EUROPEAN JOURNAL OF PRAGMATISM AND AMERICAN PHILOSOPHY

European Journal of Pragmatism and American Philosophy

XVIII-1 | 2026
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Francesco La Mantia

OpenEdition Journals

Electronic version
URL: https://journals.openedition.org/ejpap/6630
DOI: 10.4000/16km7
ISSN: 2036-4091

Publisher
Associazione Pragma

Electronic reference
Francesco La Mantia, "The Metamorphic Point", *European Journal of Pragmatism and American Philosophy* [Online], XVIII-1 | 2026, Online since 14 July 2026, connection on 15 July 2026. URL: http://journals.openedition.org/ejpap/6630 ; DOI: https://doi.org/10.4000/16km7

This text was automatically generated on July 15, 2026.

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Francesco La Mantia

1. Introduction

1 The Euclidean definition of the point as "that which has no part," "Σημεῖόν ἐστιν, οὗ μέρος οὐθέν" (Euclid I: 1) established a foundational ontology for Western thought, reducing this entity to a pure, inert position – a mere coordinate or the passive terminus of a pointing gesture. This static paradigm, while operationally powerful, effectively erased any notion of process, potentiality, or intrinsic dynamism from the conceptual core of geometry. The twentieth century, however, witnessed a profound challenge to this inheritance, emerging not from mainstream philosophy but from the interdisciplinary margins where mathematics, art, and philosophy converge. This article argues that the mathematician-philosopher Gilles Châtelet (1944-1999) and the painter-theorist Paul Klee (1874-1940) developed the most radical and fertile alternative to this inherited view. Through a systematic comparison of their work, we will trace the contours of a dynamic and metamorphic ontology of the point.

2 Although operating in distinct domains, Châtelet and Klee share a common project: to restore to the point its depth, virtuality, and generative power. For Klee, the point is an "agent" *(Agens)*, imbued with an internal *Spannungswille* ("will to tension") that propels it into movement, thus generating the line. For Châtelet, the point is a "germ" or an "operator," understood as a "sequence of spheres whose diameter tends toward zero" (a power of contraction) or as the "powers of explosion of lines" (a power of dilation). Their convergence moves beyond a simple affirmation of dynamism to outline a precise "life-cycle" of the point.

3 This article will first establish the fundamental parallels between their thought: (1) the point as a site of internal tension and mutual attraction; (2) the line as an oriented arrow, materializing the point's virtual direction; and (3) the point as a center of irradiation, a germ of multiplicity. These parallels culminate in the shared concept of

the diagram as the operative field where the point's virtuality, gesturality, and metamorphic nature are enacted.

4 Crucially, we will demonstrate how Châtelet's later work provides the technical scaffolding for this metamorphosis, pushing it to its most radical implications. We will examine how the point's generativity can be expressed algebraically as a quotient of polynomials (e.g., X=1/*x*-1), a formulation that reveals it as a "germinal matrix" capable of making points "flourish." This virtuality finds its topological counterpart in the process Châtelet calls the "point's becoming-hole": through gestures of extraction and virtual cut-out, the point is hollowed out to become a topological obstacle, a locus of lack that obliges thought and line to "turn around" it. This operation, in turn, reveals the "point's becoming-zone," where it acquires thickness as the center of a looped neighborhood. The point thus undergoes a full metamorphosis: from a germinal agent, to a diagrammatic operator, to a hollow locus of attraction, and finally to a thickened zone of relation. By synthesizing Klee's phenomenological theory of genesis with Châtelet's operative philosophy of mathematics, this article aims to reconstruct a coherent alternative theory. This theory posits the point not as a primitive atom, but as a nodal crossroads of gestures, temporalities, and virtual potentials – a conception that revitalizes the heuristic and creative fecundity of both mathematical and artistic practice

2. Paul Klee: The Point as Agent and Will to Tension

5 For Paul Klee, the point is far more than a primitive graphic element. In *Das bildnerische Denken*, it is described as an "agent": "Der Punkt als Agens" (Klee 2013: 19).

