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Acts of time: Cohen and Benjamin on mathematics and history

I. In the treatise written by the seventeenth-century French physicist Pierre Varignon on *La pesanteur* (Varignon, 1690) – or, gravity – a vignette [Fig. 1] depicts Père Mersenne standing on one side and René Descartes on the other, both staring intently upwards, apparently after having shot a cannonball vertically into the air. The caption, in which we can suppose to read their minds, asks: "*Retombera-t-il?*" or, will it fall again? – the question of the century, as it were, in which factuality in the natural world was established on the principle of scientific method rather than on sense impression, and the unity of experience established on a notion of continuity construed from the infinite iterability of the experiment. The posing of this question, one might say, constitutes the very concept of unity – ironically, if you will, and as Varignon intended, since the certainty of the answer is based on an open elision and infinite deferral of the observable outcome.

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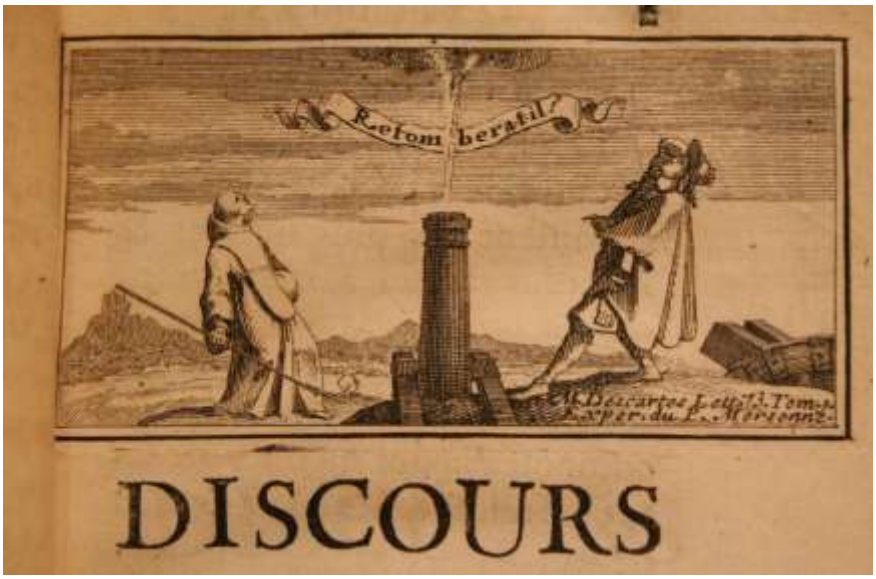

[Fig. 1] Pierre Varignon, "Retombera-t-il?" Vignette of Descartes (*right*) and Père Mersenne (*left*). In: *Nouvelles conjéctures sur la pesanteur.* Paris: Jean Boudot: 1690.

In volume six of Benjamin's *Gesammelte Schriften* there is a brief, two-paragraph fragment that does very similar work to this image, which Benjamin composed on the "Zweideutigkeit des Begriffs der 'unendlichen Aufgabe' in der Kantischen Schule" (Benjamin, 1974-1989, vol. VI, p. 53) and which dates to the summer that Benjamin spent in Switzerland in 1918, studying the second edition of Hermann Cohen's *Kants Theorie der Erfahrung* (Cohen, 1885). In the fragment, Benjamin differentiates between two "meanings" (*Bedeutungen*) of the "infinite task" – the key epistemological concept by which the Marburg school sought to methodologically provide a systematic unity for philosophy and the coordination between its various branches: metaphysics, ethics, aesthetics. Benjamin illustrates the first of these two meanings with an image of the experience of walking in the mountains:

> […] the goal lies in the infinite distance in the sense that the entire measure of its distance is determined progressively from each step of the way, just as a peak always appears to slip further away the closer one approaches it, insofar as the separating valleys of other peaks are at first hidden and only reveal themselves along the way. The position of the goal, however, even if distant, would stay constant, and it is thinkable that progress does not bring any change to the insight into the infinity of the goal, and that it lies open, as if on a flat surface, to view from the beginning. Such an infinity, however, would only ever have been

empirically and thus not a priori determined.[2] (Benjamin, 1974-1989, vol. VI, p. 53).

Since the position of the goal is in fact constant (and mountains presumably do not walk away on their own), the mountains only appear to recede; in fact, intervening valleys that are previously hidden from sight disclose themselves as one approaches. The goal, whether or not it is attained, is therefore "empirically" determined, not a priori. The second meaning of the "infinite task," however, takes the empirically determinable goal to make place for yet another, more distant goal, and by virtue of an infinite repetition of the same operation, renders the task actually unattainable and the distance to it untraversably, potentially infinite: «in this way the goal actually and not just apparently flees immeasurably into the distance» (p. 53). This second meaning of the infinite task, which Benjamin calls "non-apriori yet completely empty", seems to him to be how the neo-Kantians understand the infinity of *their* task. In other words, the process by which neo-Kantians imagine an asymptotic approach to the system of philosophy by way of a progression of empirical scientific discoveries turns out to yield an empty concept. As Benjamin suggests in his discussion of the first meaning of the "infinite task", the foundation of scientific reality should not be divorced entirely from the phenomenal realm; only as a process of shifting unconcealment is a task that is infinite yet actual thinkable at all in "empirical" terms. Insofar as the goal "lies open, as if on a flat surface", to view from the beginning, its "infinity" is actual; from an aerial view, as it were, the position of the goal can be determined. The goal is "infinite", however, because its "infinity" is indifferent to the concept of "progress"; from the point of view of the walker in the mountains, at any distance from the goal there may open up yet another previously hidden valley. "Progress", to be sure, might be considered "infinite" in the Eleatic sense if each step were an element of a finite distance divided into the infinitely small. Here, however, each step made in the name of progress is, as it were, too big, since the separating valleys are initially hidden from the perspective of the creature on the surface, each step on which is itself a leap over a distance with infinitely many valleys. The distance between any two mountains, however close together, is rifted with as infinitely many valleys as is the distance between two mountains at an infinite distance, just as for instance the number of elements between 0 and 1 might be considered the same as the number of elements in the continuum as such.

