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Heidegger and Cassirer on Science after the Cassirer and Heidegger of Davos

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Summary

The paper exposes the views of Ernst Cassirer and Martin Heidegger on the dynamics of the sciences of their day, as both developed them in the two decades after the encounter of the two philosophers in Davos in 1928. It emphasizes points of common concern, and it compares their positions to those of contemporary philosophers of science Gaston Bachelard and Edgar Wind.

Keywords: Heidegger; Age of the World Picture; Cassirer; Logic of the Humanities; Gaston Bachelard; Edgar Wind; historical epistemology

Content

1. Introduction	440
2. Martin Heidegger: The Age of the World Picture	441
3. Ernst Cassirer: The Logic of the Humanities	443

1. Introduction

In these brief remarks I examine the visions of the sciences and their history developed by Martin Heidegger and Ernst Cassirer *after* the Davos encounter so richly narrated by Peter Gordon in his *Continental Divide*.¹ But I speak neither about nor from their respective onto-existential and neo-Kantian philosophical perspectives.

In the late 1930s, after their diverging philosophical commitments had culminated in the clash at Davos, it seems to me that both Cassirer and Heidegger were prompted to engage more deeply with the sciences of their time and to provide an account of the sciences' practical entanglements, as well as the increasingly rapid changes in their conceptual frameworks. My remarks are informed by an overarching, dynamic approach to the sciences' development in the twentieth century—an examination of the historicisation of epistemology itself.² I would go so far as to claim that the kind of radical historicisation of scientific practice that both Cassirer and Heidegger felt to be necessary in their later work would have provided, if not a bridge over the divide of Davos, then at least new grounds for disputation.

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¹ Peter Gordon, *Continental Divide: Heidegger, Cassirer, Davos*, (Cambridge, MA, 2010).

² For a more extended and embedded treatment, on which these remarks draw, see Hans-Jörg Rheinberger, *On Historicizing Epistemology* (Stanford, CA, 2010).

2. Martin Heidegger: The Age of the World Picture

In his 1938 essay 'The Age of the World Picture', Heidegger—the Heidegger after the *Kehre*—grappled intensely with the nature of recent science, much more decisively and deliberately than he had done ten years earlier in *Being and Time*. This text appeared—along with other essays from the period after Heidegger's infamous Freiburg rectorate—for the first time in 1950, in a collection entitled *Holzwege*.³ It is astonishing how many parallels there are between Heidegger's analysis in this short piece and the conceptions of science developed, for example, by Heidegger's French contemporary Gaston Bachelard in his *New Scientific Spirit* of 1934. The elements of Heidegger's analysis particularly relevant to the historicising of epistemology may be briefly summarised as follows.

In Heidegger's view, science in its present-day form is one of the most essential and striking phenomena of the modern age. It made its appearance only in conjunction with another phenomenon of equal importance, namely machine-based technology, with the former—science—being dependent on the latter, technology. For Heidegger, the proper starting point for any understanding of the phenomenon of science is praxis, not theory. It was only machine technology as a particular form of the *practice* of human labour that provoked the natural sciences into being, eventually causing them to develop into their contemporary, largely mathematised form. Thus it was not the intellectual breakthrough of a new mode of thinking—natural scientific thinking—that presided over the birth of modern technology thanks to its capacity for calculation and quantification. On the contrary, technology is the driving force of natural science in its characteristic modern form. This situation, according to Heidegger, is qualitatively new in relation both to the Greek *episteme* and to the medieval doctrinaire form of science or *doxa*, and is a key characteristic of the modern age. Rather than continuous development from one form of science to the other, what we find are epochal breaks between them. Technology, for Heidegger, also underlies and constitutes the essence of modern metaphysics, and thus philosophy.

