

From Step to Mark: Knowledge and the Proliferation of Undecidable Meanings between Trace, Experience, and Interpretation

Antonella Pettoruso

Abstract

This contribution advances an operational thesis: drawing does not merely fulfill an illustrative function; rather, it constitutes a process that dynamically participates in the visual semantic field, acting as a cognitive engine within the creative act. Indeed, it selects, orders, and correlates dispersed data, transforming them into legible and debatable figures. This process is structurally akin to walking: both operate as iterative practices of orientation, grounded in rhythm, correction, and the progressive construction of meaning. Cartography is thus understood as an 'already reinterpreted space', a trace that directs the gaze and prefigures itineraries; yet, in the transition from the paper to the physical street, the initial direction does not predetermine the experience. While the trace guides the steps, it cannot govern material friction, micro-perceptual variations, the observer's affective state, or the situated encounter with the landscape. This gives rise to a proliferation of partly undecidable meanings: the map and the layout generate knowledge not by confining reality within a single reading, but by triggering plural interpretations within shared constraints (scales, codes, sequences). The text integrates case studies and theoretical references: from John Snow's epidemiological mapping as the graphic proof of a phenomenon, to schematic maps that orient without exhausting, through to the reading of historical routes as devices of memory and perception (Rutigliano). Through a neurocognitive lens, the in situ experience is interpreted as embodied cognition, wherein the environment activates perceptual-motor and affective responses (Gallese). Consequently, drawing –much like walking– becomes an integrated methodology to interpret territories, construct design themes, and render time operable within places.

Keywords: representation, traversal, embodied cognition, historical cartography, proliferation of meanings.

Introduction

To know requires either drawing or walking, traversing either cartographic space or the material space of the street. This posits that the graphic support is never neutral; rather, it always depicts a space that has already been interpreted, thereby offering an initial reading that orients the step. Tracing with a finger a path drawn by others is equivalent, in a preliminary form, to allowing oneself to be guided. It must therefore be considered a gesture that attempts to direct the hiker's feet even before they touch the ground.

From this arises a proliferation of knowledge, because cartography –stratified and already 'translated' by a prior gaze– is, in the act of walking, reinterpreted in turn by the observer according to their own repertoire of

experiences and competencies. In the same vein, whoever traces a mountain trail or a subway route offers merely an initial direction, a line of possibility. Within this perspective, two irreducibly unpredictable moments emerge. On one hand, the person sliding a finger across the map cannot anticipate what they will feel when that layout becomes ground: the friction, the incline, the rhythm of the step. On the other hand, the one who draws multiplies reality through the mark, yet cannot govern what will transpire along the walk: the texture of leaves underfoot, the scent of the air; the fatigue on the slope, a sudden light, nor –above all– the state of mind with which that landscape will be encountered and interpreted. It is precisely within this excess between

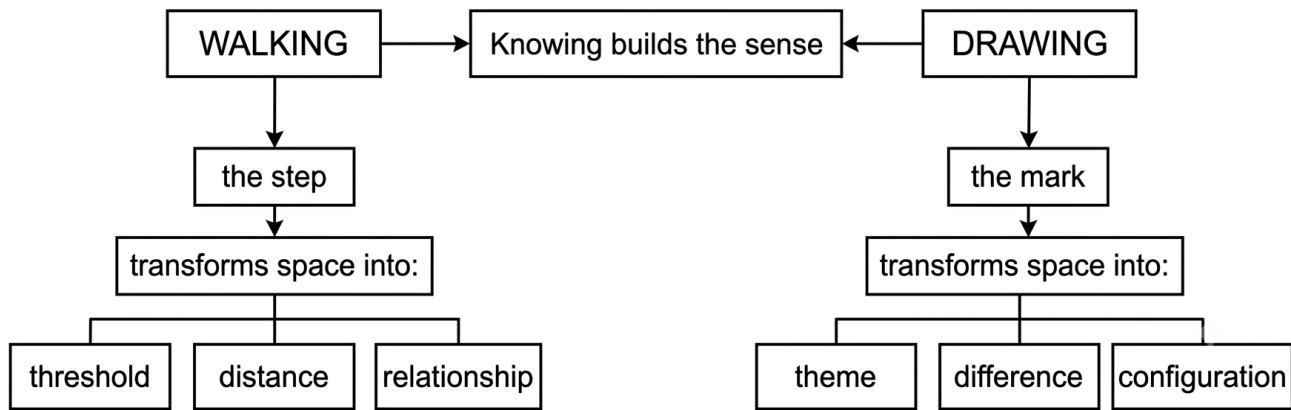


Fig. 1. Walking is like drawing, (graphic elaboration by the author).