[2] This and all subsequent translations into English are my own.

Turning the landscape of Zarathustra, as it were, into a function whose properties resist an overview to the extent that its sensible representation on two dimensions cannot fully capture the dynamic of its traversal of nature, Benjamin's criticism of the concept of infinity he attributes to the "Kantian school" hinges on a mathematical idea of actual infinity that first made a formal appearance with Georg Cantor's development of transfinite set theory. Benjamin not only knew of, but worked with Cantor's discovery that given a one-to-one correspondence between an infinite set and one of its subsets, both the full set and the subset are "countably infinite" in that they contain the same number of elements – thus making the whole equal to a part of itself, in direct opposition to Euclid's axiom that the whole is greater than the part. Benjamin's maternal uncle Arthur Schoenflies was the first popularizer of Cantorian set theory and Benjamin cites two articles by Schoenflies, one on "axiomatics" (Schoenflies, 1921) and the other on the place of "definition" (Schoenflies, 1911) in set theory, in bibliographies he prepared for projects relating to logic and language sometime after 1921.[3] For one of these projects (WBA I, Ms 1850), Benjamin also makes reference to a book entitled *Sant'Ilario: Gedanken aus der Landschaft Zarathustras*, which was written under the pseudonym "Paul Mongré" by the mathematician Felix Hausdorff (Mongré [= Hausdorff], 1897). Hausdorff was the author of another fundamental work on set theory, *Grundzüge der Mengenlehre* (Hausdorff, 1914), which was to supersede Schoenflies' *Die Entwicklung der Lehre von den Punktmannigfaltigkeiten* (1900-1908) and in which he develops a topological dimension, or unique number, that determines the critical boundary at which a geometric object, for instance a space-filling curve, exactly covers a higher-dimension object because its parameters (for uniquely picking out its points) are split from the digits of a single real number continuously (rather than being several independently selected numbers). Under his pseudonym and in a philosophical work entitled *Chaos aus komischer Auslese: Ein erkenntniskritischer Versuch* (Mongré [= Hausdorff], 1898), Hausdorff also conceived of the notion that a "stretch of time" cannot be represented by a straight line, but as a "temporal plane" in which a limited individual "time line" expands into a two-dimensional object without correspondence with the "parameters" of human life such as birth and death.[4] Previously, in

[3] Manuscripts filed as WBA I, Ms 1850 ("II") and Ms 1857 (untitled) at the Walter Benjamin Archiv, Akademie der Künste, Berlin.

[4] See also Peter Fenves' detailed discussion in the chapter on "The problem of historical time", in Fenves (2011, pp. 108- 113).

August 1916, Benjamin and Scholem had discussed very similar mathematical objects during a conversation about the problem of historical time, when they discussed the question of whether or not time necessarily has a "tangents" **[??]** or a determinable direction, or whether it might not only be representable by smooth and continuous motion determinable within rectilinear space.[5]

Furthermore, and more fundamentally, Scholem had sent Benjamin a letter (now lost) earlier in the year detailing a series of reflections he had had in March 1916 on the foundations of mathematics as he adduced them from studying Bernard Bolzano's *Paradoxien des Unendlichen* (1851), the seminal text in which a rudimentary definition of the mathematical actual infinite was laid out and which would provide the basis for Cantor's own definition of the infinite set. Whether or not it was before or after Scholem's letter that Benjamin began to occupy himself with questions opened up by the mathematical infinite with regard to the image of experience, his interest was certainly sustained long after Scholem turned from his mathematical studies to the Kabbalah in 1919; Bolzano's work is listed in the project bibliography from circa 1921 on which Schoenflies and Hausdorff also appear (WBA I, Ms 1850). Indeed, while it is possible that Benjamin first heard of Hausdorff's philosophical works from Scholem, who refers to *Sant'Ilario* and *Chaos aus komischer Auslese* in his diaries in 1915, Scholem did not acquire a copy of Hausdorff's work on set theory until after he announces his intent precisely that same summer when Benjamin composed "Zweideutigkeit des Begriffes der 'unendlichen Aufgabe' in der Kantischen Schule", on July 2, 1918 (Scholem, 1995-2000, vol. I, p. 263), which suggests that it was Benjamin who had, in the interim, followed up on relating Hausdorff's metaphysical claims to some of his set-theoretical ones. By the summer of 1918, and departing from the idea that there are differently sized infinities according to Cantor's transfinite mathematics, Benjamin and Scholem were articulating the argument[6] that Cohen's account of Kant's theory of experience erroneously construes the world as equivalent to the fact that two sides in a triangle are always greater than the third, that is, a world where it is methodologically necessary to

[5] See the account of this conversation, which Scholem recorded in his diary, in Gershom (1995-2000, vol. I, pp. 388 ff.).

[6] Scholem kept records of the conversations with Benjamin on Cohen's *Kants Theorie der Erfahrung*, and to date these are the only known documents pertaining thereto, which are in Scholem's hand or in typescript and preserved in the Scholem Archive in Jerusalem. They were published with annotations and in English translation in *Modern Language Notes* in 2012. See Scholem (2012). See also my accompanying analysis (Ng, 2012).

regard a priori intuition as "nothing at all" beyond the limit of analyzability, and which for that very reason is restricted to a calculus of perception, such as the infinite addition of the number of times an object falls.