6 The point is thus grasped in its essential mobility, which Klee terms *Spannungswille (ibid.)* – a "will to tension" or "volitive tension." This expression designates an internal force, a driving latency, an originary tendency toward movement that inhabits the point. It is not inert but is already, in itself, a "zero movement," "*Null Bewegung*" *(ibid.)*, a potentiality for displacement and orientation toward other points. This tension is the engine of the genesis of form: the line is thus nothing other than the point setting itself in motion. Klee's thought is, therefore, a phenomenology of the genesis of forms, in which the point operates as the active matrix of every composition. This phenomenological genesis will find a surprising counterpart not only in the work of a philosopher of mathematics but also in its most concrete technical articulations.

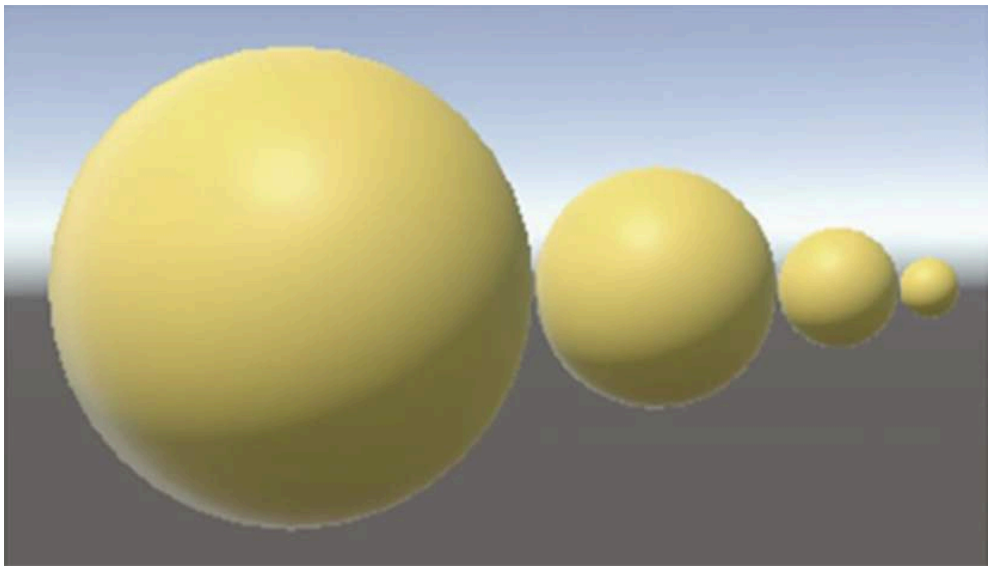
3. Gilles Châtelet: The Point as Germ and Operator

7 Gilles Châtelet, in works such as *Les Enjeux du mobile* or *L'Enchantement du virtuel*, proposes a philosophy of mathematics that reintegrates gesture, intuition, and materiality into abstraction. His conception of the point is resolutely operative. He presents it not as a given but as the product and trigger of processes.

8 Two intuitions are particularly revealing: (1) the point as a "sequence of spheres whose diameter tends toward zero" (Châtelet 2010: 180; see Figure 1); (2) the point as "powers of explosion of lines" *(ibid.)*. In the first case, the point is the result of a process of contraction, a "power of contraction" (*ibid*.: 133) in which a multiplicity resolves into a unique locus.

9 In the second, the point is seen as a site of dilation, from which lines emerge and explode, thereby transcending its ordinary dimension. It thus becomes a "germ" (*ibid.*: 180), a site of virtuality where gestures lie dormant, awaiting release. As we shall see, this operative conception would later find a precise algebraic expression in Châtelet's idea of the point as a "quotient of polynomials" (*ibid.*: 133), further deepening its germinal character.

Figure 1. The point as a "sequence of spheres with a diameter tending to zero"



Public domain image available at: catlikecoding.com/unity/tutorials/basics/jobs.