trace and lived experience (*vissuto*) that knowledge is produced: the itinerary prescribes an orientation, but experience fills it with unpredictable meanings. As Ing-hillieri suggests [Ingillieri 2012], certain places can exert a therapeutic effect of emotional regulation; if for the child a first object 'external' to the mother may be a doll, for the adult the landscape can perform an analogous function of containment and calm. Finally, it is within this situated interaction that—in line with the thesis of Gallese and Morelli [1]—mirror neurons participate in the construction of meaning: by reacting to what stands before us, they transform perception into an embodied cognition, inseparable from the gesture, the step, and the trace. This text advances an operational thesis: knowledge does not precede representation; rather, it is produced through it. Drawing does not merely 'clarify' what is already known; it is a process that selects, orders, correlates, stratifies, and, in doing so, renders the world legible and open to debate. Yet, this is inseparable from walking: to draw requires traversing—if only mentally—an already interpreted space (the paper, the map, the layout), alongside a physical space that resists full prediction (the street, the path, the terrain, thresholds, sounds, irregularities) (fig. 1). Within this dual traversal, the initial trace orients but does not exhaust: it opens a direction and generates a proliferation of meanings that remains, in part, undecidable [2].

The grammar of the mark as a rhythm of kinetics and representation

Drawing from a lineage of thought that extends from Schopenhauer [3] toward an interpretative conception of representation, the act of 'representing' does not equate to faithful reproduction; rather, it entails transforming the object into a language. Every image is the outcome of a specific mode of observation; it therefore carries judgment rather than neutrality [4]. Drawing as an analog practice, operates through codes: metaphors, analogies, schemas, and reductions. It is precisely here that knowledge emerges as a construction: without representation, the world would remain a formless mass of facts, devoid of hierarchies and relationships.

This logic manifests with particular clarity within historical cartography [5]: a map is never a 'first time' [6] but almost always a rewriting. The cartographer integrates pre-existing maps, updates details, and superimposes layers. Consequently, multiple spaces (the base and the intervention) and multiple times (the instant of the survey, the memory of the previous map, and the projection of future utility) coexist within the same sheet. Drawing, in this context, signifies 'mapping time': rendering visible transformations, permanences, deviations, meanders, and discontinuities. Time is not merely narrated; it is made operable through the mark.

In this perspective, walking is not an external theme, but rather the corporeal correlate of drawing [7]. Every graphic trace

implies kinetics: rhythm, pressure, advancement, and correction. In the linear gesture, as in the step, there are accelerations, pauses, returns, and deviations. It is no coincidence that many representations of movement throughout art history (from the Egyptian 'regal' stride to classical figures structured upon dynamic *contrapposto*) demonstrate that motion is communicated through differences [8], alternations, and tensions. Analogously, in drawing, the line suggests movement not because it 'imitates' the body, but because it reconstructs its rhythmic grammar.

This processual equivalence becomes even more compelling when considering education in drawing: the child draws just as they explore –through contours, trials, and repetitions– whereas the adult tends to discipline, abstract, and select. In both instances, however, drawing remains a form of situated learning: one learns while tracing. The distinction lies within the threshold of control, not in the cognitive nature of the act.

The itineraries of perception and the constellations of the trace

The case of John Snow [9] is paradigmatic because it clarifies that mapping does not merely serve to communicate already acquired results; rather, it serves to produce them. The correlation between deaths and the water supply source becomes intelligible precisely when it is translated graphically: positioned within space, bounded, and rendered comparable. The map thus operates as a device of proof, capable of giving form to a hypothesis and exposing it to public refutation. Within this perspective, knowledge is not content that is simply transferred from the world to the page; instead, it is the outcome of an operation of selection, montage, and visual organization of data (fig. 2).

At the end of August 1854, during the cholera epidemic in London, Snow excluded the hypothesis of airborne transmission and oriented his investigation toward a potential transmission through water. Observing the concentration of cases in the Piccadilly area, he identified the Broad Street pump (located between Broad Street and Cambridge Street) as a crucial node in the residents' supply system. Traversing the streets of the neighborhood, he recognized that the majority of deaths were clustered in proximity to the pump: a regularity that, in order to become arguable, had to be made visible. Snow therefore worked upon an existing cartographic base –published by the C.F. Cheffins studio (Holborn) at a scale of 30 inches to a mile– and transformed it into an analytical

tool by integrating three essential elements: the location of the pumps, a dashed line defining the area of influence, and black bars marking the fatalities.

It is precisely within this transformation –from topographical image to relational diagram– that the map produces evidence, rendering the association between health events and water infrastructure verifiable.

In December 1854, Snow presented his findings to the London Epidemiological Society, where further connections to the population's hygienic and sanitary conditions emerged. However, interpretations were not immediately unanimous: additional corroboration arrived from the analysis of an initially neglected fatality (the case of an infected child) and from the reconstruction of the role of a cesspool, whose contents leached through the soil, contaminating the drinking water. Here too, the strength of the argument does not reside in a single, isolated datum; rather, it lies in the possibility of reconstructing a coherent chain of relations among space, user behaviors, infrastructure, and the distribution of cases [10].