To be sure, it is possible to question the relevance of Benjamin's criticism, since for Cohen the question of *which* mathematics matters less than the idea *that* there is something like a mathematics that is valid in the description of natural processes. Cohen regarded mathematics precisely not as a particular moment in the historical development of its content, that is, as a discovery made by Leibniz or Newton, as distinct from, say, a theorem of Euclid or Archimedes, but rather as a *method*, or more exactly as the interconnectedness of methods in the sciences and in logic, which happened to have been inaugurated by Newton's systematization of the principles of mathematical natural science and formalized by Leibniz's principle of continuity, based on the infinitesimal calculus. As he writes in the *Logik der reinen Erkenntnis*, it would be an "error" to «think of science with respect to its (evolving) *contents* rather than with respect to *method*», since the historical emergence of the multifarious and specialized sciences out of the "One" science does not alone provide sufficient ground for their (re)unification (Cohen, 1914 [1902], p. 19). Method, on the other hand, is the necessary condition for all the sciences, and moreover operates with thought, whose function might in turn be clarified only by means of the science that has been reliably engaged with determining exactitude in thought: namely, mathematical natural science (*ibid.*). For this reason, it should not make a difference to Cohen *which* mathematical theorems or definitions he (or Newton or Leibniz) uses; the "mathematical" qualifying the exactitude by which our image of nature is to be determined represents a *meta*mathematical conviction that «thinking is the thinking of *being*», that is, that «thinking creates the foundations of being, that is, the ideas, which are nothing other than self-created *Grundlegungen* or layings of foundations» (p. 20). Any "historicity" embedded in the concept of thinking participates in thought's making of the foundations of being by way of ideas that by their nature *make* themselves.

By the same token, this idea of mathematics as transcendental method itself emerges from the ongoing process of scientific creativity and, as such, is by its very nature contentious. This is evidently so not only on the issue of whether the infinitesimal "produces" continuity or an *image* of continuity in which inhere infinities of expandable ultra-continuities to which we customarily give the name "discontinuity." The stakes are greater than that of a merely technical quarrel – for Cohen was clearly aware of

Richard Dedekind and other figures important for the recent development of the concept of number and of the mathematical infinite. Rather, as one of the subheadings reminds us, the concept of thinking that is operative for Cohen carries with it a "historical" quality:[7] the concept of thinking as the thinking of being, along with the intellectual schemata towards which this concept is oriented, has to be wrested from the «spectre of formal logic» (p. 13) whose incipient moment was Aristotle's introduction of the split between metaphysics and logic when he proposed to establish a special doctrine of being in the form of the ambiguously named tome, τὰ μετὰ τὰ φυσικά.[8] Cohen retrieves logic from its "fate" (*Geschick*) of being robbed of its «natural relation to factual validity» (p. 13) by charging Aristotle with misconstruing mathematics and its relation to the natural sciences, and therefore with failing to understand that Plato had in fact supplied a logical basis – that is, the Idea – for the investigation of nature.

For Cohen, Aristotle's misunderstanding of Plato's insistence that the Ideas are the foundations of being created by pure thinking decided the course on which we have neglected the fact that the real is accessible only by means of idealizations such as mathematical functions that construct the motion of material bodies through space in a smooth and continuous curve. Thus, in reviving this notion of the Platonic Idea, Cohen salvages logic as an activity of "pure thinking", independent of either psychology or grammar, which participates in the theoretical construction of reality just as much as physical concepts such as energy, gravity, and so forth; as Cohen writes, logic has been «from the outset the *logic of mathematics and of the mathematical natural sciences*, and only by remaining as such has logic remained logic» (p. 20). The task of philosophy, according to Cohen, is therefore to develop logic as a transcendental logic of science, in line with its calling, however muted, in the Platonic Idea, and on the basis of the infinitesimal principle, whose importance for the logical construal of reality Leibniz alone had been able to uncover and Kant had obscured by introducing pure intuition as one of the two components of human knowledge. This, of course, emphasizes how striking it is that Cohen *forces* a conception of mathematics that takes us back to what might be described as a world-historical image of the "present", insofar as it is still indebted to

[7] The subheading reads, "The historical concept of thinking" (Cohen, 1914 [1902], p. 19).

[8] Cohen does not specify why he finds the title of Aristotle's *Metaphysics* ambiguous (nor does he mention that the title was given not by Aristotle himself but by a later editor), but it may be because the title announces that what follows is "after" and thus separable from the doctrine of (mere) nature.

a Platonic legacy that is later picked up by Leibniz and re-emerges in distorted form in the late eighteenth century. That is, for Cohen, one could say that mathematics *is* world-historical in a very real if unintended sense: namely, that a certain extra-mathematical image of mathematics, according to which possible experience is conceivable only as a series of unfulfilled moments whose "flow", that is, smoothness and continuity, relies on a principle of the infinite repetition of the same, has determined the way in which "world-historical" movements and positions have been received and enacted.

