Mindshapes and Handscapes

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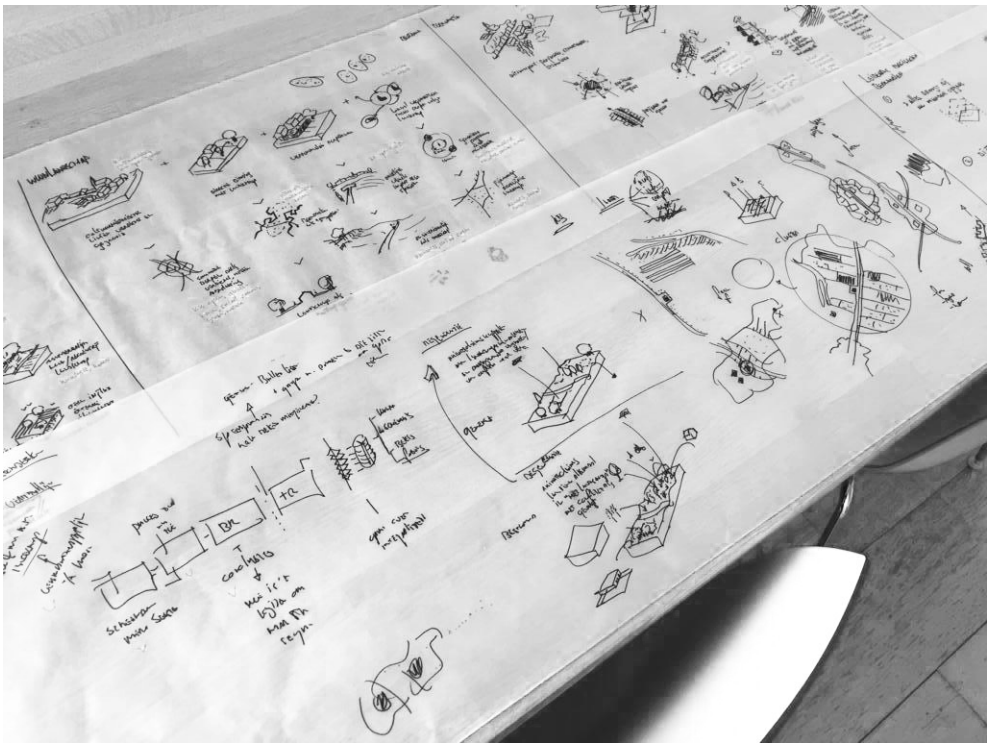

1. Introduction

> As living beings, we are continuously in contact with an outside world that pushes, pulls, stretches, warms, freezes, torments, and caresses our bodies. Our being is embodied, and through such embodied existence, we interface with the physical environment around us. This seemingly simple notion is—I believe—the most overlooked, yet unavoidable truth of any future philosophy. (Paans 2024b: p. 131)

The conception of philosophy as it came down to us from the Greeks pushed our thinking in certain directions.[1] It is not difficult to see that the blueprint of Western thought lies in Plato and Aristotle. Its categories, distinctions and basic concepts find their origin in their works and culture of thinking. The disdain for the body and the senses—so diligently practiced throughout Medieval times, and subsequently canonized by Cartesian doubt—led us to this point. Whatever is not digital yet can be digitized; whatever is now manual can be automated; what is now natural can be

[1] The original version of this essay was published in *Dimensions: Journal of Architectural Knowledge* 6.3 (2024) under the title "Handscapes: Gestures as Agents of Change and Mimetic Awareness," and is available online at URL = <https://www.degruyter.com/document/doi/10.14361/dak-2023-0614/html?srsltid=AfmBOopPlLbw5QHvLD5cA4Q-JkOj5x383rsJdc0ha8uEv7UpiNgVawuh>.

technologically reproduced; and all that is solid melts into air. How is this not a philosophy of disdain? Embodiment is the victim, its evolutionary refinement at the same time overlooked and underestimated; its adaptive potential and capacity for absorbing and producing knowledge axiomatized, formalized, and ultimately disfigured on the rack of the mechanistic worldview.

Our thinking about epistemology has suffered similarly. We have been thinking about knowledge as a set of statements, or at best statements about practices. But should we not invert this picture? Knowledge, for the better part of our evolutionary history, was intimately connected to doing. Knowing-how has primacy over knowing-that. Otherwise put, when knowledge was transmitted between tribe members, kin, or between generations, it was knowing-*what* which is important. One must know *what* to do and not to do; *what* is important and *what* is not. If we remove ourselves one step from this immersion in knowledge-how and knowledge-what, we could claim that this is actually *knowledge-that:* a set of statements about real-world practices. But this move is exactly the fundamental mistake of intellectualism: the practitioner did not have a self-conscious attitude for speaking about her knowledge-what as knowledge-that. Things simply had their reasons, either grounded in myth or in the unforgiving lessons of practice. Things *were*—with an ironclad certainty. The stubbornness of tradition can be easily explained by this feature: one should not alter the design of a hut or canoe, as climate and local circumstances have refined their physical forms over the generations. Each detail, no matter how inconspicuous, has its use. Woe to those who deviate. Their boats sink, their houses do not survive the winter. They drown, or die of starvation or cold.

Knowledge, in such circumstances, does not appear as a collection of facts; instead, it is present throughout the environment as a series of self-evident truths. To the trained eye, the environment appears as a painter's canvas, with each detail assuming its place in the larger whole. In short, knowledge appears as a *field of practice*, rather than as a collection of assertions. Knowledge is inherently integrative, rather than atomistic. The idea of knowledge as justified true belief is not tested in the halls of academia, but in the rough-and-tumble of everyday practice.