A trace can be radically directive and, at the same time, non-deterministic. A network diagram (such as the celebrated logic of simplification (fig. 3) found in Beck's schematic maps [11] for the London Underground) orients displacement: it indicates sequences, nodes, interchanges, and directions. Yet, it does not govern experience: it does not control overcrowding, noise, fatigue, mood, or the personal memory that grafts onto every journey. The trace, therefore, directs without determining; the line guides the feet, but it does not possess the body.

The act of walking becomes a method in the discourse on historical routes, as the road is not merely a functional infrastructure: it constitutes a landscape monument, a device of memory, and a 'privileged itinerary' [12] through which to rediscover and understand a stratified Italy. Within this framework, the road is a territorial writing that warrants preservation and valorization, particularly because numerous traces have been erased or degraded by modernization and the homogenization of layouts. The proposal to rediscover historical routes is explicitly tied to a 'slow and inquisitive' tourism and to a pedagogy of the gaze: a return to reading places along the line of a traversal that carries with it walls, bridges, hydraulic works; signs of a 'making' coherent with the *genius loci*. Hiking practices (such as CAI report-mapping, guided crossings, and field surveys) demonstrate a key point: walking produces description, and description tends to become textual cartography. Through the step, one recognizes inclines, materials, water regimes, and land-use shifts, but above all, one constructs a sequence of decisions: where to pass, where to halt, and

Fig. 2. Redrawing of the London epidemiological map. The prisms identify the contagion zones, while the cylinders signal the presence of the pumps (graphic elaboration by the author).