These stakes are evident if one considers for a moment some of the positions that have been taken with respect to the "infinite task" more broadly conceived. In "Interpretations at War: Kant, the Jew, the German," Jacques Derrida sees Cohen defining German idealism as a project of scientific philosophy based on an inductive mode of testing hypotheses, and aligning it with the logic of "protest" and of undermining dogma that placed the Lutheran Reformation and the so-called "German spirit" at the center of world history. From the inaugural interpretation of the Platonic Idea as the basis for an anticipatory logic, by which reason may call itself into existence without an external guarantee for its veracity, thus issues forth a limitless "family feud" that also implicates a Judeo-Hellenic heritage in the genealogical alliance between State power and auto-instituting force (Derrida, 1991, pp. 39-95). Taking her point of departure from Derrida's essay, Avital Ronell interprets Cohen as an icon for the culture of public verification and reality testing that defines a distinctly modern, Western linking of justice and justification, reason and rationalization (Ronell, 2005, pp. 22 ff.). Likewise following Derrida's lead, Rodolphe Gasché reads Husserl's *The crisis of the European sciences* as borrowing from Cohen the idea of philosophy as the infinite task of holding oneself accountable to a universal idea, one that calls upon everyone regardless of customary or traditionalist, ethnic or religious ways of thinking (Gasché, 2009). As different as each of these projects are, and in spite of their lack of investment in Marburg neo-Kantianism *per se*, all three depart from the premise that the infinitesimal principle has a world-historical character, one, moreover, that overdetermines the way in which the infinitesimal principle itself is received.

Benjamin contests the overdetermination of the concept of history by the infinitesimal principle. By challenging the adequacy of the infinitesimal for the task of supplying reality with its principle, Benjamin challenges the assumption that the adherence to a certain principle of continuity – namely, Leibniz's principle that "*natura non facit saltum*", which Cohen glosses as

«there are no jumps in consciousness» (Cohen, 1883, § 42)—is a necessary condition for the theoretical construction of the physical world. That is, the possibility that modern science might represent its objects on the basis of an alternative mathematical concept is no mere technical matter for either Benjamin or Cohen. Rather, this mathematical possibility carries with it metamathematical consequences for conceiving the moment when something might genuinely be considered to happen, and as such, as history, insofar as "history" is understood independently of the restrictions placed upon it by transcendental subjectivity. As Benjamin writes in the "Epistemo-critical prologue" of the *Origin of the German baroque mourning play*, «the category of the origin is therefore not a purely logical one, as Cohen claimed, but a historical one» (Benjamin, 1974-1989, vol. I, p. 226). Far from indicating that Benjamin adopts the anticipatory logic of the infinitesimal principle from Cohen in however qualified a manner, the shift that Benjamin enacts from the logical to the historical marks a departure from the received conception of what constitutes the material of experience, the structure for which Cohen borrows the Leibnizian principle of continuity and restricts to the autoproduction of smooth and continuous motion. Benjamin's remark that the «category of the origin is therefore […] a historical one» is intended to open up the concept of history beyond the "infinitesimal" differentiation of its moments into given, factual structures. As such, it is a direct rejoinder to a point crucial for Cohen's construction of experience, which is that Cohen takes Kant, and Plato, to proceed from what he calls «the factical validity of mathematics» (Cohen, 1914 [1902], p. 70).

II. The core of Cohen's metamathematical understanding of the task of philosophy may be gleaned from a small part of the argument in the *Logik der reinen Erkenntnis*, which, by and large, consists of elaborations of the metaphysical presuppositions and ramifications of the mathematical arguments set out in *Das Prinzip der Infinitesimalmethode und seine Geschichte*. The *Prinzip* is where Cohen first treats the infinitesimal and to an extent the *Logik* presupposes acknowledgement of the validity of the former. Where the *Prinzip* differs from the *Logik* is in the latter's insistence that the foundations or "origin" of the principles of experience are to be found in thinking alone, that is, conceived as being independent of anything external or given to it. Thus Cohen's thesis begins with the identification of a "weakness" in Kant (Cohen, 1914 [1902], p. 12) that presents itself so far as Kant takes thinking to begin somewhere external to itself, namely in sensible intuition. By contrast, for Cohen it is necessary to think thinking

(again) as starting with thinking itself, that is to say, with an origin of thinking in thinking, and without a doctrine of sensibility preceding it. Only if thought does not have an origin outside itself might its purity be "unconstrained and unclouded"; thinking can be said to be "pure" to the extent that it brings pure cognitions to fruition of its own accord (p. 13). As previously mentioned, Cohen locates this origin of logic in the Platonic Idea, arguably *insofar as* this localization reverses the separation that Aristotle instituted between metaphysics and formal logic for the posterity of philosophy (*ibid.*). That is, the basis for Cohen's historiographic reversal is a methodological one: it allows him to read Kant's project as beginning with the systematic attempt to bring Newton's principles of mathematical natural science in line with metaphysics, while erring from the purely logical origin of the principles of experience afforded by Leibniz's infinitesimal (p. 8).

Accordingly – and this "accordance" of the principle with the fact of science might itself be considered a demonstration of Cohen's "transcendental method" – the task fell to the infinite to "discover" existence by way of infinitesimal analysis, which Cohen posits as the "legitimate instrument" of mathematical natural science. Infinitesimal analysis is taken to be the privileged instrument for the scientific representation of the physical world because its methods are presumed to mathematically "generate" continuous motion and, through continuous motion, nature—a «triumph of pure thinking», so Cohen, on which all methods and all of certainty of science are based (p. 33). Logic, if it is to be the logic of science at all, has therefore to be the logic of the principle of infinitesimal calculus. (p. 34) On this point Cohen borrows from Leibniz the idea that motion is always continuous, that is, it expresses the principle of conceptual construction that unifies all sciences, rather than being empirically given. Continuity is an idealization that, in clarifying, constructs the real; as Leibniz wrote in a letter to Pierre Varignon on February 2, 1702, «one can say in general that, though continuity is something ideal and there is never anything in nature with perfectly uniform parts, the real in turn, never ceases to be governed perfectly by the ideal and the abstract». Because everything is «governed by reason», the rules of the infinite may also apply to the finite, «as if there were infinitely small metaphysical beings, *although we have no need of them*» (my emphasis); indeed, science and regularity exist insofar as it may be said that «infinites and infinitesimals are grounded in such a way that everything in geometry, and even in nature, takes place as if they were perfect realities» (Leibniz, 1989 [1702], p. 544).

