constructs. This means that science understands everything, including living, feeling, and thinking bodies, as nothing more than a set of physical elements connected by causal relations. As a result, even the human body becomes pure exteriority, a mere collection of parts outside of parts, interacting with one another according to scientific laws. On this view, genuine subjectivity is eliminated – an obvious travesty of our experience. This is the motivation behind Merleau-Ponty's dramatic statement that phenomenology's "return to the 'things themselves' ... is from the start a rejection of science" (*PP*, viii).

Subsequently, however, Merleau-Ponty came to maintain that phenomenology could avoid idealism only by accepting the fact that the domain of lived experience

was itself essentially tied to the world of scientific objectivity. His line of thought was as follows: his analysis of lived experience led him to the conclusion that there was an "ultimate truth" of idealism in the fact that all phenomenological description took place from the standpoint of the "cogito" (perception, which, Merleau-Ponty always insisted is primary, implies a perceiver). To avoid subjective idealism (which is contradicted, moreover, by the givens of lived experience), this cogito must be understood as a an impersonal subject (a "tacit cogito"), other than my personal self. But then, to avoid absolute idealism (or at least an ahistorical transcendental idealism), this tacit cogito had to be viewed as having a real content; that is, a content that made it in at least some respects not constituted by consciousness. Specifically, Merleau-Ponty suggested that this objective content could be introduced through the phenomenological "recognition" and "appreciation" of the structures revealed by the social sciences, especially the anthropology of his good friend Claude Lévi-Strauss and the linguistics of Ferdinand de Saussure.

Both Lévi-Strauss and Saussure give accounts of social realities (e.g., language, kinship relations) in terms of structures. These structures are meanings (that is, they "organize [their] constituent parts according to an internal principle" [*Signs*, 117]) and are therefore not reducible to causal relations among objects. At the same time, they are not the idealist's "crystallized ideas," since the subjects who live in accord with the meanings typically have no conscious grasp of them. People "make use of [structure] as a matter of course," but "rather than their having got it, it has, if we may put it this way, 'got them'" (*Signs*, 117).

Because structures are both objective realities, independent of any mind, and meanings informing the lives of individuals, they are the vehicle of the concrete unity of man-in-the-world. The problem, of course, is how to join objective structural analysis to lived experience. Part of the answer is available from phenomenology, which describes our lived experience of structural meanings. But our particular consciousness of such meanings is just one perspective on them. There is also a need for "ethnological experience," which results from inserting ourselves into another culture through anthropological fieldwork and provides an "experience" that is more comprehensive than what phenomenology has access to. Merleau-Ponty's phenomenology has revealed its own need to be complemented by social-scientific knowledge.

Although existential phenomenology dominated French philosophy for the 15 years after the Second World War, there was another line of thought, centered on science, that was a major force, particularly in university philosophical training. This was the French, broadly positivist, tradition of history and philosophy of science, ultimately rooted in Comte's positivism, classically developed by Duhem, Poincaré, and Meyerson, and brought to fruition in the work of Bachelard. From the 1940s, this approach was primarily represented by Georges Canguilhem, Bachelard's successor as director of the Sorbonne's Institut d'Histoire des Sciences et des Techniques. Canguilhem trained a large number of historians and philosophers of science, and even nonspecialists frequently followed his courses.

Canguilhem was more a historian than a philosopher, although his historical work cannot be sharply separated from his generally Bachelardian philosophical viewpoint. Moreover, his specialty was biology, rather than the natural sciences on which Bachelard focused. The Bachelard–Canguilhem approach provided a distinct alternative to

existential phenomenolgy: it accepted the cognitive priority of science and regarded the domain of lived experience as merely a first approximation to the truth about the world, a truth toward which science moved by revising and even rejecting the concepts of everyday experience. As Foucault put it, Canguilhem offered not a philosophy of experience but a philosophy of (scientific) concepts.