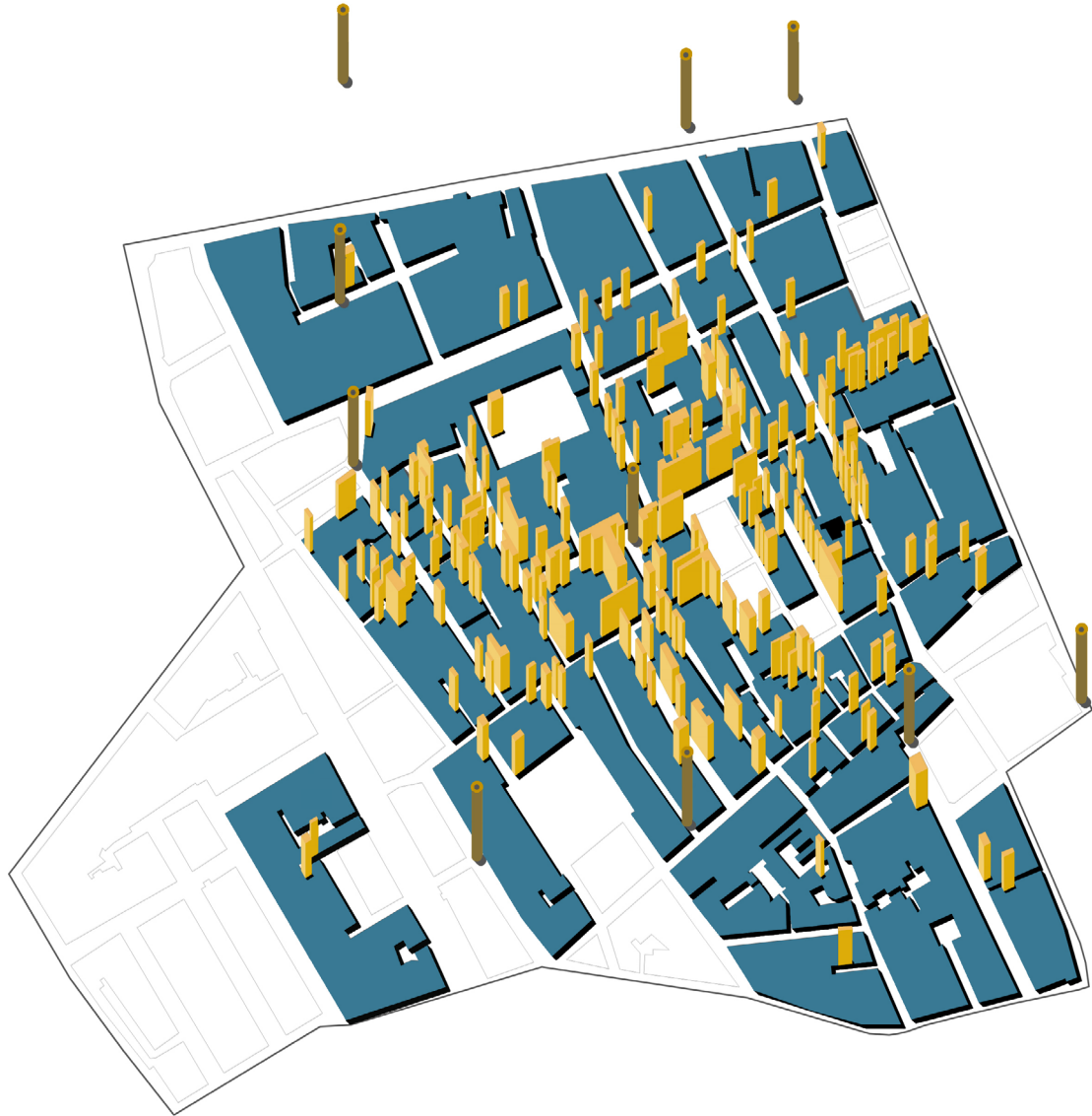
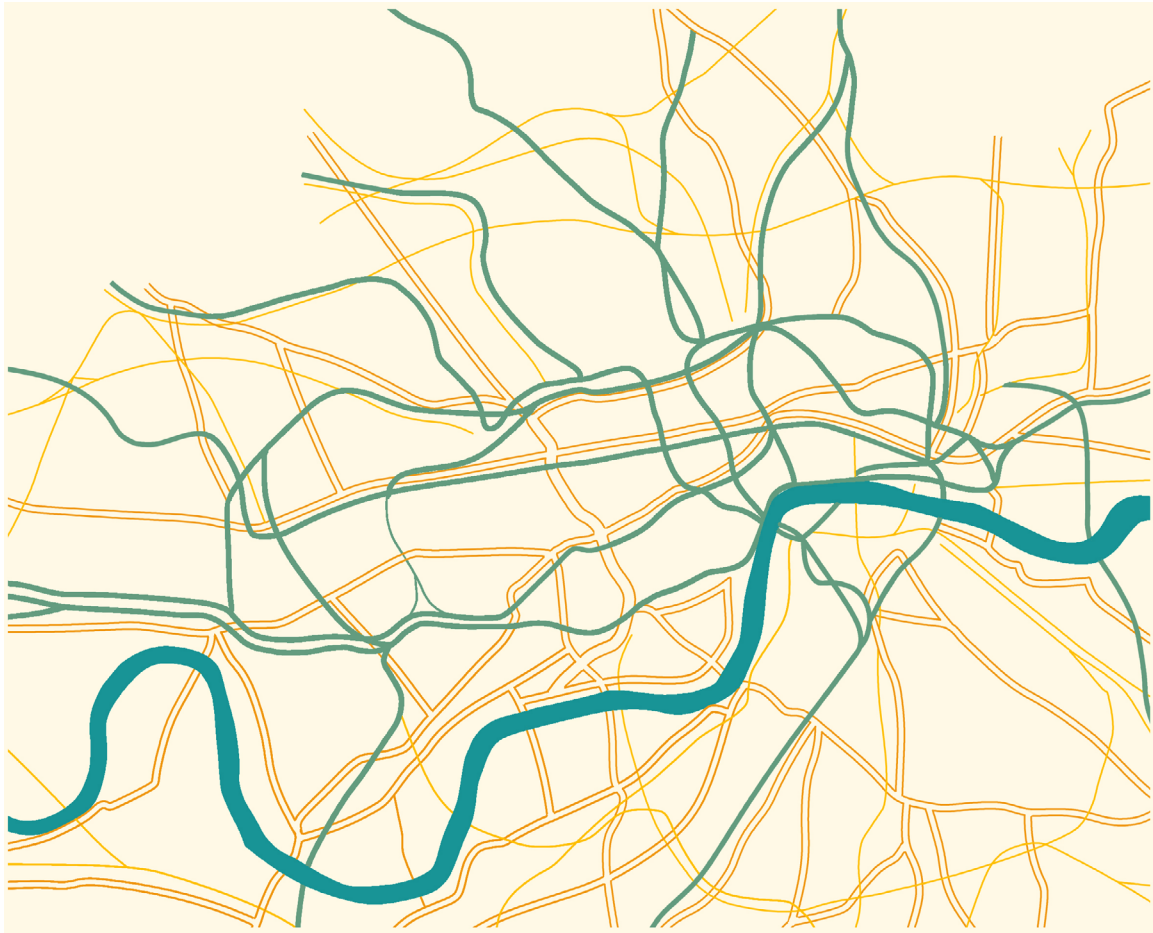


Fig. 3. Redrawing of the London Underground map, 1930-pre-Beck. The route of the metro line is shown in green, the routes of other road infrastructure in orange and mustard, and the River Thames in turquoise (graphic elaboration by the author).



what to avoid. Walking, in this sense, is a corporeal algorithm that transforms space into relation. When cartographic analysis identifies territorial continuities and recurring elements, it does not merely 'discover' objects; rather, it extracts a theme and employs it as a design rule. Here, knowledge proliferates through the stratification of historical maps, technical maps, toponomastic data, *in situ* perceptions, and, ultimately, the new design synthesis. In this regard, the final product is not a static image, but a traversable network constructed of terrestrial paths, waterways, crossings, and control devices.