In such circumstances, practice shapes the mind: it creates an attitude towards the world that is deeply responsive and observant. Yet, modernity, with its dreams of control and disembodiment seems to have lost this intimate connection. It dreams of disentangling us from nature, of creating synthetic life.

But have we really lost the innate capacities of our minded bodies? Have we severed the intimate connection between knowing and doing? The answer is: of course not. We've pushed it aside, brushed over it, accorded it a place in the periphery of intellectual life, and we tolerate it merely. But that does not diminish its efficacy. Moreover, we can reclaim its potential in a new setting. At least to me, this seems a

moral imperative: to utilize the full functional potential of our bodies, instead of succumbing to the utilitarian demands placed upon it. In a traditional Marxist sense, one must act to resist such influences. If at one point in time, ideology was a form of crude political propaganda, by now its has evolved into a subtle, subterranean influence that undermines and debilitates our embodied life. And there is no better way to accomplish this gesture of resistance than through creative action.

Over the course of centuries, we have altered the landscape of the earth. Indeed, the word "scape,"present in the Germanic languages as *schaffen* (German), *skapen* (Norwegian), *schaffen/scheppen* (Dutch), indicates this: that which is scaped is created, but simultaneously allows for new possibilities to be realized. The German verb *schaffen* means roughly to accomplish something, or to make it. In Dutch, the conjugate verb *verschaffen* means to provide a possibility. The Norwegian verb *skapen* has the connotation of actively making something, of determining its shape. One would use the word to indicate a formative influence. In this word, the connection of form and possibility is already latent.

To scape or to form something is to shape it. But this relation is not unidirectional. The tool shapes its user in turn. Likewise, ideas shape our minds, hence recurring and formative mental schemata are *thought-shapers* (Hanna & Paans, 2021). Likewise, thoughts themselves are shaped by other thoughts, preconceptions or the templates through which our thoughts are schematized. Once more, we should not constrain our view too much here. To think is not merely to contemplate. As we have seen, practice, thought, and knowledge are intimately connected. To know is to practice.

Likewise, many forms of thinking occur in practice. They do not originate from some point in the mind as pure thoughts dislodged from physical reality. To conceive of thinking in this way traps us in what has been called *intellectualism*: the mistaken viewpoint which holds that thinking only happens in the head or brain. Try to explain that to the dancer, the musician, the painter, the architect. The hand, the feet, the body – they all think. One must, as Nietzsche put it, dance with concepts. Only then can one render them effective. If we mobilize concepts, knowledge becomes a field of action—no longer confined to the rigid, mechanistic taxonomy of the determining judgement, the concept undergoes an organic development—whereby it grows, develops and acquires depth. Hegel realized this, and once more tried to pin the concept down. But how immensely did the words fail him! Each notion had to be reworked, refined and put to new use. Yet, not through the word, but through the gesture, we can also investigate meaning, by tracing, drawing and actively (indeed, non-conceptually) embodying and enacting an idea. "The whole being of a gesture lies in what it says" contends H.G. Gadamer in his essay on image and gesture (Gadamer, 1998: p. 79). Indeed: the gesture is what it is, and yet, it is not tautological. In its visual presence, it points beyond itself to a reality that it does not directly represent, but of which it is a

part, and which, through it, shimmers through and reveals itself. The gesture is an entrance towards a mode of engagement, just like language. However, it allows for new engagements that surpass the scope of language, fully including the expressive and the non-conceptual. In so far as the gesture "says" something, it does not utilize spoken or written language – its presence suffices.

Notably architectural design provides multiple examples of such gradualist conceptual development, freely blending conceptual and non-conceptual contents. The architectural drawing leaves traces of a thinking process, but its tracing and exploring activity, acted out through the body on sketching paper or a digital screen, is a mode of *epistemic enactment* (Paans and Pasel 2020). Why is that line displayed this way rather than that? Why are these villages located in such-and-such a way? What is this strange ridge in the landscape? Such questions are explored and answered through the tip of the pen, the mobility of the hand, which feeds directly into the capacity for deliberative reasoning. Never was the connection between the head and the hand so intimate as in sketching.

The "handscape" is the environment of clues, affordances, hints, creative motives, and free associations that architectural designers develop once they start sketching. It represents the intimate connection between the body and the lived space it inhabits and creatively expands. Through the handscape, one learns to think with the hand and dance with the mind. In turn, this changes how we arrive at knowledge:

> Knowledge is not given to us in a sudden illumination of the mind; to know is to strive, to work. We learn that this chipped stone can serve to cut and to chop; that stone, blunted, can serve to grind.… Once we see what we can do with a broken branch, a chipped stone, a bone or steel knife, we figure out what falling rocks, streaming water, the roots of trees do by themselves. (Lingis, 2018: p. 448)

"Figuring out": the term itself speaks volumes. It is through *figuration* that knowledge assumes shape, and that we progress from hunch or intuition to proto-concept and clarity at last. Only through working, that is, acting, through the body, do we acquire knowledge. As Kant put it, through such activity, we pose questions to nature. We interrogate it, probe it and make our concerns felt. In return, we expect nature to respond—sometimes foolishly, as we presume we have a right to know. Nevertheless, we should also take the liberty of interpreting "nature" as physical reality in the broad sense, as became customary during the 19th century. It is through engagement and striving that we know. The demonstrative nature of knowledge so vividly depicted in the *Meno* is the basis for architectural design, and other forms of knowledge as well. What it demands is *attunement*—a refined sense of engagement with the subject matter. It demands a process of sensing, teasing out possibilities, trying different pathways, and thinking in different modalities.