Indeed, Canguilhem's major contribution to the philosophy of science is his analysis of the relation between scientific theories and the concepts in terms of which they are formulated. In much twentieth-century philosophy of science, concepts are functions of theories, deriving their meaning from the roles they play in theoretical accounts of phenomena. Newtonian and Einsteinian mass, for example, are regarded as fundamentally different concepts because they are embedded in fundamentally different physical theories. This subordination of concept to theory derives from the view that the interpretation of phenomena (that is, their subsumption under a given set of concepts) is a matter of explaining them on the basis of a particular theoretical framework. For Canguilhem, by contrast, there is a crucial distinction between the interpretation of phenomena (via concepts) and their theoretical explanation. According to him, a given set of concepts provides the preliminary descriptions of a phenomenon that allow the formulation of questions about how to explain it. Different theories (all, however, formulated in terms of the same set of basic concepts) will provide competing answers to these questions. Galileo, for example, introduced a new conception of the motion of falling bodies to replace the Aristotelian conception. Galileo, Descartes, and Newton all employed this new conception in their description of the motion of falling bodies and in the theories they developed to explain this motion. Although the basic concept of motion was the same, the explanatory theories were very different. This shows, according to Canguilhem, the "theoretical polyvalence" of concepts: their ability to function in the context of widely differing theories. His own historical studies (for example, of reflex movement) are typically histories of concepts that persist through a series of theoretical formulations.

Canguilhem supervised Michel Foucault's doctoral thesis (on the history of madness), and his history of concepts was a model for what Foucault called his "archaeological" histories of knowledge. Foucault's primary focus was the social sciences, and his *The Birth of the Clinic* and much of his *The Order of Things* can be read as history of concepts, à la Canguilhem.

A good case can be made for thinking of Foucault's attitude toward science as broadly positivist, in the sense defined above of recognizing no cognitive authority beyond that of science. Here a first point to note is that, although both critics and supporters often classify him as a epistemological skeptic or relativist, he never questions the objective validity of mathematics and the natural sciences. He does show how the social sciences (and the medicalized biological sciences) are essentially implicated in social power structures, but does not see such implication as automatically destroying the objective validity of a discipline's claims. Sometimes a discipline's role in a power regime is in part due precisely to its objective validity (if, for example, objectivity is a social value). Further, Foucault does not, like the neo-Kantians and even Bachelard, recognize any body of truth achieved by philosophical theorizing. He spins out the occasional philosophical theory (e.g., of language or of power), most often of

Nietzschean or Heideggerian inspiration. But this is for the *ad hoc* purpose of understanding a particular historical phenomenon and has no pretensions to universal validity. The only general epistemic standard to which Foucault holds his own work is that of historical accuracy.[3] If we count history as a broadly scientific enterprise, then Foucault recognizes no knowledge outside the scientific domain and so counts as a positivist.

Unlike mainstream positivists, however, Foucault has little interest in questions about the methodology or ontology of science. This is no doubt because his focus was almost entirely on "dubious" scientific disciplines, such as psychiatry or criminology, or, at best, on the dubious aspects of more respectable disciplines, such as economics or anthropology. Here a discipline is "dubious" to the extent that what it presents as unquestionable objective truths about a certain domain (say, the mad or criminals or homosexuals) are rather (or also) part of an eminently questionable system of social power. So, for example, Foucault argues in his *History of Madness* that the modern conception of madness as "mental illness" is grounded much more in the effort of bourgeois morality to control the mad than in any scientific truth about the nature of madness. Foucault's concern with the cognitive limitations of disciplines implicated in the power network left little room for standard discussions of the positive (methodological and ontological) achievements of science.