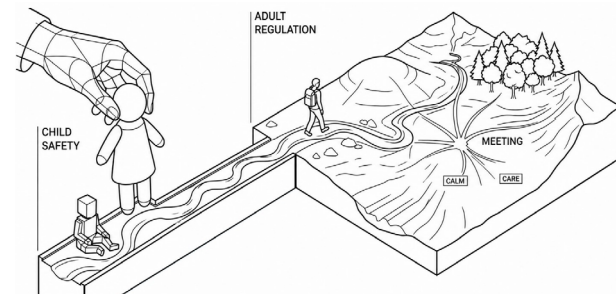
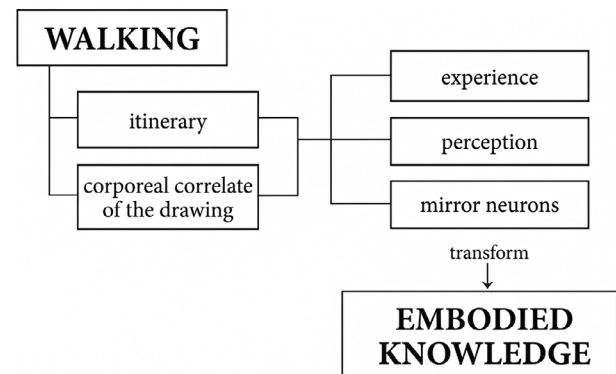
From trace to presence: insights on knowledge arising from drawing and walking

Convergent results emerge from these cases. First: drawing is an epistemic act because it produces relations. It does not limit itself to describing entities; rather, it places them into a configuration (proximity, influence, hierarchy, sequence). Knowledge arises as a structure, not as a list. Second: the trace is always 'first' and 'not final.' It represents an initial direction, akin to a marked trail or a line on a map: it orients movement, yet leaves the quality of the experience indeterminate. This indeterminacy is not a defect; rather, it constitutes the very condition for the proliferation of meanings. Third: cartography is a space that has already been reinterpreted. Walking 'within the map' means tracing with a finger a route that someone has already deemed relevant, practicable, and nameable [13] (fig. 4). Yet, in doing so, the observer reactivates the map through their own knowledge: what to one is an 'incline' becomes a stimulus to another; what to one is 'flat terrain' becomes monotony to another; or a promise of speed. Fourth: the transition from the map to the physical street produces a surplus that cannot be fully translated. The map does not contain the friction of leaves underfoot, the anxiety on the cliff's edge, the unpredictability of the wind, or the unexpected joy of a visual opening [14]. The tracker can dictate the direction; they cannot prescribe sensibility. Fifth: this surplus is not merely poetic, but neurocognitive [15].

If, as in Gallese's readings [16], our understanding of the world is mediated by systems of embodied simulation (mirror neurons and related mechanisms), then the environment triggers responses that depend not merely on information, but on presence. The street 'forces' the body into action: demanding specific postures, focuses of attention, and anticipations. Knowledge is generated within the reciprocal grip between organism and context.

Fig. 4. Walking: trace, experience and meaning (graphic elaboration by the author).

Fig. 5. Security and emotional regulation: from the doll to the landscape (graphic elaboration by the author).



From mark to step in the cognition of undecidable meanings

To state that 'drawing is akin to walking' does not imply reducing drawing to a mere metaphor for movement; rather, it means recognizing an identical operational structure: both are iterative processes of orientation. Walking is a practice of the minimal measure (the step) that transforms space into threshold, distance, and relation; drawing is a practice of the minimal measure (the mark) that transforms reality into theme, difference, and configuration (fig. 5).

The decisive point lies in the proliferation of undecidable meanings [17]. 'Undecidable' here does not denote arbitrary; it means inexhaustible by a single reading. A historical route is simultaneously infrastructure, document, monument, memory, aesthetic occasion, economic resource, and political device. An epidemiological map is simultaneously description and argumentation. A hiking trail is simultaneously direction and narrative. Knowledge is not unequivocal: it is a proliferation