4. A Fundamental Convergence: Dynamics against Inertia

10 Despite differences in perspective (the ontology of mathematical objects for Châtelet, painting and figuration theory for Klee), both authors agree in rejecting any reduction of the point to a static, designative ontology. Their common horizon is a dynamic conception of the point: it is always grasped within a process, in a before and after. For both, therefore, it is an operator within a field of forces, and not a mere position in an inert space. This common ground paves the way for a comparative analysis that will progressively reveal the stages of the point's metamorphosis. We will examine three initial conceptual parallels before delving into the technical elaborations that complete this transformative vision.

5. First Parallel: *Spannungswille* or Will to Tension as a Principle of Mutual Attraction

11 The first conceptual bridge between Klee and Châtelet lies in the idea of a force or internal tension within the point that propels it toward movement and relation. In Klee, this idea is explicit with the *Spannungswille* (Section 2). This "will to tension" manifests as a will for mutual attraction between points. Points are not isolated; they

are in tension with one another, mutually pushing each other to shift, to draw closer, and this reciprocal movement is precisely what generates the line: "The point in tension relative to the point yields the line *(Der Punkt in Spannung zu Punkt gibt Linie)*" (Klee 2016a: 19). Surprisingly, Châtelet arrives at a similar intuition in his celebrated commentary on Leibniz. He notes that "[f]or Leibniz two points do not exist blissfully [...] but represent the possibility of filling [...] a hole thus and so with an interval thus and so" (Châtelet 2010: 144; see Figure 2).

Figure 2. Points as matrices of intervals

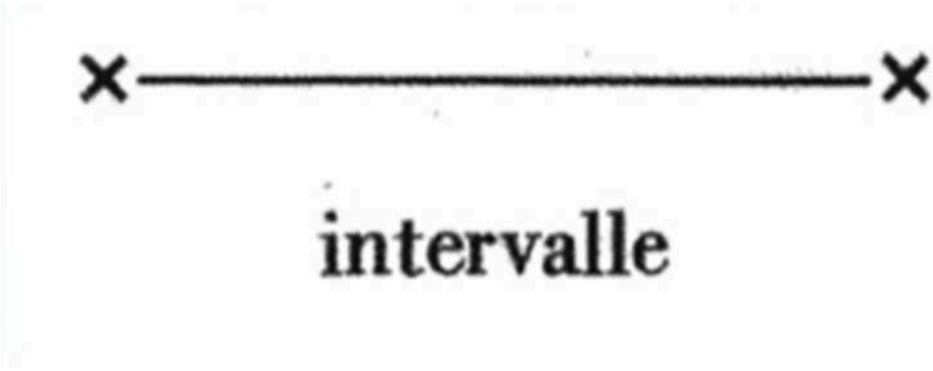


Image from Châtelet 2010.

12 This observation is crucial. It means that the existence of two points immediately evokes the interval that separates them, an interval that is not an emptiness but an active potentiality that fills a "hole." The possibility of "filling" this hole is nothing other than the actualization of the attractive tension that exists between them. They can fill the hole (generating an interval) only if they move toward each other. This conception makes the point an operator (in Châtelet) or an agent (in Klee), whose nature is to act and interact. As such, point-agents-operators are matrices of modes of movement, and particularly of tracing gestures. The point is not the passive term of a pointing gesture; it is the active origin of the tracing gesture, that which generates the line. The line is thus the actualization of the dynamic relation between points.

6. Second Parallel: Line as Arrow and Gestures of Orientation

13 The second parallel follows directly from the first: if the point is mobile and relational, then the line it generates is not a mere neutral trace. For Klee as for Châtelet, the line is essentially directional, oriented: it is an arrow, a directed segment. The mobility of points is not a blind, purposeless movement; it is a gesture of orientation. The point moves in one privileged direction rather than another. This idea leads Châtelet to a strong assertion: inside every point, there is "something that emerges like an arrow" (Châtelet 2010: 113). The arrow is the materialization of the motive virtuality contained within the point. It is the becoming of the point. Klee develops a similar idea by systematizing the dynamic operativity of points in the form of arrows across three distinct levels:

a. The dynamic operativity of points relative to the line (the point generates the line in the form of oriented arrows).

b. The dynamic operativity of lines relative to the plane (the generated arrows structure the plane).

c. The dynamic operativity of the plane relative to volumes (planes constitute space).