On the other hand, Foucault's critical historiography was very fertile in developing new ways of viewing science, ways that would reveal aspects not available to the self-understanding of a discipline. Here his two great innovations were the archaeology and the genealogy of thought. Archaeology is a synchronic technique of unearthing and comparing the deep structures (the epistemic "unconscious") of historical bodies of thought. Foucault's assumption was that there are rules of "discursive formations" (the bodies of discourse that express the scientific and would-be-scientific disciplines), beyond those of grammar and logic. These rules materially constrain the possibilities of what can be said and define a limited conceptual domain in which the thought of a certain period about a given subject-matter must operate. Genealogy is a complementary diachronic technique for understanding the emergence of new disciplines and the discursive formations that structure them. Its two main postulates are that systems of knowledge develop in symbiotic relations with systems of social power and that social power consists of a diffuse network of many microcenters of power, with no centralized, hierarchical structure. As a result, a genealogical history of knowledge avoids unitary teleological narratives of domination (such as Marxism) while still allowing us to question alleged cognitive necessities that mask techniques of disciplinary control.

The Bachelard–Canguilhem approach to science has produced a number of other important contemporary French philosophers/historians of science. In his early work, Michel Serres emphasized (as did Bachelard) the dispersed, regional character of scientific work. Each domain is like a Leibnizian monad, with a life and intelligibility of its own. But here, unlike Bachelard but like Foucault, Serres sees a structural unity that connects independent scientific domains. He explicates this unity in terms of the concept of communication, which he expresses through both the metaphor of the Greek god Hermes and the formalism of modern communication theory. Serres also offers disconcertingly flamboyant interpretations designed to show how domains conventionally regarded as nonscientific, such as art and literature, share the structures of scientific disciplines and must be regarded as their epistemic peers. So, for example,

he claims that Emile Zola expressed thermodynamics in his novels before it was explicitly formulated by physicists, tries to show the structural identity of Descartes's *Meditations* and La Fontaine's fables, argues that "Turner translates Carnot," and presents Lucretius's *De Rerum Natura* as a contribution to twentieth-century physical theory. He later developed, in a series of academic bestsellers, a poetico-philosophical cosmology that presents a metaphysics inspired by chaos theory and fractal geometry.

In quite a different vein, Michèle Le Doeuff has continued the tradition of Bachelard by articulating the images that dominate systems of scientific and philosophical thought (for example, in the works of Francis Bacon). She has also employed the Bachelardian notion of epistemological breaks to develop feminist analyses highlighting fissures and discontinuities in the history of scientific reason that, she argues, reveal the complexity and ultimate incoherence of the sexist attitudes implicit in much scientific thought.

Germany: Habermas and the Frankfurt School

Foucault's approach to science is interestingly similar to that of the critical theory of the Frankfurt School, which in many ways anticipates his social critique of science. (However, according to Foucault, he learned virtually nothing of the Frankfurt School during his philosophical formation.) The Frankfurt School began with Max Horkheimer, who developed a very important neo-Marxist approach to the problem of reason at just the time that Husserl was writing his *Crisis*. A major obstacle to Horkheimer's approach was the subtle and very persuasive social analysis of rationality recently put forward by Max Weber, who maintained that the very application of reason to the practical sphere (the key idea of critical theory) was the primary form of social control in modern society and the destroyer of any hope of objective values. Horkheimer and other members of the Frankfurt School (here influenced by Lukács) tried to show that Weber's analysis applied not to reason as such but only to the form it inevitably took in capitalist societies. But their own analyses (as well as the reality of Marxist totalitarianism) eventually led them to the conclusion, especially in Horkheimer and Adorno's *Dialectic of Enlightenment*, that the fault did indeed lie in reason itself. Horkheimer and Adorno argue, for example, that social oppression inevitably follows from the "identity logic" at the core of scientific rationality; this is the root drive to eliminate otherness and reduce everything to a single identity. This line of thought culminated in Herbert Marcuse's rejection of technology as such (i.e., any practical applications of reason) as a form of domination.

Since the 1960s, Jürgen Habermas has developed a new approach to critical theory. He agrees that modern deployments of reason have in fact undermined values and curtailed human freedom. But he maintains that this is not due to the nature of reason as such but to a one-sided modern conception of reason. Modern accounts, he maintains, have viewed rationality as limited to the techniques of "instrumental reason": the means/end reasoning characteristic of empirical science. There are, however, other forms of reason (e.g., the understanding of hermeneutics) that provide a key to unlock Weber's iron cage. As Habermas sees it, the goal of philosophy should be to offer a fully comprehensive account of rationality in all its aspects and, on the

basis of it, provide a foundation for human values and restore reason as the avant-garde of human liberation.