2. Gestures Towards the Subject of Design

Over the past few decades, there has been a tendency in design literature to locate the locus of meaning-making *in* the objects or artefacts that emerge during such processes. Examples include the use of visual and/or spatial representations as spaces one could imaginatively inhabit (Zumthor, 2014); the role of creating variations and differentially exploring possibilities (Rittel, 2014; Rheinberger, 2008); the manner in which knowledge is embodied in artefacts (Ballestrem & Gasperoni, 2023); and the role that a certain "fuzziness" or "openness" plays in conceiving objects.

In the "object-focused" line of thinking, the artefact is treated as a physical focal point that directs, influences and aids decision-taking. When Donald Schön opened up the debate towards the social dimension surrounding artefacts, the focal point of the "conversation with the situation" was still the architectural sketch (Schön, 1983, 1992). More recent notions, for instance "epistemic dissonance" (Farias, 2013) still utilize a similar approach: Meanings are held to be "read into" artefacts, and so it is the act of "beholding" that drives the process of designing and deciding.

This line of thinking leads into two dead ends simultaneously:

First, it unwittingly accepts so-called "ocularcentrism," the predominantly Western notion whereby visual perception in the form of the glance (or the Platonic *eidos,* perhaps) is taken as the pinnacle of knowledge, and consequently techniques of "making visible" or "making explicit" assume center stage (Pallasmaa, 2012: pp. 18–22).

Second, in focusing on objects, there is a tendency to reconstruct the *processes of reasoning* that occurred when they were created. However, this has the—often unintended—consequence that any form of meaning-making is retrospectively reduced to deliberative reasoning or to the practice of logic more generally at the expense of lived, embodied experience.

The idea that understanding resides just in grasping theoretical concepts, or that the center of cognition merely resides in the head or brain, guided by logic, exemplifies the intellectualism and associated conceptualism inherited from the Enlightenment. Subsequently, these ideas found their way in the works from the first generation of researchers that laid the foundations for the post-World War Two developments in design theory (see, e.g., Asimow, 1962; Eastman, 1969; Simon, 1996). By and large, the logic-centered approach discounted the lived and experienced body, its mnemonic capacities, its haptic operation, its gestural capacities, and its proprioceptive, situated, oriented being in favor of abstract conceptualizing.

Given its emphasis on logic and conceptualism, the object-focused line of thinking owes a certain debt to philosophy of language and linguistic notions of meaning-making that were prevalent in architectural theory during the 1970s and 1980s: like a text, an artefact was held to be read or interpreted, and so, a variety of overlapping meanings emerge and enrich the artefact (Pirolli, 1992; Peréz-Goméz, 2007; Eisenmann, 1995; Knorr-Cetina, 2006; Rheinberger, 2005). We can easily detect the influence of notions like Derridean *différance* or hermeneutic theory in this line of thought. The underlying idea that meaning emerges through an ever-shifting play of interpretations has claimed a prominent place in the pantheon of design theory.

The recent move to regard architectural sketches as traces that can be read or interpreted afterwards places the emphasis mostly on the object or its production process (Krämer et al., 2016; Krämer, 2015, 2016). This direction of thought is clearly indebted to the idea that language-use is inherently performative. Likewise, it is also preoccupied with objects. But would it not be prudent to consider the "subject of design" as well? Every object has a subject, after all, even if we would like to integrate their relationship as much as possible.

In the next section, I introduce my overall argument by making four remarks, in order to provide a theoretical foundation for thinking about the links between gesture and meaning. In the fourth section, I introduce a case study in landscape architecture in which gestures played an important role in creating mimetic awareness. And in the fifth and concluding section, all the thematic lines are drawn together in a concise reflection.

3. Gestures as Agents of Change: Four Remarks

Drawing on the perspectives of (i) embodied cognition, (ii) architectural phenomenology, and (iii) gesture theory, I propose to shift the perspective temporarily away from the object-focused thinking. I do not imply that the object-focused perspective is somehow superfluous or useless. Instead, I intend to invoke a "subject-focused approach" in order to supplement it. Since we fully engage our biological, living bodies while designing, especially when sketching by hand and/or building models or prototypes, a significant part of the meaning-making process involves our *embodied cognition,* in particular our capability to use our hands in gesturing. Together, these gestures form a "handscape": a bodily anchored complex of affordances, understandings, and evocations broadly similar to what Marco Frascari has called "a genetic analysis which forms a continuation of the architectural imaginative act." (Frascari, 2009: 204).

The turn towards embodied cognition was largely, although not exclusively, initiated by Varela and Maturana (Varela & Maturana, 1980; Varela, Rosch, &

Thompson, 1991/2016; Gallagher 2005; Thompson, 2007; Hanna & Maiese, 2009;) and has been steadily developing ever since. Closely related to Gibson's ecological psychology (Gibson, 1966), it frames cognition as a fully embodied capacity, locating the mind not just in the head or brain, but in a network of sensory capacities, including the capacity to sense moods and atmospheres, pick up on perceptual clues, and to cognize through gesturing. Likewise, it was cemented in architectural theory due to the pioneering work of Pallasmaa (Pallasmaa, 2009, 2011) and Zumthor (Zumthor, 2014), thereby acquiring prominence as the "phenomenological approach" (see, e.g., Mallgrave & Goodman 2011: 201–214). And while we often – out of habit – speak about body *and* mind, we could equally well emphasize that we in fact are a *bodymind*—an integrated, organic unity, capable of intentional action (Kasulis, 2018).