14 At each level, the basic element (point, line, plane) is seen as an active agent whose action is symbolized by an arrow, i.e., a vector of force and direction (see Figure 3).

Figure 3. The arrow and the levels of operability of the point, the line, and the plane

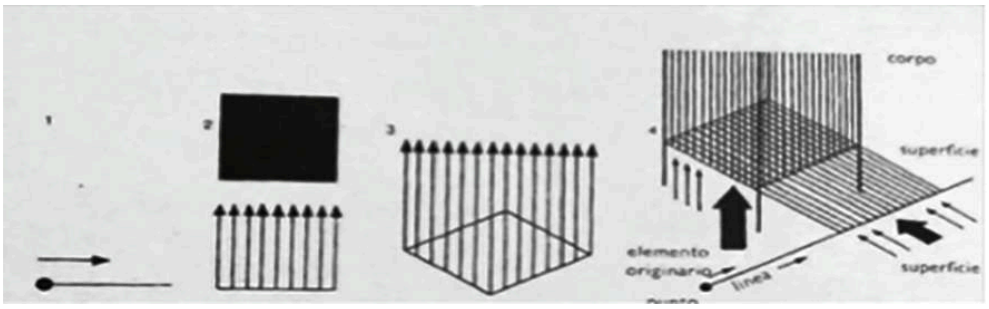


Image from Klee 2016a (1956).

15 The arrow thus becomes the basic unit of a grammar of the genesis of forms, common to the concerns of the mathematician-philosopher and the painter.

7. Third Parallel: The Point as Center of Irradiation and Germ of Multiplicity

16 The third parallel concerns the multiplicity of directions contained within the point. The point-agent is not bound to a single possible direction; on the contrary, it is the site of an infinity of potential directions. For Châtelet as for Klee, the point thus conceived becomes a germ or a center of irradiation (Figure 4). It is the locus from which a family of arrows can emerge, propagating from the inside outward in all directions of space (Figure 5). It is not a restricted singularity but a site of virtual proliferation.

Figure 4. The point as "center of irradiation"

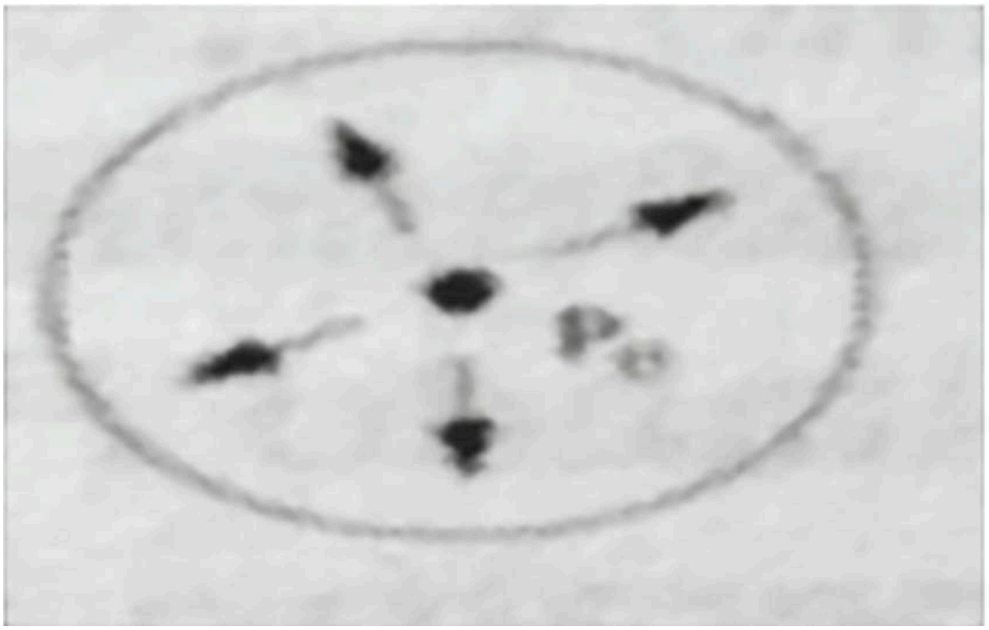


Image from Châtelet 2011 (1993).