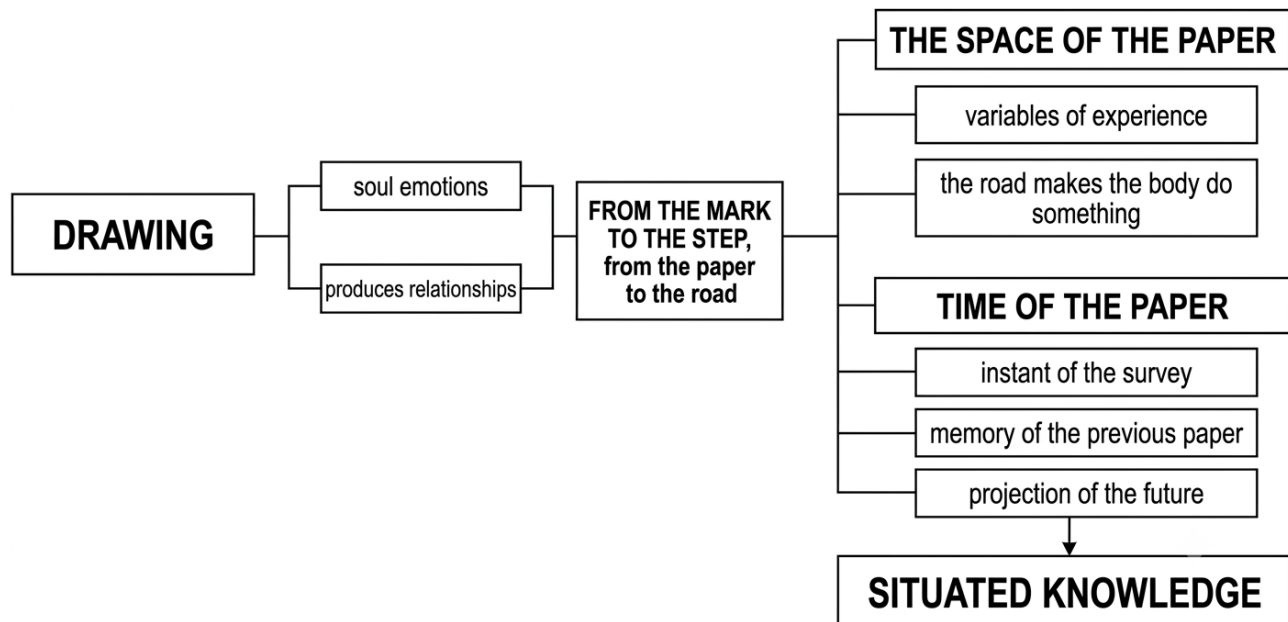
governed by constraints (topography, scale, graphic codes, rules of walking) yet open in its interpretations.

The affective dimension is situated precisely within this openness. If, as in Inghilleri [18], the transitional object for the child (the doll) acts as a mediator between security and the external world, for the adult, the landscape can function as a mediator of regulation: soothing, reorienting, and capable of 'healing' through perception. The trace (map/road) prepares the encounter; the encounter activates emotions [19] that, in turn, become situated knowledge (fig. 6).

On walking and tracing: knowledges of place and the care of their ways

For research: treating drawing and walking (fig. 7) as integrated methods allows for the construction of 'two-tier' investigation protocols. These can involve the analysis of

Fig. 6. From sign to step (graphic elaboration by the author).



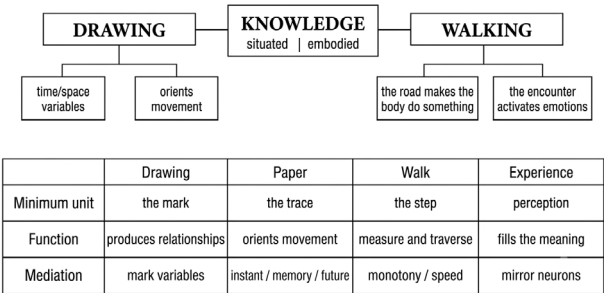


Fig. 7. Conceptual matrix (elaboration by the author).

cartographies and toponyms followed by *in situ* perceptual and narrative verification; or, conversely, exploratory walking followed by subsequent graphic formalization. In both cases, validity resides not merely in the 'precision' of the data, but in the apparatus's capacity to bring forth relations. For territorial design: considering historical routes as landscape monuments implies intervention criteria that cannot be reduced to mere traffic functionality. Valorization requires preserving the legibility, continuity, and perceptual quality of the traversal, rather than focusing solely on the road cross-section. For pedagogy: teaching drawing as a form of walking means shifting attention from the 'beautiful mark' toward the construction of experience and judgment; learning what to trace is equivalent to learning what to see.

Notes

[1] The volume explores the concept of 'embodied simulation', explaining how our motor system does not merely execute actions but actively participates in understanding the world. In this perspective, perception is not a purely visual or abstract process but a profoundly bodily experience: by interacting with the environment and with traces (graphic or physical), the subject constructs meaning through a continuous sensorimotor exchange between themselves and the context [Gallese, Morelli 2020].

[2] For the distinction between cartography as an abstract 'place' and walking as a 'practiced space', see de Certeau [de Certeau 1984]. The article highlights how walking is not limited to following a route but 'inhabits' it, transforming the trace into a dynamic experience that escapes the closure of the drawing.

[3] For Schopenhauer, 'representing' (*Vorstellung*) does not mean reproducing an object 'in itself', but rather constituting the world as an 'object-for-a-subject': what we call the world is, first and foremost, 'representation', that is, a

This approach entails at least three limitations. First: the proliferation of interpretations can slide into relativism if it is not anchored to explicit constraints (scales, sources, selection criteria, conditions of traversability). Second: the *in situ* experience is inherently variable (season, weather, bodily state, competencies), making it difficult to replicate. Third: the link between perceptual processes and neuro-cognitive explanations (mirror neurons, embodied simulation) serves as a powerful interpretive framework, yet it demands caution when employed to 'prove' point-by-point causalities within complex contexts.