On these premises Heidegger explains the essence of contemporary science as follows:

The essence of what we today call science is research. In what does the essence of research consist? In the fact that knowing (*das Erkennen*) establishes itself as a procedure within some realm of what is, in nature or in history. Procedure (*Vorgehen*) does not mean here merely method or methodology. For every procedure already requires an open sphere in which it moves. And it is precisely the opening up of such a sphere that is the fundamental event in research.⁴

In scientific discovery, knowledge becomes a 'procedure' within a space characterised by multiple open horizons. Research discloses certain regions of objects according to a 'project' (*Entwurf*), which also determines the kind of 'rigor' to which research commits itself. 'This binding commitment to the rigor of research has its own character at any given time in keeping with the project'.⁵

In this 1938 essay, Heidegger, much like Bachelard, thus sees the modern scientific spirit as realised through an *Entwurf*—Bachelard's term is *projet*—and essentially developing within spheres—*Bezirke*—or what Bachelard calls 'cantons'. Each of these open spheres has its own character of rationality, which must be understood in light of the

³ The term, incidentally, is ambiguous in itself, meaning lonely paths through the wood identifiable only by those in the know, as Heidegger himself suggests in the *exergon*, but also paths that can lead one astray.

⁴ Martin Heidegger, 'The Age of the World Picture [1938/1950]', in *The Question Concerning Technology and Other Essays*, translated by William Lovitt (New York, NY, 1977), 115–54 (118). Translation slightly modified.

⁵ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 119. Translation modified.

specific procedural conditions in each sphere. In this context, 'rigour' or 'exactness' is not an absolute degree of precision, but is geared towards the particularities of the objects that can be reconstructed within the sphere in question; in a given sphere, the procedure makes these objects accessible and renders them intelligible 'by calculation' through 'the constant comparing of everything with everything', as Heidegger puts it.⁶

It is in the 'becoming objective' of a region of knowledge that the potential for ever-new knowledge lies. The 'procedure', guaranteed by rigour in the context of a project, remains essentially open to 'changeableness in whatever encounters it'. New knowledge is realised by experimentation, a form of obtaining knowledge that according to Heidegger 'becomes possible where and only where the knowledge of nature has been transformed into research'.⁷

There is a further quite interesting parallel between Heidegger and Bachelard. Like his French contemporary, Heidegger sees the specialisation of the modern natural sciences *not* as a deficient mode of a scientific spirit essentially oriented towards comprehensive and overarching *Bildung*, but rather as a structural particularity of modern knowledge anchored in the very nature of the procedure:

Every science is, as research, grounded upon the projection of a circumscribed object-sphere and is therefore necessarily a science of individualised character. [...] This particularising (specialisation) is, however, by no means simply an irksome concomitant of the increasing unsurveyability of the results of research. It is not a necessary evil, but is rather an essential necessity of science as research.⁸

Heidegger goes on to identify the advantage of this system as its 'flexibility', which, though 'regulated', remains open to change by virtue of its own ramification, and thus retains the potential to respond to new challenges in a flexible way.

This network of knowledge activities, striving to separate out into specialisations of knowledge, is nevertheless held together by something that Heidegger describes as the basic procedure of the 'pursuit [*Betrieb*]'. Pursuit here does not mean either mere assiduousness or the proper arrangement of ongoing production. By 'pursuit' Heidegger means the recursive cohesion that the modern natural sciences obtain and maintain by drawing on technological practice and feeding their results back into that practice. We detect echoes of Bachelard once again when Heidegger states:

The methodology through which individual object-spheres are conquered does not simply amass results. Rather, with the help of its results it adapts itself (*richtet sich ein*) for a new procedure. Within the complex of machinery that is necessary to physics in order to carry out the smashing of the atom lies hidden the whole of physics up to now.⁹

The recursive loop that is implied here, in which the implementation of the results of the procedure becomes the precondition for its productive continuation, lends modern science its particular systemic character, which in the last analysis can be understood only in and through its temporal dimension. Science follows historical trajectories that can best be grasped through the idea of recursive differentiation:

⁶ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 123.

⁷ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 121.

⁸ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 123.

⁹ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 124.