In *Knowledge and Human Interests* (1968) Habermas offered a neo-Kantian account (though in a Marxist vein) of knowledge as constituted by various human interests. Natural objects are knowable by scientific methods precisely because this is the only way that we can fulfill our interest in technical control of nature. In this sense, the technical interest constitutes the natural world as an object of our scientific knowledge, just as Kant thought the forms of sensibility and categories of the understanding did. However, our survival and development as a species requires not only the control of nature but also our forming social groups. Further, society is not possible without effective communication, which requires mutual understanding through intersubjectively shared symbols. This reveals the second of Habermas's cognitive interests: the communicative interest whereby humans understand one another in social contexts. Habermas sees the fundamental flaw of positivism as its failure to recognize the role of the communicative interest (and the knowledge as understanding correlated with it). Further, he thinks that it is the same failure that led philosophers of the Frankfurt School to see reason as destructive of human values and freedom. If our only cognitive interest were the empirical-analytic interest in technical control, then natural science would be the only form of knowledge and reason would be nothing but instrumental reason and could construct nothing but Weber's iron cage. If we ignore the communicative interest and think of reason in purely instrumental terms, we will find no alternative to postmodern dystopias. But a recognition of the understanding of human beings as a distinct realm of objective knowledge opens the way to the grounding of human values in a liberating practical reason (which, he argued, corresponded to a third, emancipative, interest).

In subsequent work Habermas brought his entire discussion of knowledge and interests under the heading of communication, arguing that the interest in technical control itself required a particular form of communication ("discourse") among scientists and that an orientation toward emancipation is implicit in the norms of effective communication (which involve, for example, the right of all to equal participation). Developing this view, his treatment begins to sound less like a continuation (in a more practical and historical mode) of Kant's transcendental reflection and more like a social-scientific construction of models for social practices. The detailed analyses of Habermas's theory of communicative action can be read as a kind of higher positivism, in which "reconstructive social science" (like history for Foucault) replaces transcendental reason. However, unlike Foucault, Habermas insists on the irreducibly normative character of such social science and so maintains a stronger link with traditional conceptions of philosophy.

France: Poststructuralism and the Abuse of Science?

As we have discussed it so far, continental philosophy, whatever its reservations and critiques, clearly takes the cognitive enterprise seriously and works from a responsible understanding of its methods and results. According to some recent commentators, this is not true of another group of continental thinkers, often called poststructuralists

or postmodernists, whose views we have not yet discussed. Some of these (e.g., Lacan, Kristeva, Baudrillard) seem better classified with those working in disciplines other than philosophy. But others, especially Luce Irigaray and Gilles Deleuze, seem philosophers by any reasonably inclusive definition, and have in fact been included in this volume's roster of continental philosophers with views on science worthy of consideration. By way of conclusion, I want to address the concerns of those who find their treatment of science irresponsible.

The negative case has been most thoroughly and forthrightly stated by Alan Sokal and Jean Bricmont in their *Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science* (1999). Their basic procedure is to quote from their targets' passages dealing with science and comment on their scientific intelligibility and accuracy. Because Sokal and Bricmont rightly focus on specific points rather than vague accusations, I will look at two particular examples. I think, however, that these are typical of their discussions.

Consider first their treatment of Deleuze on calculus. They cite several pages on the topic from Deleuze's *Difference and Repetition*, pointing out specific inadequacies in footnotes to Deleuze's text and also making more general comments about its deficiencies. The latter consist of two main claims: that Deleuze is discussing "classical problems in the conceptual foundations of differential and integral calculus" that "were solved by the work of d'Alembert around 1760 and Cauchy around 1820" (p. 160), and that most of the sentences of the cited passages simply don't make sense ("these texts contain [only] a handful of intelligible sentences" (p. 165).