Conclusions

Drawing is akin to walking because both constitute knowledge through the medium of the trace. The trace is not a secondary outcome; rather, it is the very means by which the world becomes legible and, simultaneously, an invitation to be traversed.

To walk within a cartography means to follow the intelligence deposited by others, yet it also entails reactivating it through one's own singularity; to walk upon a physical street means accepting that direction does not govern experience, and that precisely here arises the proliferation of meanings. Within this oscillation between guidance and indeterminacy, between code and sensation, a knowledge is produced that does not coincide with a single truth, but rather with a network of relations: a knowledge capable of generating design, memory, care, and, above all, new questions.

phenomenon dependent upon the forms of knowledge (space, time, and causality) and inseparable from the perspective of the knowing subject. In this sense, without a subject there is no object, and reality is always given as a relation, never as an absolute datum [Schopenhauer 1818].

[4] On the nature of cartography as a cultural practice that shapes reality rather than merely reflecting it, see Cosgrove [Cosgrove 1999]. The author highlights how 'maps' are visual devices that, through the selection and organization of data, construct a spatial order intrinsically linked to specific power structures and ideologies, surpassing the idea of representation as a transparent transcription of the real.

[5] The set of cartographic practices and products of the past (manuscript and printed) are assumed not as simple 'images' of the territory, but as cognitive and cultural devices: situated representations, constructed according to technical codes and conventions of the time, which select, prioritize, and render space (and often its uses) governable. In this sense, historical

cartography is read as interpretative stratification: each map incorporates previous sources, scale choices, omissions, and accentuations, and therefore returns both a territory and a historical gaze on the territory itself.

[6] The set of cartographic practices and products of the past are assumed not as simple 'images' of the territory, but as cognitive and cultural devices. See Harley and Woodward [Harley, Woodward 1987], who define cartography as a social and historical construction that selects, prioritizes, and renders space governable. In this sense, the historical map is read as interpretative stratification: each sign incorporates previous sources, scale choices, omissions, and accentuations, returning both a territory and a historical gaze on the territory itself.

[7] The statement that walking is not an external theme but the bodily correlate of drawing should be understood in an operative sense: both function as tracking practices. As Ingold observes, drawing and walking produce lines that organize experience, transforming space into a path and into a relationship; and, from Careri's perspective, walking is not limited to traversing places, but knows them and "constructs" them through a sequence of perceptual and narrative choices. In this sense, drawing can be read as a graphic translation of kinetics (rhythm, pressure, correction), while walking can be read as a bodily writing that makes the territory readable [Ingold 2007; Careri 2006].

[8] In the lexicon of art history, movement is often rendered not as cinematic registration, but as an effect of structural differences: oppositions and asymmetric balances that make one perceive a 'potentiality of motion'. In classical contrapposto, exemplary in Polyclitus's Doryphoros as understood by Asa Simon Mittman [Mittman 2019], it is used to explain how balanced asymmetry—crossed tension/relaxation—produces the effect of vitality and implicit motion. The figure appears alive because the weight is concentrated on one leg (tensed) while the other relaxes, and the alternation is mirrored in the arms: a grammar of tension/release that suggests dynamism even in stillness.

[9] John Snow (1813-1858) was a British physician and one of the founders of modern epidemiology. During the 1854 cholera epidemic in London, he refuted the 'miasma' hypothesis and argued for the waterborne transmission of the disease, demonstrating the correlation between fatalities and the Broad Street pump through a map of cases and a spatial analysis; the removal of the pump's handle became a landmark intervention for a data- and territory-driven approach.

[10] Snow's intervention is situated, moreover, within a broader genealogy. The mapping of fatalities had previously been employed to investigate plagues and fires (1665-1666), and in the United States, Valentine Seaman applied cartography to medicine in 1798 through epidemiological maps. A further theoretical reference is Ludwig Finkle, who in the 1780s conceptualized a disease atlas in continuity with Hippocratic influences, seeking common environmental factors (soil type, vegetation, animal treatment). Although the project was halted due to the costs of the Napoleonic Wars, Finkle produced a world map of the geographical distribution of diseases in 1792. Within this framework, Snow's contribution demonstrates with particular clarity the epistemic nature of representation: the map is not a neutral 'background' but an apparatus of intelligibility that makes it possible to see what, without tracing, would remain scattered and incomparable.

[11] Harry Beck (1902-1974) was an English technical draftsman who, in 1931, devised the famous schematic map of the London Underground, first published in 1933. By replacing geographical accuracy with a 'diagrammatic'

logic (simplified lines, regular angles, non-scalar distances), Beck rendered the network comprehensible as a sequence of nodes and interchanges: a graphic orienting device that guides movement without coinciding with the actual territory, and which has durably influenced transit cartography worldwide. The trajectory leading to Beck's 'definitive' map clearly illustrates that drawing is not merely a graphic vessel for pre-existing content, but a method of knowledge constructed through successive trials. In 1931, Beck proposed an initial scheme; it was deemed too distant from established conventions and was rejected. In 1932, he resubmitted it with targeted corrections: the proposal was accepted and, prior to full distribution, was even tested via a trial print run. This sequence highlights the epistemic core: to draw means to formulate a hypothesis about the world (which relationships matter; which should be simplified, which hierarchies render a system legible), to subject it to public verification, and to modify it in light of the effects it produces. Knowledge, here, does not precede the mark: it emerges within the mark, because it is the drawing that renders relations comparable and allows one to determine whether an idea 'functions' as a tool for orientation and comprehension.