More and more the methodology adapts itself to the possibilities of procedure opened up through itself. This having-to-adapt-itself to its own results as the ways and means of an advancing methodology is the essence of research's character as ongoing activity.¹⁰

For Heidegger, this process also points to the core of contemporary metaphysics. Its concept of being, in particular, is the concept of the object in modern science: 'Only that which becomes object in this way *is*—is considered to be in being. We first arrive at science as research when the Being of whatever is, is sought in such objectiveness'.¹¹ 'What is, in its entirety, is now taken in such a way that it first is in being and only is in being to the extent that it is set up by man, who represents and sets forth'.¹² Heidegger's later critique of technology, as spelled out in the early 1950s, is certainly latent in 'The Age of the World Picture', but by no means explicit as a critique.¹³ It is clear, however, that unlike most of his contemporaries, including Cassirer, who saw science's key achievement as the elaboration of ideal forms (theories, concepts, symbols), Heidegger understood modern science as a material form of the mobilisation of rationality and as having an essentially collective constitution.

Contemporary scientific 'representation', for Heidegger, consists quite literally in 'representing [*Darstellen*]' in the sense of 'setting before [*Vor-sich-Hinstellen*]', which, as he himself puts it, results in a 'structured image [*ein Gebild*]' that is the creature of humanity's representing as producing, and thus also results in a far-reaching historical transformation of our life-world.¹⁴ Modern metaphysics is a metaphysics of representation with all its concomitant categories, most importantly the categories of subject and object. The title of the essay under consideration here could and should therefore rightly be translated as 'The Age of Representation'. It is the science–technology nexus and its concomitant metaphysical presuppositions that dominate our modern age. Heidegger continues to look desperately for a perspective from which these presuppositions can be overcome. After his *Kehre* in the 1930s, *Existential-Ontologie* and the recourse to being as *Dasein* were no longer appropriate to this quest. For the time being, as he confessed in the title of his essay collection, he walked along *Holzwege*. What Heidegger appears not to have seen clearly, however, was that the very process he described so succinctly in and by itself already transgressed the static concept of representation on which the traditional theory of knowledge (*Erkenntnistheorie*) rested. Bachelard, no less towering a thinker from over the Rhine but far less prominent as a philosopher in his day, saw this clearly when he remarked that science's modern form of the *projet* (*Entwurf* in Heidegger's terms) pointed beyond any simply conceived Cartesian relation between subject and object as the unquestioned ground on which representation rested.¹⁵

3. Ernst Cassirer: The Logic of the Humanities

Let us turn now to Ernst Cassirer. After emigrating in 1933, first to England, then to Sweden, where he became a Swedish citizen, and eventually to the United States (US), he

¹⁰ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 124.

¹¹ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 127.

¹² Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 129–30.

¹³ Martin Heidegger, 'The Question Concerning Technology', in *The Question Concerning Technology and Other Essays*, 3–35.

¹⁴ Heidegger, 'Age of the World Picture', in *The Question Concerning Technology*, 134.

¹⁵ Gaston Bachelard, *Le nouvel esprit scientifique*, tenth edition (Paris, 1968, first published in 1934), 11.

continued to be a productive philosophical writer. His convictions led him to work consistently to prevent the natural and cultural sciences of his time from drifting apart completely. He conceived of the whole of science (in its broad German sense) as a differentiated, historically articulated, dynamic framework of cultural knowledge—expressive, depictive and symbolic—in which each part ultimately referred to and depended on the other. I look first at some of Cassirer's reflections on the history of the sciences in the last volume of *The Problem of Knowledge: Philosophy, Science, and History since Hegel*, published posthumously in English translation by Yale University Press in 1950.¹⁶ Cassirer had written the book while in Gothenburg, and it was dedicated to the rector and faculty of Gothenburg University. I then examine the five studies published as *On the Logic of the Humanities*, which first appeared in German as *Zur Logik der Kulturwissenschaften. Fünf Studien* in 1942 during Cassirer's Gothenburg exile.