With this in mind, we shift attention from the "object of design" to the "subject of design" (Carbon, 2016) to emphasize different aspects of what transpires when meaning is created through designing. In line with this intention, I suggest that the *gestures involved in drawing* may be read as epistemic operations all of their own, in the sense that they deepen understanding through gestural enactment. This enactment changes the designer in the process.

First, we must liberate ourselves from the assumption that gestures are mere embellishments of speech acts. Mental processes are externalized by two distinct modes of expression: speech and gesture. Gestures are distinct from speech, but they form an integral part of language (McNeil, 2005: p. 13). Because gestures are performed in a three-dimensional space, they are naturally closely allied to imagery. For instance, we may assert that "we would like to follow the natural contours of the slope in laying out the sidewalk," while tracing this spatial connection and slope angle with our hands, pulling it from the realm of verbally expressed concept into the realm of spatial orientation.

Second, gestures change the person making them. We touch the world, but our understanding of it is mediated and negotiated through words and gestures, utilizing them as probes or instruments (Flusser, 1994: pp. 49–52). They literally "in-form" the world. Flusser plays on the terms "inform" and "in-form", emphasizing that our understanding of the world is action-oriented, haptic, and dialectical (Flusser, 1994: p. 50). Hands in-form the world between them and shape our image of the world accordingly.

Flusser echoes the Kantian insight that: "[one] orients [one]self geographically only through a subjective ground of differentiation" (Kant, 2001: p. 9). We can here plausibly exchange "geographically" for "spatially." The very subjective ground of understanding is constituted by our bodies, through which we gesture, touch, and act on possibilities. Moreover, every act of thinking-through-making shapes thought-patterns and the foundational images and ideas that direct and inflect our thinking.

These foundational images influence our thinking, and they change and develop over time, leading to new (thought)-habits, preferences, and values (Hanna & Paans, 2021). Through practices of making, one can actively prime the mind to regard certain images or ideas as rich in meanings, allowing designers to gradually explore their own thinking. As Pallasmaa worked out in his study on the "thinking hand," gestures enable us to "fuse" to some degree with the subject matter that we investigate through tactile and haptic qualities (Pallasmaa, 2009).

The gestures in architectural designing are *invented gestures* (Kang and Tversky 2016). They belong not just to the category of movements that speakers use to communicate thoughts. Instead, they are deliberately *invented* for the purpose of working on a specific idea. They are unique, responsive and context-sensitive.

Such invented gestures indicate a "deep understanding": they are unique creations by individuals, used in the course of exploring and probing the space of possibilities. This is especially important because (landscape) designers deal often with dynamic systems, such as erosion pattern, agricultural cycles, water runoff, and developing settlement patterns. Gestures that "explain" or "highlight" how dynamic systems function over time and in conjunction exert important cognitive effects. One effect is that a person working gesturally with a dynamic system (say, in sketching its structure) develops the skill to explain the fundamental features to him or herself or to other parties (Kang & Tversky, 2016).

There is an intimate link between gesturing, language (see, e.g., Harrison, 2018) and procedural memory: that is, knowledge on how to perform certain actions (see, e.g., Klooster et al., 2016). Patients with impaired procedural memory experienced problems in learning from watching gestures or their own gestures, suggesting that "knowing-how" is activated and directed through bodily movement. Literally, to understand through the body, one must move:

> [The] spatial reality [of imaginative patterns] is such that they cannot be perceived. The patterns emerge in the form of imagined trajectories, moving lines of force, that a moving body draws in the process of moving, as when a dancer runs across stage, jumps in the air, and in landing, turns upstage and moves in a series of spirals downstage—or more simply, when we ourselves, in walking, turn a corner and proceed on our way down the different street. (Sheets-Johnston, 2013: 24)

To understand a spatial reality deeply, it must be actively created through lines of force—embodied projections in a three-dimensional space. The body draws the line through gesture and creates its own space, delineating and orienting itself in the world.

Third, resulting from the double tension between speech and gesture or word and image, a "growth point" emerges:

> A growth point [GP] … is a minimal unit of dialectic in which imagery and linguistic content are combined. A GP contains opposite semiotic modes of meaning capture—instantaneous, global, nonhierarchical imagery with temporally sequential, segmented, and hierarchical language. The GP is a unit with demonstrable self-binding power (attempts to disrupt it, for example, with delayed auditory feedback do not succeed), and the opposition of semiotic modes within it fuels the dialectic. (McNeil, 2005: p. 18)

Oppositions, tensions, fuzziness, sketchy lines, etc., invite a kind of playful speculation that shapes subject as much as object. Gesturing as sketching is not just embellishment, but a continuous "update of a speaker's cognitive state of being" (McNeil, 2005: p. 19) As Marco Frascari has argued in the context of architectural creation, the drawn line is the materialization of a sequence of cognitive states that shape thoughts and thinking habits alike (Frascari, 2009). In tracing an intricate or dynamic line, the gesture in its entirety is felt as a sequence of varying cognitive states, a kind of free hypothesizing, a playful, yet directed and inquisitive "what if?" question (Cocker, 2013).