[12] In the volume *Strade storiche. Monumenti da salvare*, Oreste Rutigliano [Rutigliano 2022] interprets 'historical roads' not as mere infrastructure, but as authentic linear 'monuments': unified works that integrate engineering, landscape, and decorum, constructed using traditional materials and methods, and conceptualized to encompass aesthetic qualities (alignments adhering to the terrain, curves and hairpin bends, stonework, arched bridges, tree-lined avenues, and furnishings). Within this reading, their cultural value was recognized belatedly: many have been destroyed or altered, while others remain forgotten, necessitating rediscovery and restoration. Rutigliano links their protection to a contemporary demand for 'slow' and inquisitive tourism, capable of reactivating inland areas and the historical landscape through trails, villages, and itineraries.

[13] The shift from the conception of the map as a static object to a vision of 'mapping' as a processual practice is supported by Kitchin and Dodge [Kitchin, Dodge 2007]. According to the authors, the map does not exist as an immutable datum, but constitutes itself through situated interaction with the subject: it 'happens' only when used in the context of movement, making cartography a continuous practice of negotiation and transformation.

[14] On the primacy of multisensory experience in inhabiting space and on the limits of an architectural culture excessively dominated by sight ('oculocentrism'), see Pallasmaa [Pallasmaa 2012]. The author argues that the authentic experience of a place—and therefore also of architecture—requires the involvement of all the senses, as only through tactile, auditory, and bodily contact does the environment reveal itself as a deep and significant reality, escaping the purely iconographic reduction of the graphic design.

[15] The nature of experience as knowledge inseparable from the body that inhabits the world is the core of Merleau-Ponty's reflection [Merleau-Ponty 2012]. The author argues that perception is not a datum that the subject receives passively, but an act of direct involvement in which the body, through its own movement and its own situated presence, gives meaning to matter. This phenomenological vision offers the interpretive framework necessary to understand how the 'surplus' that emerges in the walk—that is, what the map cannot anticipate—constitutes the very essence of a knowledge that is generated in the encounter between the intentionality of the gesture and the resistance of the physical world.

[16] Giacomo Rizzolatti and colleagues identified in the early 1990s, in the macaque frontal lobe (area F5), neurons that activate both when the animal performs a goal-directed action and when it observes the same action performed by others. Giacomo Gallese played a central role in the development of the theoretical interpretation of this system, proposing that these circuits support a form of 'embodied simulation' at the basis of the immediate understanding of others' actions through a pre-reflective sensorimotor coupling. In this perspective, mirror neurons are not a simple 'imitation mechanism' but a neurocognitive device that connects perception and action, making the experience of the other intelligible as a possibility of one's own body [Gallese et al. 1996; Gallese 2005].

[17] As Barthes [Barthes 1977] suggests, the meaning of a text –or a graphic trace– does not reside in an ultimate and closed intention, but rather in its nature as an open space that the reader, or the walker, must constantly reactivate and rewrite.

[18] In *I luoghi che curano*, Paolo Inghilleri (a social psychologist at the University of Milan) frames 'care' or 'healing' not as an abstract property, but as a situated effect born from the encounter between the individual and the environment: places, objects, and nature can function as protective

factors because they modulate emotions, attention, a sense of security, possibilities for action, and the overall quality of experience. Within this perspective, the landscape is not a neutral 'background' but a mediator: through its perceptual and symbolic characteristics (forms, light, vegetation, visual openings, accessibility, cultural signs), it can support positive experiential states, reduce stress, and foster mechanisms of psychological and social regulation. Healing, therefore, emerges from relationships and practices (dwelling, traversing, pausing) rather than from any presumed intrinsic power of the place itself [Inghilleri 2012].

[19] For Goleman, an 'emotion' is not a simple state of mind; rather, it is a complex construct that encompasses a feeling, its distinctive thoughts, psychological and biological states, and a range of 'propensities to act'. Within this framework, emotions are considered evolutionary devices for behavioral orientation: "impulses to act" [Goleman 1996, p. 355], that is, action plans designed to prepare the body for rapid responses to environmental demands (sharing its etymological root with *muovere*, 'to move'). This definition appears explicitly in Appendix A (where the author clarifies his conception of emotion and its connections to mind, body, and action) and is anticipated in the opening chapter, which is dedicated to the function of emotions as prime movers of action.

Author

Antonella Pettorrosso, Department of Architecture and Design, Polytechnic of Turin, antonella.pettorrosso@gmail.com

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