It is hard not to sympathize with Sokal and Bricmont's frustration at the aggravating obscurity of Deleuze's writing. But since they admit to not understanding the bulk of what Deleuze is saying, it is also hard to see how they can judge themselves to be in a position to pick out parts of his text as inaccurate or confused formulations of calculus or to conclude that Deleuze is offering a discussion of classical problems in the foundations of mathematics. His discussion does not neatly separate what he is saying (or implying) about mathematics from his formulation of his own philosophical standpoint; the two are inextricably intertwined. Sokal and Bricmont get critical purchase on Deleuze's text only by assuming that he is using terms such as "difference," "differential," "continuity," "power" in the technical mathematical sense. There are certainly allusions to these technical senses, but the terms are also part of Deleuze's distinctive philosophical discourse. We are, therefore, in no position to assess what he is saying without understanding the philosophical language he is using. Sokal and Bricmont, of course, assert that this language is simply meaningless. But they offer no philosophical analysis to justify this claim, nor do they claim to be competent to do so.

The same general point applies to Sokal and Bricmont's critique of Luce Irigaray's provocative comments about the sexist nature of the physics of fluid dynamics (although here their case is weaker, since the main "mistakes" they attribute to Irigaray concern not the content of physics but philosophical issues about the limits of formalization and the role of idealization). But, beyond this, Sokal and Bricmont seem oblivious to the humorous and ironic tone of Irigaray's discussion, which is as much a tease as a sober critique, as much a matter of trying to disconcert and stimulate as of trying to refute.

Of course, these are very puzzling texts and thorough analysis might reveal that they have no plausible sense, although the essays in this volume on Deleuze and Irigaray make a good case to the contrary. But my point here is that the sort of critique Sokal and Bricmont propose is not capable of supporting such a conclusion, which would have to be based on an informed awareness of the text's possible meanings and connections, not uninformed exclamations of incomprehension.

The essays and complementary primary texts that follow offer much more detail on topics either ignored or treated only schematically above. (In some cases, for example that of Merleau-Ponty, my comments cover material on which we were not able to include essays.) We begin with two essays on the historical background of continental philosophy of science. Terry Pinkard's discussion of Hegel gives a good sense of the issues that developed out of Kant and the idealistic turn taken by his followers and critics, while Jean Gayon shows the relation between Bergson's spiritualist metaphysics and his critique of science. Moving into the German neo-Kantian context out of which the continental–analytic division arose, Michael Friedman analyzes Ernst Cassirer's views on philosophy of science. Next, we look at the phenomenological approach: Richard Tieszen provides an overview of Husserl's conception of philosophy as a science and of his critique of empirical science, and Joseph Rouse discusses Heidegger's treatment of science with particular reference to his attitude toward naturalism. Returning to France, we begin with three essays on figures in the important French tradition of history and philosophy of science. Mary Tiles discusses Bachelard's early work on science and technology, Hans-Jörg Rheinberger treats Canguilhem's historical approach to epistemology, and Linda Alcoff explores Foucault's approach to science in the context of his genealogies of power. Next there are two essays on poststructuralist views of science, with Todd May surveying Gilles Deleuze's view of science and Penelope Deutscher discussing Luce Irigaray and French feminist approaches to science. Finally, we return to Germany for one last time, with Axel Honneth's analysis of the Frankfurt School's critique of science.

Notes

1 Duhem in fact thought there was a body of metaphysical knowledge about the world, roughly that expressed in Aristotle's metaphysics. But his own philosophy of science dealt with the realm of appearances, not the underlying realm of metaphysical truth.

2 There was also Wahl's book, *Vers le concret* (Paris: Vrin, 1932), which Sartre says was particularly important for him and his friends.

3 On this point, see my "Foucault and the History of Madness," in Gary Gutting (ed.), *The Cambridge Companion to Foucault* (Cambridge: Cambridge University Press, 1994), 47–70.