Fourth, all this confirms a further finding from cognitive science: representations of objects are built out of systems of activations. During gesturing, the body actually creates and refers to perceptual symbol systems (PSS). Put concisely, PSS are layered neural traces that contain some of the motor information of the gesture that was being made in the attempt of working a thought or idea out (Goldin-Meadow, 2010: p. 665).

Sketching is a means by which thought is oriented towards an idea through gesturing and tracing. As such, it leaves neural traces (PSS) in the brain, opening a gestural connection to conceive something not (yet) imagined, but that operates via a non-intellectual pathway. It allows one to treat lines as if they were *processes* instead of static *depictions* or pieces in a logical puzzle. This brings an important cognitive change about: a re-ordering of one's "affective frame" (Hanna & Maiese, 2009: pp. 202, 230-237), or the way in which someone relegates certain visual aspects to the cognitive periphery while pulling others towards the center of cognition. This associative ordering is not random: It is importantly influenced by bodily states, including memories, feelings, emotions and affects. Literally, gestures change what we perceive and what we deem important or merely secondary. Even more poignantly, tool-use in general, including sketching, changes the conception of the body image, thereby altering one's own view of what one is bodily capable of (Martel et al., 2016).

4. From Landscape to Handscape

In this section, I illustrate some of the notions discussed previously by way of a case study. It concerns a "cloud of sketches" made during a single project that lasted around 18 months. The project goal was to provide a new landscape vision for the municipality of Beekdaelen in Dutch southern Limburg. The vision was considered as an "architectural agenda" that would address threats and developmental possibilities within the landscape. Topics included were agriculture, water management, tourism, residential quality, and natural development.

The problem we ran into was that the main themes relentlessly fused with one another. In this case, the geographical features of the landscape tied into our conceptual difficulties. The region of southern Limburg has unique geographical features, including hills and a natural network of small streams. During its agricultural development, a network of villages and traditional farms emerged in reciprocal relationships with these features.

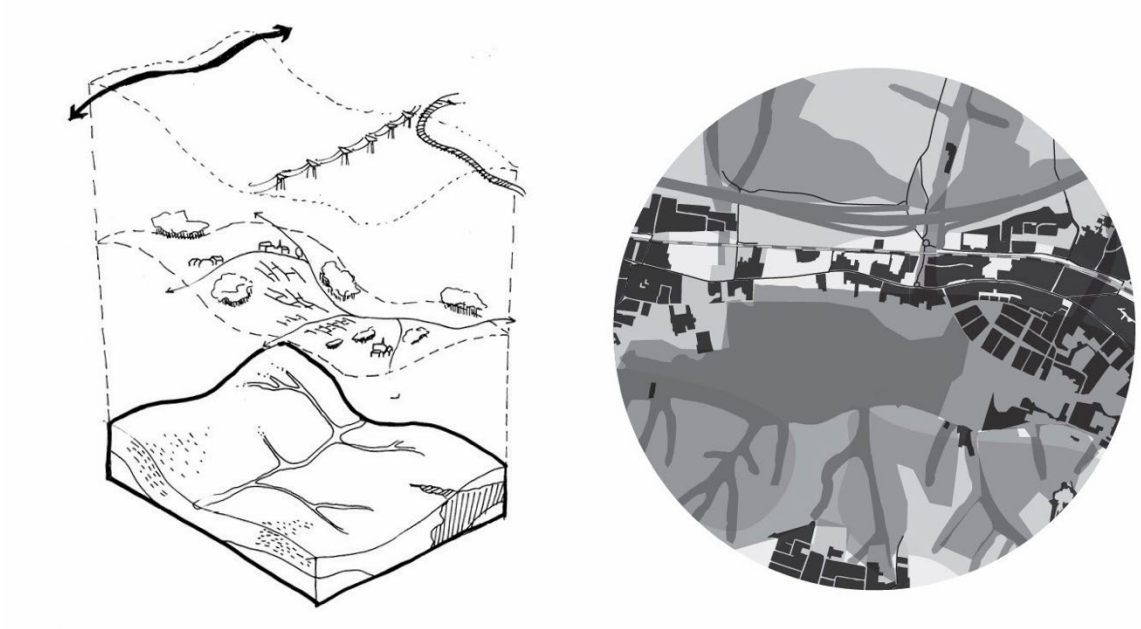

Figure 1: Isometric depiction of the main landscape systems and processes (left) and how it appears in GIS-data (right). (Author, 2022)

It took literally meters of sketch paper to present our strategic ideas to ourselves in ways that did justice to the fine-grained, interlinked and legally protected physical landscape features (fig. 1). The resulting sketches were often halfway products depicting (i) unfinished, quick design ideas, (ii) landscape structures with which they interacted and (iii) connections of an idea to adjacent themes.

An example of such a sketch concerned the relationship between the altitude, the resulting network of fine-grained streams and the traditional settlement pattern. Southern Limburg has long been an agricultural region, so small clusters of farms grew into villages. Since this process already started before medieval times, the villages were located within walking distance of one another. Larger farms, religious structures and family estates complete the settlement pattern. When tracing out these old, yet tangible structures, the first thing we noticed is that precision is absolutely necessary. One must acquire a bodily sensibility to the subtle twists and turns of the water network, just as one must acquire a feeling for how the old roads connect the villages and isolated structures. Nothing is coincidental—everything has a reason (fig. 2).