Figure 5. The point as a matrix of multi-directional arrows and as a site of virtual proliferation

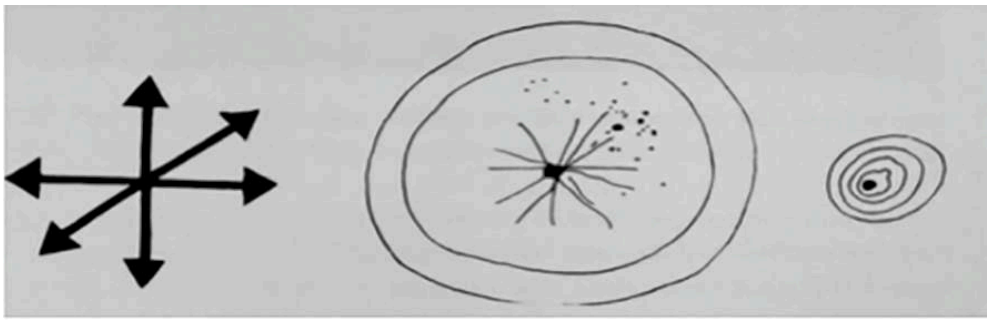


Image from Klee 2016a (1956).

17 This conception makes the point a veritable locus of the virtual. The virtual is understood here in a dual sense,[1] which both Châtelet and Klee explore. On one hand, there is the idea of the virtual as a germ or unexpressed potential. From this perspective, the point is not a mere sign, but a "driving latency" (Klee 2016b: 134), to use Klee's words, or an "arrow awaiting emergence" (Châtelet 2010: 198), as Châtelet defines it. It is a reservoir of future processes, a pure potentiality still awaiting translation into act: the point, in essence, is conceived as a "power of explosion." On the other hand, the virtual can be understood as something residual, like the memory of a concluded process. In this case, the point is not at the origin but at the end of an action.

18 Consider a pendulum whose spiraling motion gradually contracts until it comes to rest at a point.[2] That point is not primitive but derived; yet, it is not therefore inert. It is a residue charged with history, encapsulating within itself the entire trajectory that generated it, accumulating energy for a possible new beginning. It thus becomes simultaneously the end of one cycle and the germ of the next. In summary, the point is

a crossroads of temporalities: it can be both a beginning laden with future and an end saturated with past, each time proving itself a concentration of virtuality. The duality germ/residue shows the depth of the metamorphic conception of the point. It is always susceptible to becoming other than itself, of transforming into a line, a surface, or of re-contracting from a movement. This plasticity finds its most complete expression in the diagrammatic realm common to both thinkers.

8. Further Elaborations: The Point as Quotient and Becoming-Hole

8.1. The Algebraic Germ: The Point as Quotient of a Polynomial

19 Châtelet's critique of the designative ontology finds one of its most revealing technical expressions in algebra. He invites us to consider the fraction $X = 1/x\text{-}1$. The aforementioned expression actually occurs a few pages before the considerations devoted to the "arrow [...] that springs forth from the point" (Châtelet 2010: 135). However, it is in the subsequent pages that the geometric-algebraic idea of the point as a polynomial quotient is explicitly developed in its technical details. Continuing this critique, and observing, for instance, that "the designation kills all virtuality" (*ibid.*: 144), Châtelet ironically asserts that one could take "$x = 1$ and remain for centuries fixed in front of" *(ibid.)* and no longer have "nothing can be done!" (Châtelet 2011: 33).