In Cohen's adaptation, infinitesimal analysis of the infinite gives an outline to the independence and creativity of pure thinking as "generation", or *Erzeugung*. It thereby clarifies the problem of origin as entirely a matter of thinking, without recourse to pure sensibility (Cohen, 1914 [1902], p. 35): as Cohen writes, «Thinking is the thinking of the origin. Nothing can be given to the origin. […] If thinking has otherwise to discover being in the origin, then this being cannot have any other ground than the one that thinking lends to it. Only as thinking of the origin does pure thinking become true» (p. 36). That is, «logic must become the logic of the origin», by virtue of which all pure cognitions must be variations of the principle of the origin; the «logic of the origin», in other words, «must therefore complete itself in its entire structure». It is in this sense, so Cohen, that logic may be said to have an «eternal history»—that is, so long as the principle of the origin is «in force» (*durchwalten*) as the «eternal principle» of logic (pp. 36 ff.).

Cohen gives the name «hypothesis» to the «driving force» of the Platonic Idea, which he defines as the *Grundlegung* or laying of the foundation that precedes all exact sciences (p. 7). That is, the ideas are the «self-created layings of the foundation», which is to say that a "historicity" of thought constitutes part of thought's laying of the foundations of being. Functioning to dispel "mythic" notions of where thinking comes from, that is, from an external source such as sensible intuition, the Platonic Idea is construed as the culmination point of mathematical natural science *from the outset*, that is, as the principle of thinking insofar as it contracts into itself and gives an account of itself in the history of experience *qua* a priori laws of scientific cognition. The minimal operation by which Cohen sees the world kept from merely collapsing into itself, or in his words, «the concept always remaining a question», is what he calls "anticipation," which he defines as a «fundamental act of time» or *Grundtat der Zeit*: a *logical* act of «*Hineinheben in die Zukunft*», which serves as part of a *task* towards an *ideal* that only logic can set to the task: «For the task that is set to thinking in judgment can never be seen as coming to rest or to completion. (*Denn die Aufgabe, die dem Denken im Urteil gestellt wird, darf niemals als zur Ruhe, zur Vollendung gekommen betrachtet werden*)» (p. 64).

There is, of course, a "mathematical" equivalent to the activity of anticipation, which Cohen gives as the "plus sign" – the operation of addition alone, which without presupposing any one or two elements to be added, yet always only directed at elements in a temporal sequence, generates unity in the sense that the infinitesimal in principle guarantees that number determines reality. Under the sign of the infinitesimal, number

can be understood from the outset as the unity of plurality, because *time* operates as a motivating force for what Cohen calls "recursion" to unity. Anticipation fulfils this operation by «rolling out the series», according to Cohen, and «projecting the setting for these unities that (thus) are only thinkable in the plural» (p. 158). «(Here)», he continues, «it is not unity that produces plurality as their mere sum, or success of their self-propagation; but conversely it is plurality that produces for itself its corresponding unity, which is only to be thought of as additive». By way of the infinite repetition of the finite operation of addition upon the infinitely small, «anticipation» admits no gap, no leap, and no distance, such that continuity «*durchwaltet*» existing beings and existence enters into a relation of identity with thinking. (pp. 165 ff.) It is in such a way, so Cohen, that *Erzeugung* might itself be the *Erzeugnis*. (p. 148).

The main, metamathematical point may be summed up as follows: the concept is tasked with the activity of giving an account of itself, a *Tätigkeit* which evinces an immanent historio-logic to the extent that it redescribes the a priori laws of becoming contained in "facts" of science *qua* experience without recourse to a subject or object of this activity. This activity, by which pure thinking generates the principles of experience from itself, establishes identity between being and the thinking of being in the manner of a *given time* – a *time* that is associated with the verb "to give" in the phrase *giving an account*, which describes how in the foundations *qua* principles of pure cognitions, reason gives an account of itself in the mathematical natural sciences. This giving an account of itself comes from the phrase *logon didonai*, which Cohen retrieves from Plato's *Republic* (534b), where Plato demands of the Socratic concept a validity and meaning resulting from its task of giving account of itself. The very notion that the concept attains to validity and meaning (only) as a result of giving an account of itself arises, of course, only in the situation where as Cohen remarks, «the [Socratic] *concept* was discovered to be the big question mark of being: what is, or *ti esti*» – in other words, where «*nothing* is or can be *given* to the origin» – only in such a case where nothing can be given might the time of reason's self-mastery be given. Or put another way, that time by which gaps are filled, distances are closed, and being enters into a relation of identity with thinking, that time of that «fundamental act» by which plurality projects its own unity «into the future» that time of «anticipation» whereby the unity of experience is guaranteed by a continuity governed by the principle of the infinitesimal which generates a discreteness or stuff of reality that is «more solid» (Cohen, 1914 [1902], p. 166) than discretion *is able to give itself*: this time can be given only where

nothing can be given. Nothing given – but time where nothing is given, and so not even time but a husk, an empty series growing ever thicker with anticipation (and the prospect of self-reckoning): «Thus is thinking, as thinking of being, the thinking of cognition (Daher ist das Denken, als Denken des Seins, Denken der Erkenntnis)» (p. 16).