HEGEL

1

SPECULATIVE *NATURPHILOSOPHIE* AND THE DEVELOPMENT OF THE EMPIRICAL SCIENCES: HEGEL'S PERSPECTIVE

Terry Pinkard

As a possible source for ideas about the philosophy of science, Hegel might seem like an unlikely prospect. Many of his basic ideas about history have, after all, already been put to use (even if quite unconsciously and often in full ignorance of their source) by people in the history and philosophy of science. Hegel's shade appears throughout the post-Kuhnian picture of science that sees science as going through revolutions in which one scheme of thought (or "paradigm") replaces another such that the new scheme grows out of the very specific failures (or, as Hegel would say, the "determinate negations") of the previous scheme, setting itself up not merely as what just comes later but as the rational successor to what preceded it. Likewise, Hegel's refusal to comment virtually at all on the nature of scientific "method" or the structure of scientific theories, and his insistence instead on treating the individual sciences (mechanics, physics, meteorology, geology, biology) in detail, has at least a passing resemblance to the kind of close-grained contemporary philosophies of physics and biology that are very much the mode in contemporary philosophy of science, but what Hegel actually has to say about those sciences hardly seems to have any contemporary resonance to it.

Curiously enough, however, Hegel, who took a historical approach to almost everything he did, did not himself take such a historical approach to science. Instead, his writings and extensive lecture series on the topic were titled "*Naturphilosophie*," and, contrary to what one might have expected, in his *Naturphilosophie* he did not offer a Collingwood-style treatment of the history of the "Idea" of nature but instead a reconstruction of the picture of nature that was emerging from the sciences of his time, and how that picture related to his conception of agency, of *Geist*. Even worse, although Hegel himself cut a rather impressive figure as a reader and commentator on the scientific literature of his time, his status as a prognosticator about which developments in science were going to be the winners and the losers turned out not to be nearly as imposing. In almost all cases, he simply placed his bets on the wrong horses – most famously in siding with Goethe's delightful but wrong-headed theory of colors against the Newtonian tradition.

To be sure, many of Hegel's own failures in this regard cannot be laid entirely at his feet. After all, he lived and wrote before the advent of the twentieth-century

revolution in physics; in his time geology was dominated by the debate between vulcanists and neptunists – that is, by the debate over whether the earth's formations originate in internal fiery volcanoes or in more watery origins. Post-Euclidean geometries were barely even dreamed of in his time, and the fledgling efforts at creating them were for the most part unknown. Chemistry was still in its early infancy – Lavoisier's recognition of oxygen and banishment of phlogiston had not yet been fully accepted, and organic chemistry had not yet even been born. Modern biology was still several years off – Darwin's *Origin of the Species* was published in 1859, and Hegel died in 1831. It would be unfair to fault Hegel for failing to predict the upcoming "second" scientific revolution.

It is nonetheless worth attending to what Hegel took himself to be doing in offering a piece of what he called a *speculative* philosophy of nature in order to see whether there still is anything left to find in his lectures and writings on the topic other than matters now only of antiquarian interest.[1]

To get a grip on that, we need to understand what Hegel means by a "speculative philosophy." Hegel's use of the term originates in the post-Kantian predicament of how to use Kant to get beyond Kant, especially when the Kantian resolutions of certain key problems seemed so problematic.[2] Key to this was Kant's "third antinomy," which to his successors seemed to say that the problem of freedom in the modern world was not only theoretically irresolvable but was, literally speaking, theoretically unintelligible, and few seemed convinced by Kant's own solution to save freedom by appeal to the phenomenal/noumenal distinction. However, because so much of Kant seemed right, it also seemed especially important to the post-Kantians either to put the Kantian house in order (such as Reinhold and, at first, Fichte more radically tried to do) or to use Kant to get out of Kant into something appropriately post-Kantian.