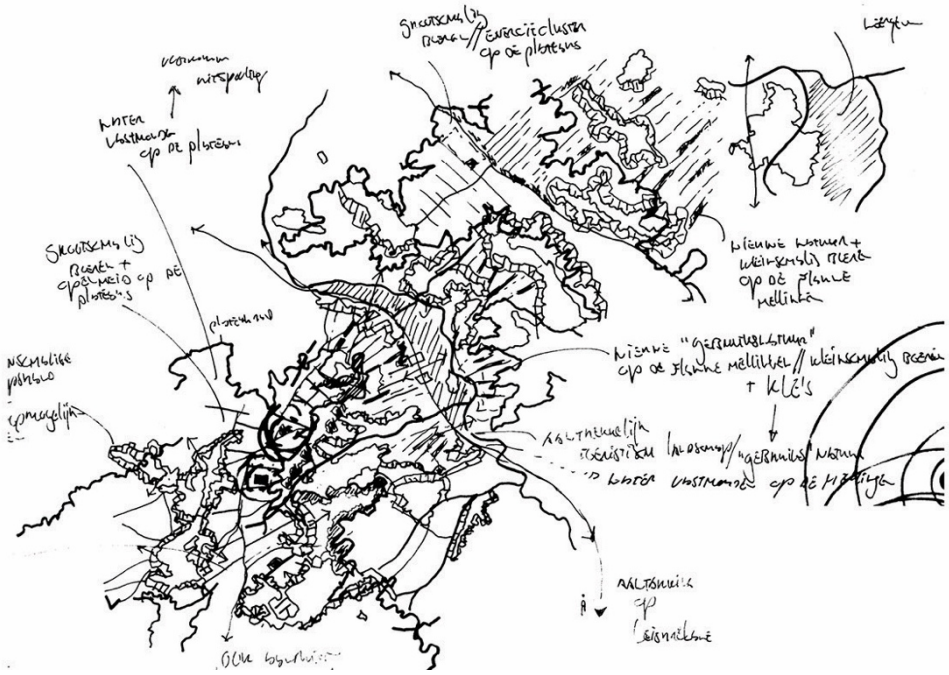

Figure 2: Tracing of multiple systems led to intricate drawings dealing with scale, subtle features and interconnections rather than analysis. (Author, 2022)

Through gesture, a newly developed sensibility or *cognitive attention* emerges from reproducing and superimposing existing patterns. The exact geographical data is also available in a GIS-format, but merely seeing it does not result in comprehension, let alone in intimate, felt knowledge. The key is that in the process of familiarizing with the contents and developing a sensibility, the body is gesturally, and not just cognitively, involved.

Likewise, the mind is also shaped by this practice. What appear as a series of coincidental features to the new onlooker, acquires meaning when seen through expert eyes. Deliberately shaping mind and body (or, we should say: bodymind), makes one look differently at the landscape. Through practice, a *Gestalt* shift takes place, and an initially unconnected series of features acquires shape, meaning and reason.

While the representational contents of the data and the tracing are largely identical, the process of interiorizing them in the body, and therefore establishing a sensible, felt and haptic relation with it unlocks a level of intimate knowing that exerts a very tangible effect on how the next design steps unfold (fig. 3).

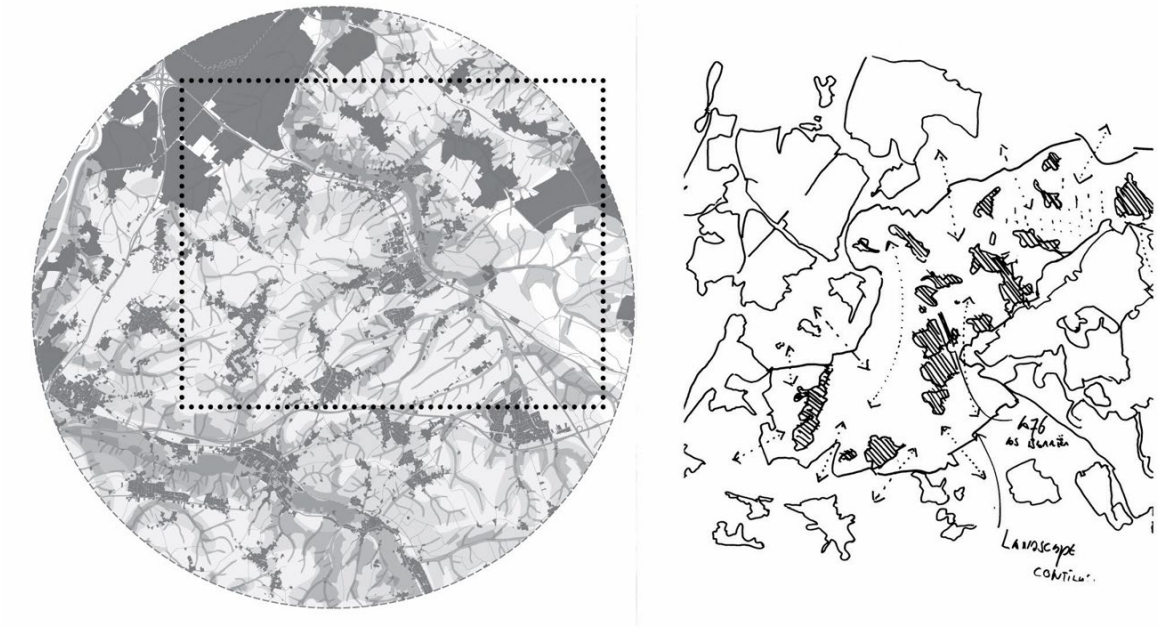

Figure 3: Multiple tracings are required for deep familiarization with the content. The dotted rectangle on the GIS drawing (left) corresponds to the area of the hand drawing (right). (Author, 2021)

Rather than absorbing contents informationally, it is drawn into being. It is "in-forming" rather than being informed. The full involvement of the body through gesture organizes knowledge. In doing so, it affectively frames meanings that emerge during the drawing process. The process-based character of gesturing and sketching re-creates, and mimics processes rather than looking at them. When investigating the natural flow of precipitation downhill, sketching and tracing the main streams recreates a real-life movement, and causes one to think through the landscape structures (fig. 4).