III. There are those who have pinpointed the instant when the operation of adducing proof and stabilizing reference has broken down on its own anticipatory force. In an elliptical remark that appears in an essay entitled "Tradition of the immemorial" (Agamben, 1999, pp. 107-108), which discusses the "fracture" between names (*onoma*) and discourse (*logos*) that the Greeks attributed to Plato, Giorgio Agamben identifies the *name* as the site where testing breaks down, because, so Agamben, the name is that for which language cannot give reasons (*logon didonai*) in propositional form. Because the name can only name what can never be "said" or given an account in discourse, the name can be understood as the "linguistic cipher" of what can only be presupposed in the process of signification. But discourse is also therefore "anticipated by the hermeneutics of Being" in names insofar as what is said in any proposition can only be said thanks to the original and discursively ineffable presuppositions for which names stand. For Agamben, the reflection that necessarily ensues on the groundlessness of language and its representations opens up to a «poetic task and an ethical decision» (p. 115) rather than to sheer nihilism—as he writes, the prospect of language being entirely composed of fulfilled presuppositions, which is to say an entirely non-propositional and no-longer-presuppositional language, can «found ["find"???] the possibility of an overcoming of the State» in abandoning the letter (*e.g.* of the law). By the same token, one might argue that the anticipatory force of signification breaks down into a proliferation of names, such that at the extreme end of the culture of self-legitimation one finds in fact a *Dichtkunst*, an art of poetry that, as Agamben himself points out, can quite literally translate as the «art of dictation» (*ibid*.).

For Heidegger (in the *Basic problems of phenomenology*)[9], *logon didonai* describes the very manner in which geometry is in fact *not*, since geometry has as its object pure space, which is a specific being with a specific content but is different from a physical material thing or living being and only exists in the manner of "subsistence". To this extent,

[9] Heidegger, 1988, pp. 53-54 (§ 9. Need for fundamental formulation, pp. 76-77).

geometry is in fact different from philosophy; citing the *Republic* (Book 7, 533b), Heidegger argues that for Plato, geometry and the positive sciences are in fact «not in a position to see a being as something sighted in waking vision, *idein*, *idea*, that is, to apprehend the being of such a being», but in fact are consigned to *dreaming of their objects*. That is, even where the object is a priori there is something prior to that, a "fact" that exists only in a dream state, namely the «constitution of the being of its thematic domain». Moreover, and remarkably, «the positive sciences arrive at their results precisely while dreaming in this way»; they do not need to be awake to that entire domain that is a priori to a priori cognition in order to arrive at validity and meaningfulness. Precisely for this reason, for Plato, according to Heidegger, the mathematical sciences are in fact «unable to give an account» (*me dunamenai logon didonai auton*) «of what a being is as a being» (Heidegger, 1988, pp. 53-54). There is something a priori to the laws of geometry that cannot be elucidated and to which geometry itself cannot be awake, but merely has to presuppose. This might be understood as the geometry-character of geometry, or perhaps the anticipation-character of anticipation, that is, the minimal operation of the principle of continuity *as* an operation whose operativity can neither be elucidated nor refuted on the terms of the operation itself if the science is to remain a positive science.

Thus it might be said, contra Cohen, that geometry cannot provide a principle for philosophy because it has a specific object which cannot be refuted or tested, but only dreamed, and thus it does not have an immediate link to the Idea, nor does it therefore "generate" being as a form of thinking. One name that has been given to this possibility is, in fact, "Platonism" in mathematics in a non-Cohenian sense of the term: that is, a mathematical modernism in which number is granted an autonomy with which to imagine its objects. Autonomous, modernist mathematics entails a transformation of mathematical ontology and consists in foundational inquiries that bring with them new standards of proof required to accommodate the new, autonomous ontology. Understood as such, however, modernism's achievement was therefore to *dissociate* mathematics from the domain of logic, in the sense of removing it from its dependence on logic conceived as its absolute and secure foundation. Conceivably, then, for mathematics to provide genuine insight into being as Cohen's "logic of origin" proposes, mathematics would in fact have to have an autonomous ontology, which in turn would radically transform mathematical epistemology in ways that also alter what logic "is", if at all still a unitary entity. And absent a unitary conception of logic as an

absolutely secure foundation for mathematics, Kantian epistemological questions such as whether or not there are necessary limits on human thinking, or predispositions of the human mind that ensure that things can be known, become entirely irrelevant. Arguably the irrelevance of Kantian epistemology was not unknown to the Marburg school, and the response of the neo-Kantians (for instance Natorp and Cassirer) was to retreat to elementary laws of logic and shift the emphasis from mathematical objects to mathematical reasoning. However, there is another, formalist response possible, as seen for instance in the work of Paul Mongré a.k.a. Felix Hausdorff, who reworked logic so entirely that mathematics could be studied without any consideration of ontology and as arbitrary systems of manipulation – revealing, for one, that logic is only secondary to mathematics and that mathematics is dissociable from the process of reasoning. In view of this, the category of origin is certainly not logical, but perhaps something else altogether.