The post-Kantian rejection of both Kant's hard-and-fast distinction between two separate faculties of knowledge – intuitions and concepts – and his language of an "imposition" of conceptual form onto intuitive content also put the issue of saving Kant from Kant high on the agenda. Hegel in particular joined in the arguments against intuition as an *independent* source of knowledge uninformed by concepts, arguing that Kant's own arguments to the effect that we could never be conscious of "unsynthesized intuitions" showed that intuitions could only play their epistemic, normative role as part of (or as a "moment" of) some larger normative "whole," that is, that classifying part of our experience as an intuition (as a representation) amounted to ascribing a normative status to it, an ascription which itself had to come from "reason." Likewise, Kant's own concern that concepts without intuitions were devoid of content showed that any attempt to completely unchain concepts from sense-experience was doomed to repeat the failures of previous metaphysics that Kant had so devastatingly diagnosed. Hegel's own leading idea, articulated partially in his first published monograph in 1801, *The Difference Between Fichte's and Schelling's Systems of Philosophy*, and then made more explicit in his long journal article the following year, "Faith and Knowledge," was that concepts and intuitions should be understood as having normative statuses within a larger "whole," that their epistemic roles and contributions could be separated only in light of understanding their place in that whole, which he identified as "reason," the capacity to draw inferences, which he

then developed into a more social conception of the *practice* of giving and asking for reasons. To use Hegelian language: we must begin from the *unity* of intuitions and concepts, not from their separation, which is rightfully done only within the larger whole in which they play their roles.[3]

Rejecting pure intuitions as a source of epistemic content independent of all conceptual shaping put all those post-Kantians making that move into a predicament that Kant himself had grasped (even if somewhat inchoately) with regard to his practical philosophy. On Kant's view, the moral law and its bindingness on us were, of course, independent of intuition, representing only the full, unfettered spontaneity of reason (expressed as autonomy in the practical sphere), and thus, as Kant put it in an often-cited passage in the 1785 *Groundwork*, the will can be subject only to those laws of which it can regard itself as the author.[4] However, since a lawless will cannot bind an agent, the will needs a law to guide it in authoring whatever law it institutes, which implies that such a prior law cannot itself be self-chosen, but the law, paradoxically, can obligate the agent only if it is self-chosen. This "Kantian paradox" – that the will must have a self-chosen law that is not self-chosen – found its expression in Kant's "fact of reason" in the 1788 *Critique of Practical Reason*, which in some ways just restates the "paradox" as a "fact," namely, that in undertaking any commitments at all, we cannot get "outside of" or "beyond" the claims of reason *even while* we regard them as self-authored – that we are committed to the absolute normative priority of reason as a "fact" that we ourselves have "made."[5]

Moving this "Kantian paradox" to the forefront informs the problem that animates virtually all post-Kantian conceptions of normative authority.[6] Hegel's own position develops in part out of the implications of dropping intuition as a separate, independent faculty that must then be combined with a conceptual faculty – the implications, that is, of dropping intuition as a separate source of "content" which must then be organized in terms of some "scheme." This paradox – about how I can be both author of the law and subject to the law – was for Hegel simply *the* speculative problem, the great "speculative truth" that post-Kantian philosophy was called upon to articulate and explain.[7] The problems surrounding the bindingness of the claims of reason (and of what even counts as "internal" and "external" to reason) is the pulse of the Hegelian dialectic, which, for example, in the *Phenomenology* narrative moves through various shapes of "consciousness" as those "shapes" try to hold fast to some type of external reason only to find it "dissolving," which in turn motivates "consciousness" to "return into itself" after having originally taken its standards to have been "external to itself." The *Logic* in turn traces the progress of thought's finding that it is, in Hegel's speculative language, the "other of itself" as it comes to grips with how it, as autonomous thought, can be the author of the norms to which it is subject.[8] On the Hegelian understanding, the "Kantian way out of Kant" thus has to take Kantian idealism not to consist in a contrast between the mental (the ideal) and the real (or the "inner" and the "outer"); it instead rests on the contrast between the normative order versus some kind of comprehensive naturalism (in a way very similar to Wilfrid Sellars's conception of the contrast between the "space of reasons" and the causal order).[9]

Turning either to a purely "externalist" or a purely "internalist" account of reason would only be one-sided and would, as Hegel stressed in his *Difference* book and the