20 Yet, the scholar observes, there is much to be done: namely, to correct the preceding equation by setting $x = 1/(x\text{-}1)$ [A]. Observations of a similar tenor can also be found in *Les Enjeux du mobile*. We refer in particular to the pages dealing with the profound innovations of Cauchy and Poisson. Just as he remarks that "Cauchy and Poisson [...] provided an answer to the problem: how to make a sensible point out of a point" (Châtelet 2011: 32) he invites the reader to consider "the fraction $f(x) = 1/(x\text{-}x_0)$" (*ibid.*: 33) [B]. With the exception of minor differences, [A] and [B] are equivalent. They provide, in our view, a good algebraic representation not merely – or not only – of "a singular point in a complex plane" (Châtelet 2010: 68) but, above all, of the point as a Leibnizian *locus* of fulguration.

21 Let us focus on the expression on the right side of [A]. The fraction $1/(x\text{-}1)$ (henceforth, $[A_r]$) functions as a germinal matrix insofar as the variable x in the denominator can assume infinitely many values. For instance, this is the case for $f(x) = 1/(x\text{-}1)$, $\forall\ x \in Z^+$. If we disregard the case $x = 1$, $[A_r]$ becomes comparable to a root in the botanical sense of the term. That is, excluding the substitution for which "$1/(x\text{-}1)$ [...] is not defined" (*ibid.*: 142), our algebraic fraction will generate an infinity of points corresponding to the elements of Z^+. To conceive of a point as a polynomial quotient is thus to acknowledge that "A point is not absolutely nothing in itself" *(ibid.)*.

22 This is why "Constructing mathematics is, in a sense, 'making the points blossom'" (*ibid.*: 143). Châtelet's significant theoretical legacy is encapsulated in these final assertions. By stating that points are nothing in themselves, the author pushes his philosophy of the virtual to its ultimate consequences. By further asserting that doing mathematics means "making points flourish," he enriches this philosophy with vegetal metaphors, which contribute to an even more powerful vision of the virtual in mathematics. Together, the algebraic concept of the polynomial quotient and the

image of blossoming provide a small-scale representation of assumptions with a far broader scope

8.2. The Topological Metamorphosis: From Becoming-Hole to Becoming-Zone

23 The point's virtual generativity demands a corresponding gestural kinematics. Châtelet analyzes this as a shift from viewing the point as a position to engaging with its becoming-hole (see Figure 6).

Figure 6. "A circuit around a point"

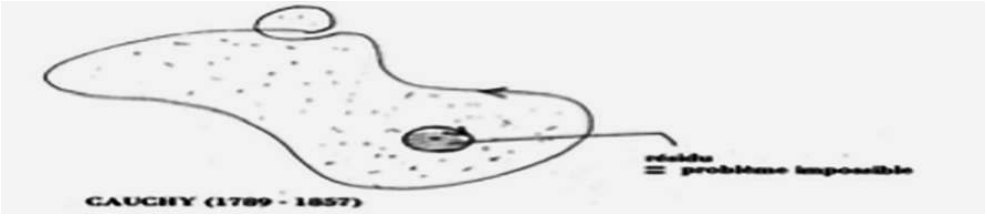


Image from Châtelet 2010.

24 This process involves a double gesture: the extraction of the point and the virtual cut-out of a neighborhood around it (as in Cauchy's method of drawing a dotted circle and removing the point). The point, now a hole, is no longer something to be designated but a topological obstacle – a locus of lack that "obliges us to go around." This becoming-hole dialectically triggers a gesture of propagation. The excavated cavity seems to attract the point, causing it to "irradiate" vectors toward the newly created borders. The point becomes the center of a potential movement. This leads to the final stage: the becoming-zone. By imagining loops that turn endlessly around the point-hole without crossing it, the point acquires a virtual "thickness." It is no longer a punctual identity but a zone of relation, defined by the deformations and paths that encircle it. The sequence of gestures – extracting, cutting-out, irradiating, turning-around – enacts the full metamorphosis of the point from a punctiform entity to a dynamic, relational field.