Benjamin's response to Cohen may thus be best described as a historio-logic of the "history of experience." For Benjamin, in whose writings the German translation of *logon didonai* turns up at several pivotal moments, *Rechenschaft* repeatedly *fails*: according to his essay on Goethe's *Wahlverwandtschaften*, for instance, Goethean science seeks in vain to establish evidence in the form of experiments, and in the stead of philosophy, of the identity of the sphere of perceivable phenomena and that of intuitable *Urbilder* (Benjamin, 1974-1989, vol. I, p. 147). The characters of the novel are described as having lost the sense for what is ethical, and are deaf to God and mute before the world: «Rendering account (*Rechenschaft*) eludes them, not because of their actions but because of their being. They fall silent» (p. 134). There is no *logon didonai* in Goethe's world. Benjamin thus raises the question: what does any action look like without *logon didonai*? What is acting without rendering account and without given reason, or indeed, without any guiding principle? The answer, for Benjamin, is this: the characters are still human beings, but at the very height of their *Bildung* they are subject to those forces that cultivation claims to have mastered. Their movements form the ground not for a spiritual harmony of beings, but for the particular harmony of deeper natural strata. These strata are intended by what is slightly amiss in each of their conjunctures. For this reason, according to Benjamin, the novel is not about the marriage whose dissolution seems (to Goethe's contemporaries as well) to be at the heart of the narration, nor is it therefore about the ethical powers of that marriage; rather, the novel is about the dissolution of marriage and the powers released upon its dissolution, without there being

any question of morality or immorality associated with it. Indeed, the revelation of marriage's juridical form occurs at the moment of the dissolution of any relevance of its juridical character. In such a world, where ethical judgment (and action) is rendered moot and the orders of fate and law collapse into a nexus of culpable life and supernatural expiation, it is "nature" that narrates—as in the case of Ottilie, who is, as it were, «predestined» (als "Opfer des Geschicks") (p. 140) for sacrifice to this struggle.

For Benjamin, it is important to point out that Goethe's novel cannot therefore be judged on moral grounds (or on the basis of the author's statements of purported clarification, for that matter), but rather as a presupposition of "true nature", which Goethe intuitively sought in "Urphenomena" but for whose purported "synthesis" of phenomena and archetype his scientific experiments repeatedly fail to give an account. That is, if moral struggles never make it into aesthetic representation, then by the same token aesthetic representation is a «poeticized» (*Gedichtete*) that «asserts its rights» (*behauptet sein Recht*) *as* the «mythical material layer of the work» (p. 146), which is to say as the failure of *Rechenschaft*, a failure that finds expression as an ambiguity in the conception of "nature" as both all-indicting and all-expiating, or both guilty and guiltless. Such seems also to be the character of the "historicity" that issues from the secret (*viz.* dream-state) element of unaccountability at the heart of the self-reckoning that is supposed to "generate" time, as it were, in the manner of smooth and continuous anticipation. By virtue of the same, then, what truly constitutes "history" – as opposed to the smooth and continuous *image* of the guilt-debt nexus "generated" by the "logic of origin" – is "history" only in its purely motive character, in the absence of ethical decision and in the sheer latitude to act without foundation. Strictly speaking, a history of pure motives is what would genuinely exceed the bounds of representation *qua* cognition theorized as the mere imitation of a given reality—which describes the *Abbildtheorie* of consciousness that the Marburg school disavowed. Thus, in the *Erkenntniskritische Vorrede* of the *Origin of the German baroque mourning play*, too, Benjamin wonders whether the "givenness" of the world of ideas and the *Rechenschaft* whose responsibility it is to account for its structure might not be irrevocably and unavoidably assigned to so-called «intellectual intuition»—which (of course) he regards as impossible, since the «being of ideas» is not given in the phenomenal world and as such cannot be the object of any intuition whatsoever (vol. I, p. 215). When Benjamin suggests that «the category of origin is not a logical one, as Cohen claimed, but a historical one» (p. 226),

he therefore means that "origin" is in fact a category that belongs to a secret core of historicity that is *prior* to the logic of origin, genuinely uncontainable by intuition, and, indeed, nothing other than sheer motive.

In other words, an *account* of the continuous structure of the world, if any can be given at all, might itself only be an image, albeit given as an *absence* of image – as an image of imagelessness that, in the first, unpublished introduction to the *Trauerspiel* book, Benjamin proposes first as a detour and then as a principle of *style.* As he writes, *method* itself constitutes such a style, even of a "treatise," of which *Rechenschaft* might be given by virtue of a "retardation" of time into the anticipated arrival – which is to say, non-arrival – constituted *by the method qua style of the treatise itself*:

> "Darstellung als Umweg - die methodische [Sp. 1] Ordnung des Traktats wäre demnach ein *Stil*prinzip? So dürfte in der Tat dort formuliert werden, wo *Rechenschaft* von der eigentümlichen so philosophischen Funktion *dieses retardierenden Stils* gegeben werden kann. Zuvörderst wird solche Rechenschaft, und immer wieder, darauf weisen, daß jener Ausfall mathematischer Stringenz durch Künste rednerische Oberführung nirgends einzubringen gesucht wird. Soviel auch gerade diese Form der Macht des Wortes verdankt: der gänzliche Verzicht auf den unabgesetzten Verlauf der Intention, der das mathematische Denken kennzeichnet, ist ihr erstes Merkmal" (vol. I, p. 926, my emphasis).

A *Rechenschaft* of the treatise's style would reveal that its "retarding style" does not entirely compensate for the "loss of mathematical cogency", and that as a result the treatise is not entirely mathematical. In fact, if there is a "characteristic" of "mathematical thinking" to be gleaned, it would be the "relentless course of intention" of which its *representation* seems methodologically bound to "represent" by detour, that is by giving an image of its "total renunciation". As mentioned near the outset, this image of mathematics as the "total renunciation" of its "first characteristic" gives to itself a world-historical character. Thus, if there is a quarrel to be had with the historio-logic identified by Cohen at the center of the "intentionless" style, it may be found with this image: namely, the assumption that a certain extra-mathematical image of mathematics – *such as the vignette in Varignon's treatise on gravity renders visible by way of retardation* – according to which possible experience is conceivable only as a series of unfulfilled moments whose "flow" relies on a principle of the infinite repetition of the same, has determined the way in which "world-historical" movements and positions have been received and enacted.