Up to the eighteenth century, as Cassirer claimed in the third volume of his *Philosophy of Symbolic Forms*, it was possible to approach the history of the sciences through their representation in contemporary philosophical systems such as those of Aristotle, Descartes and Leibniz. For the nineteenth and twentieth centuries, according to Cassirer, this form of reflection, so convenient for philosophers, was no longer feasible. As he put it, 'there is no longer any great representative philosophical system in which we can discern the status of scientific theory and methodology'.¹⁷ Cassirer responded to this situation in the fourth volume of *Das Erkenntnisproblem in der Philosophie und Wissenschaft der neueren Zeit*, which is devoted to the nineteenth and twentieth centuries, with a detailed discussion of recent developments not just in physics but also in the life sciences and humanities. Here he explained his observation that today there are as many individual theories of knowledge as there are fields of research and scientific interests corresponding, as he put it, to 'the real, inner, moving forces' that lie 'often deeply hidden, within the sciences'—not unlike Bachelard. Understanding these forces consequently required a 'patient steeping of oneself in the work of the separate sciences'.¹⁸ Certainly, he continued in the introduction to this book, 'the era of the great constructive programs, in which philosophy might hope to systematise and organise all knowledge, is past and gone'.¹⁹ But this did not prompt Cassirer to repudiate synthetic reflection. Instead he believed that, in place of earlier philosophical systems with their integral metaphysics, what we need is an intensive debate about the regional formation of concepts, a process in which the sciences engage within specific realms of their development. 'The demand for synthesis and synopsis, for survey and comprehensive view', Cassirer concluded, 'continues as before, and only by this sort of systematic review can a true historical understanding of the individual developments of knowledge be obtained'.²⁰ To achieve such 'genuine historical understanding' required a cultural history of knowledge that traces its modern diversification and takes the various manifestations of this process of diversification seriously. Cassirer thus increasingly regarded reflection on the sciences as itself historically dependent on the very development of the sciences

¹⁶ Ernst Cassirer, *The Problem of Knowledge: Philosophy, Science, and History since Hegel*, translated by William H. Woglom and Charles W. Hendel (New Haven, CT, 1950). For the original, see Ernst Cassirer, *Das Erkenntnisproblem in der Philosophie und Wissenschaft der neueren Zeit. Von Hegel's Tod bis zur Gegenwart* (Stuttgart, 1957).

¹⁷ Ernst Cassirer, *The Philosophy of Symbolic Forms* 1–3, translated by Ralph Manheim (Oxford, 1953–1957), here: 3, 459.

¹⁸ Cassirer, *Problem of Knowledge*, 17–19.

¹⁹ Cassirer, *Problem of Knowledge*, 19.

²⁰ Cassirer, *Problem of Knowledge*, 19.

themselves—thus endowing epistemology itself with deep historicity. On this view Kantian transcendentalism tended to disappear from the quest to understand.

Cassirer became more and more aware that the forms and shapes of modern knowledge could not be understood simply by analysing its results. ‘We must not content ourselves with considering its product; we must investigate from within the mode and direction of its *production*’.²¹ Evidently, what was involved in the scientific appropriation of the world was

not a matter of disclosing the ultimate, absolute elements of reality, in the contemplation of which thought may rest as it were, but of a *never-ending process* through which the relatively necessary takes the place of the relatively accidental and the relatively invariable that of the relatively variable.²²

Objectivity no longer appeared as a given, but as a permanent ‘task’ of objectification. Theories became instruments for carrying out this task. ‘All theoretical concepts bear within themselves the character of “instruments”. In the final analysis they are nothing other than tools, which we have fashioned for the solution of specific tasks and which must be continually refashioned’.²³ What we encountered in Bachelard in the form of a *projet*, in Heidegger as *Entwurf*, we now meet in the form of a never-ending *Aufgabe*. This last quotation is from Cassirer’s 1942 *Logic of the Humanities*.

By the 1930s, in a work published as *Experiment and Metaphysics*, philosopher and art historian Edgar Wind, who was Cassirer’s student in his Hamburg days and fellow member of the Warburg Institute, had already linked this process-character of the sciences back to their instrumentality. He referred to a circle that could not be completed if this meant ‘restriction [...] to a view of the world based on instruments which have their place within this world and are therefore subject to the laws of the world’, as demanded by and peculiar to experimental science.²⁴ From this restriction, it follows that

to make precise use of those instruments we must know the laws of the world to which they are subject. On the other hand, it is precisely the goal of this use to find out these laws in the first place.²⁵

Having launched itself upon this path of embodying knowledge, the scientific spirit must ensure the ceaseless, ongoing development of its instruments and experiments, as well as the associated concepts and theories, through a continuous movement of immanent transcendence.