9. The Diagrammatic Life of the Point: Virtual, Gestural, Metamorphic

25 The synthesis of the conceptual parallels and the technical elaborations brings us to the heart of Châtelet's and Klee's common contribution: the diagram as the operator of this metamorphic life. The diagram is the arena where the virtual (the germinal quotient, the power of explosion), the gestural (the tracing of arrows, the excavation of holes, the turning-around), and the metamorphic (the passage from point to line, from hole to zone) become inseparable. The "diagrammatic life of the point" is this very process: the point as a node of virtuality, traversed by gestures, and constantly transforming. It is the seat of gestures that supplant the pointing gesture: the gesture of propagation (the explosion of lines from a germ), the gesture of contraction (the convergence into a point-residue), and, most radically, the gesture of rotation (the turning around a point that has become a hole). The diagram thus materializes a dynamic ontology where the point is the active center of a field of forces and continuous transformation.

10. Conclusion: The Metamorphic Point

26 The cross-reading of Gilles Châtelet and Paul Klee reveals a profound and concerted subversion of the point's static ontology. Their shared project – to reanimate it as a dynamic, gestural, and virtual site – unfolds through complementary lenses: Klee's phenomenology of genesis and Châtelet's operative philosophy. We have traced the stages of this metamorphosis. It begins as a germ or agent, imbued with internal tension. It is realized as a diagrammatic operator, whose life is expressed through gestures. Algebraically, this generativity is captured in the quotient of polynomials, a germinal matrix. Topologically, it culminates in the becoming-hole, where the point, hollowed out by gestures of extraction, becomes a locus of attraction that obliges thought to "turn around," thereby revealing its becoming-zone.

27 This metamorphic rehabilitation is an antidote to disembodied abstraction. For mathematics, it reinstates intuition and gesture at the heart of conceptualization. For art, it provides a foundation for understanding creation as the actualization of virtual forces. Ultimately, Châtelet and Klee teach us that the simplest entities are the most potent. Their legacy is a philosophy of relation and virtuality, inviting us to reconsider all objects of thought by attending to the life, movement, and metamorphic potential that animate them. The point's journey from germ to hole to zone stands as a paradigm for this renewed mode of thinking.

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NOTES

1. Regarding the philosophical origins of this ambiguity, I offer an extensive discussion in La Mantia (2020: 189-95), as well as in Alunni & La Mantia 2023.
2. See Klee (2016b: 399): "A rotating pendulum may also wander if its central point is set in motion [...]; (if) it is shortened [...] the circles will become progressively smaller until the spectacle concludes at the point."

ABSTRACTS

This article presents a radical deconstruction of the static ontology of the point inherited from the Euclidean tradition, through a comparative analysis of the thought of mathematician Gilles Châtelet and visual artist Paul Klee. Against the notion of the point as an inert, partless entity, both thinkers conceive of it as a dynamic agent and virtual germ: for Klee, it is an "*Agens*" imbued with an internal *Spannungswille* (will to tension), while for Châtelet, it is an "operator" resulting from processes of contraction or dilation. The article identifies three fundamental parallels between them: the point as a site of internal tension and mutual attraction, the line as an oriented arrow actualizing its virtual direction, and the point as a germinal centre of irradiation. The synthesis culminates in Châtelet's later technical elaborations, where the point becomes, algebraically, a quotient of polynomials (a "germinal matrix") and, topologically, a *becoming-hole*. Through gestures of extraction and circumvolution, the point transforms into a relational *zone*. The diagram thus emerges as the operative field where the point's virtuality, gesturality, and metamorphic nature are enacted, offering a fertile alternative ontology for both mathematical and artistic practice.

INDEX

Keywords: Châtelet, Klee, Diagram, Point, Gesture, Virtual

AUTHOR

FRANCESCO LA MANTIA

IDREF : https://idref.fr/166596574
ORCID : https://orcid.org/0000-0002-5893-4151
VIAF : http://viaf.org/viaf/299284582
ISNI : https://isni.org/isni/0000000385252057

Università di Palermo
francesco.lamantia28[at]unipa.it