In sum: for Cohen, mathematics produces motion, and thereby nature. This is the reason why the logic of origin is a logic of pure cognition, and why Cohen holds *Ursprung* to be a logical rather than a historical category; the logic of origin must complete itself in its entire structure. This logicistic employment of mathematical induction, according to which the complete induction is presumed to be logically constructible, implies that Cohen's Leibniz is able to produce an image of nature on the calculus alone. Replacing Leibniz's principle of continuity with another principle where the infinitesimal is *not* a necessary element amounts to replacing the principle that nature is construed from smooth and continuous functions, and therefore also the principle that the real is governed by the ideal. In place of this reality principle would be a function that is not restricted to smooth and continuous motion, which is on a higher order than that of the motions "generated" solely by transcendental subjectivity, that is, a nature-determining consciousness or theoretical construction of nature. Metamathematically speaking, this deployment of a new and autonomous mathematical ontology can in fact be seen as a necessary consequence of following through with Cohen's insistence, first, that logic be a "logic of origin", that is an entirely auto-generative operation that ultimately has to dissociate from reasoning as well, insofar as reasoning follows a continuous trajectory; and second, that logic transform its implicit understanding of mathematical epistemology, in order that it genuinely and radically maintain its autonomy from any givens.

And everywhere Benjamin gives indication of *which* mathematical ontology should replace the old adage that "nature" (Leibniz) *viz.* "consciousness" (Cohen) "knows no leaps". One of the manuscript pages to "On the concept of history" is illuminating in this respect:

"Das Eingedenken als der Strohhalm
{Die Katastrophe ist der Fortschritt, der Fortschritt ist die Katastrophe.}
Die Katastrophe als das Kontinuum der Geschichte
Geistesgegenwart als das Rettende: Geistesgegenwart im Erfassen der flüchtigen Bilder;
Geistesgegenwart und Stillstellung
Definition der Geistesgegenwart hiermit zu verbinden; was heißt das: der Historiker soll sich gehen lassen
Moralische Legitimation, Rechenschaft des Interesses an der Geschichte
{Das Subjekt der Geschichte: die Unterdrückten, nicht die Menschheit}
{Das Kontinuum ist das der Unterdrücker}
{Die Gegenwart aus dem Kontinuum der historischen Zeit herausprengen: Aufgabe des Historikers}" (Benjamin, 1974-1989, vol. I, p. 1244).

These are the notes to Theses XIV to XVIII on the concept of history, where Benjamin writes that «history is the object of a construction whose location is not homogeneous and empty time, but rather time that is filled with now-time» (vol. I, p. 701; Thesis XIV). The revolutionary is characterized by its "consciousness" that it should «blow open (*aufsprengen*)» the «continuum of history» (Thesis XV), just as Robespierre «blew out (*herausprengte*)» «a past laden with now-time» from the «continuum of history» and brought it (Rome), through citation, into time as a present that no longer served merely as a transition into the next moment, but rather as time standing still as «the» present of the historical materialist (p. 702; Thesis XVI). The now-time "blown out" from the "continuum of history" is not merely at a standstill leading nowhere, however, nor does it lead only back to itself as though a relic (or indeed «monument of historical consciousness» (*ibid.*)) availing itself of fresh and palatably revolutionary interpretation. Rather, the now-time is a time in which *thinking* comes to a halt (*Stillstellung*) (p. 702; Thesis XVII). It is in this context that the notes are revealing, as it is there that Benjamin seems to have pondered the question of the "moral legitimation" and "accounting (*Rechenschaft*)" for the materialist's explosive "interest" in history. For if in the act of "blowing out" the now-time from the continuum, *thinking* comes to a halt, where should "moral legitimation" even be an issue, or *Rechenschaft* be called upon for an "interest in history"? The answer is simply: where there is none available. Benjamin crosses out (as denoted by the curly brackets) the moral legitimation for "blowing open" the "continuum of historical time," namely the notion that the "continuum" itself must be "the oppressor". He leaves open the question of "moral legitimation" and *Rechenschaft*, but this is befitting where *thinking* itself has come to a halt – and if thinking halts, then also the continuity of experience, the logic of always anticipating the next from each transitional now, and therefore the entire logico-mathematical apparatus in which moral legitimation and self-reckoning turn up in the first place as operators of historical time.

The standstill of thinking, however, also "blows open" an entirely new ontology, an insight that would be difficult to arrive at without the intimation, provided by the fact that *Rechenschaft* is put into question, that the "continuum" at hand, and in the moment of being "blown open", is in fact understood in its technical, mathematical sense: namely, as the set of all real numbers, and therefore as a set that has the same number of elements as the set of all functions from [0,1] into the real numbers should

one *restrict* these functions to only the continuous ones. The questionability of the operation of self-reckoning blows open the continuum to the new, unrestricted ontology of pure symbolic manipulation – and pure struggle. In this unrestricted ontology, "nature" narrates – that is, there is no "oppressor" or "oppressed" position whose relative legitimacy may be fixed by an act in time, or *of* time, and hence no moral legitimation available for any act of salvaging the past for the present (Incidentally, this may clarify the enigmatic indifference of Thesis XVIII, in which we read that messianic time is equivalent to the abbreviation of human history into the two seconds relative to the history of all of organic life). Thus, whereas Cohen salvages the logical character of the category of origin for the constructibility of the real, Benjamin notes that «presence of mind [is] as the salvaging one: presence of mind in the capture of fleeting images (*Geistesgegenwart als das Rettende: Geistesgegenwart im Erfassen der flüchtigen Bilder*)» (vol I, p. 1244). In bursting the continuum, the historical materialist salvages *images*: the image-character of the logic of origin, the counter-intuitive character of continuity, and therefore the image-character of the images themselves.

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