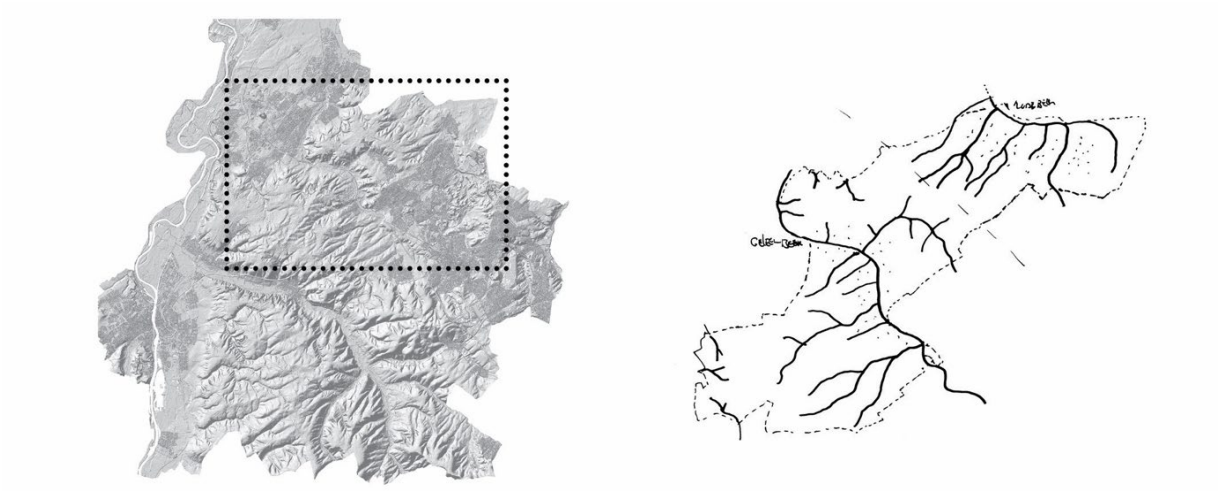

Figure 4: The subtlety and fragility of the vein-like water system (right) shows the underlying geomorphology (left). Mimetic awareness creates a deep understanding of the relation between geological features and water management. The dotted rectangle (left) corresponds to the area of the drawing. (Author, 2021)

One "fuses" with the behavior of the water through tracing its pathways and evoking a process that shapes the world emerging under the pen. In making such drawings and highlighting a single aspect, the processes occurring in the landscape acquire a rhyme and reason, as the relation between their unfolding and the physical features of the environment are drawn into the center of the affective frame.

5. Discussion: Mimetic Awareness and Meaning

The deep connections that shape the landscape were made gradually tangible by drawing multiple sketches in which we attempted to superimpose all layers. To create an image that is understandable, a lot of fine-turned drawing was required. No sweeping gestures, but instead a careful overlapping of layers, was needed in order to ensure that every element was readable as part of a larger, integral story. The gestural approach made it far easier to devise strategies that interacted with the features we had mapped out before. We easily built on the connections that we identified earlier, but now with an eye to solve recurrent problems like loss of biodiversity, drought, disappearance of small landscape elements or messy built-up village edges.

Gestures make it easier to ingrain knowledge about the interconnections that constitute landscapes. To our surprise, we found we had them cognitively "ready" when thinking about solutions to the systemic problems. Tracing out connections by hand stores the acquired information in the body, and so it becomes readily accessible while sketching. We customarily think of *information* as something to be obtained by viewing or reading, while we think of a *skill* as something to be acquired by practicing. Some information, however, is acquired only by doing.

I would suggest that gestural involvement in architectural design creates a *mimetic awareness*. It has been argued that architectural drawings are *non-mimetic* (Emmon, 2019: p. 192). That is, they are not aiming at the faithful visual reproduction of an object. However, in this case, mimetic quality played an indispensable role. Like the invented gesture, tracings and orderings resulted in a deep familiarization with the subject matter. Reproducing a pattern or landscape feature stimulates a thought process about the logic of what is gesturally experienced. Why are the twists and turns in the road *this* way rather than *that*? Why are these estates located *here* instead of *there*? This information is uncovered once one reconstructs these features with a certain mimetic acumen (fig. 5), as in this manner, anomalies and remarkable features quickly stand out, as the underlying structure discloses itself (Paans, 2022: pp. 12–31).