It is interesting to look back at Davos in 1929 in this light. One of those lecturing at the university there was Léon Brunschvicg, and one of his talks was on reason and science. Jean Cavaillès, then a young *agrégé de philosophie* at the *Ecole normale supérieure* in Paris and among the students of the *Internationale Davoser Hochschulkurse* of 1928, summarises this talk in an enthusiastic review:

At every moment of science, then, real reason – and not the kind of reason that satisfies and reassures the logicians – transgresses itself. Through its intelligible dynamism, this form of reason breaks with what is contingent and limited in the

²¹ Ernst Cassirer, *Philosophy of Symbolic Forms* 3, 449. Emphasis added.

²² Cassirer, *Phenomenology of Knowledge*, 475ff.

²³ Ernst Cassirer, *The Logic of Humanities*, translated by Clarence Smith Howe (New Haven, CT, 1961), 76.

²⁴ Edgar Wind, *Experiment and Metaphysics*, translated by Matthew Rampley (Oxford, 1972), 10.

²⁵ Wind, *Experiment and Metaphysics*, 10.

concept it has engendered and to which it is unwilling to adhere. ‘Things are more reasonable than men’, as [Felix] Klein stated.²⁶

In his late studies, Cassirer himself had come to take great pains in defining objects of culture in general no longer solely within the realm of the symbolic but in light of their transient historical materiality and worldliness:

Like every other object, an object of culture has its place in space and time. It has its here-and-now. It comes to be and passes away. Insofar as we describe this here-and-now, this coming-to-be and passing-away, we have no need to go beyond the sphere of physical determinants. But, on the other hand, in this description even the physical itself is seen in a new *function*. It not only ‘is’ and ‘becomes’; for in this being and becoming something else ‘emerges’. What emerges is a ‘meaning’, which is not absorbed by what is merely physical, but is ‘embodied in and through it’; it is the factor common to all that content which we designate as ‘culture’.²⁷

A truly cultural history of the sciences, therefore, is necessarily concerned with embodied meanings of this kind, in particular with specifically scientific meanings. In his five studies, however, Cassirer did not analyse the sciences in any further detail, although he did generally indicate that physical, historical and psychological categories had to be brought into synthesis if the description of a cultural object was to be successful. The historical, in this connection, is not simply what has been, but ‘possesses and retains a present peculiar to itself’,²⁸ a peculiar present that is even, to express it in the seemingly paradoxical formula of the late Edmund Husserl, the ‘historically primary in itself’.²⁹

For Cassirer, the natural sciences of his day lent the cultural sciences unexpected support. In terms of method, the cultural sciences were in a bad position as long as the ‘mechanical world view’ of the natural sciences remained unchallenged. ‘But it was just here’, he observed, that ‘that remarkable development occurred which led to an inner crisis and finally to a “revolution in our mode of thinking” within the field of the science of nature’.³⁰ Cassirer saw the core of this revolution—a revolution at the very heart of natural-scientific thought—in the rehabilitation of particular concepts of wholeness and structure. For him this in no way provided *carte blanche* to transgress, let alone undo, the boundaries between the natural sciences and the humanities; but the latter could now ‘immerse themselves more freely and with less constraint than previously in the study of their forms, their structures and shapes, since the other realms of knowledge [had] also come to pay attention to their formal problems’.³¹ On the other hand the natural sciences, as formations to be considered in terms of their own deep historicity and cultural mediation, were thus placed irrevocably on the agenda.

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²⁶ Jean Cavaillès, ‘Les deuxièmes Cours Universitaires de Davos’, in *Die II. Davoser Hochschulkurse/Les IIe Cours Universitaires de Davos*, (Davos, 1929), 65–81, 72–73.

²⁷ Cassirer, *Logic of Humanities*, 98.

²⁸ Cassirer, *Logic of Humanities*, 145.

²⁹ Edmund Husserl, ‘The Origin of Geometry’, in Edmund Husserl and Jacques Derrida, *Edmund Husserl’s ‘Origin of Geometry’: An Introduction*, translated by John P. Leavey, Jr., (New York, NY, 1978), 176.

³⁰ Cassirer, *Logic of Humanities*, 164.

³¹ Cassirer, *Logic of Humanities*, 172.