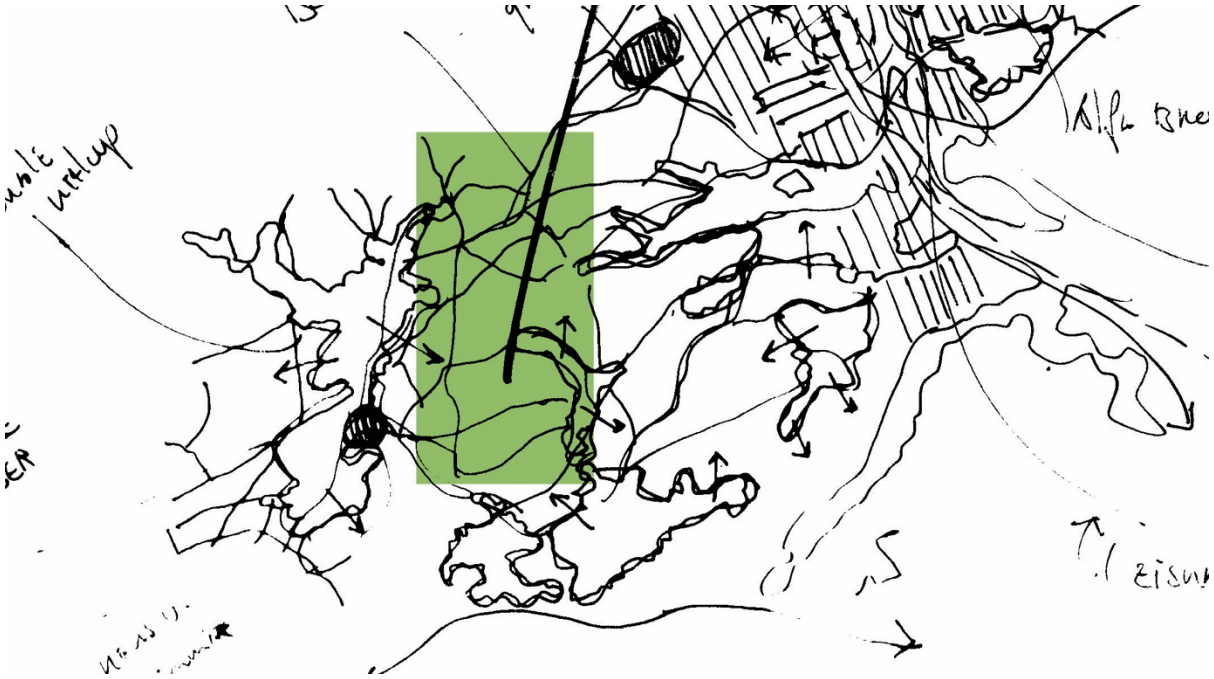

Figure 5: The highlighted area shows how intricate the road network is. Its twists and turns respond closely to geographic landscape features and functional demands alike. (Author, 2021)

In a theory titled the "cognition-action transduction hypothesis," Nathan proposed that repeated bodily actions lead to long-term, generalized learning (Nathan, 2017: p. 191). This may explain the relative cognitive ease with which we could navigate the complex of physical landscape features, issues, and solutions. The action of tracing is a bodily activity that stimulates a learning process in which spatial features are related, cohering in an increasingly meaningful whole. Meaning and comprehension emerges in a gestural process not just by receiving information, but by creating it. The handscape literally changes the mind, actively shaping its cognitive and affective pathways, and its procedural memory:

> Epistemologically, hypothesizing a reciprocal action-cognition system challenges deep-seated notions that place intellectual processes atop physical actions. There is a

> broad, societal bias favoring explicit, verbal ways of describing and assessing knowledge. (Nathan, 2017: p. 191)

Mimetic awareness aims not at visual imitation or verbal ways of description and assessment. Instead, through gesture, one becomes acquainted with the subtleties that underlie form and function. In sketching and tracing, this information is bodily stored for easy retrieval, but equally for changing thinking habits, thereby changing the designing subject as the line unfolds.

Here we find a link to the orientation of our embodied cognition. As a bipedal species with two eyes, we perceive depth, and intuit a clear up-down orientation (see, e.g., Koffka, 1936). These physical features enable us to situate our perceptual system and proprioceptively experienced body in an organized, oriented space of cognition. We can trace out a gesture space within the limits of our bodily capabilities. A sweeping architectural gesture or delicate line is not merely drawn as a way of visually representing an idea. Instead, it is bodily *acted out*.

Our perceptual field is never undisturbed or homogeneous (Koffka, 1936: pp. 281–282). If we gesture by means of drawing—by carefully tracing a line, or interacting with what we have already drawn—we deliberately disturb the tranquility of the perceptual field. If we do so on purpose, we re-orient the entire field, and consequently, we literally change our outlook on the subject matter. The "growth point" emerges due to these disturbances, and exactly there, the dialectic between gesture and thought unfolds. For architectural design, the drawn lines, and therefore the gestures, conjoin into a *graphesis*, or generative process of visual understanding (Frascari, 2009: p. 202).

A further point in this connection concerns precision: in a landscape where nothing is coincidental, and where searching for historical clues is necessary to make any proposed change appropriate and meaningful, the crucial thing to do is to train to body to achieve a heightened, mimetic awareness for features that might elude the innocent eye. Often, these innocuous clues provide fundamental motives to propose changes.

An example in this category is the relation between the angle of the hillsides and the run-off speed of precipitation. On a steep slope, water runs off quickly, dragging fertile soil with it and causing erosion, as well as flooding down the slope. However, steep slopes are often flanked by gentle slopes. Because the water reaches a lower speed on such slopes, it takes longer to traverse them. During that time, it is possible to "trap" the water in hedges, bushes or artificial cascades. Once we realized this possibility, it became the very basis for a new spatial order, in which shallow slopes were designated as areas where to add small landscape elements and reviving traditional visual features (fig. 6).

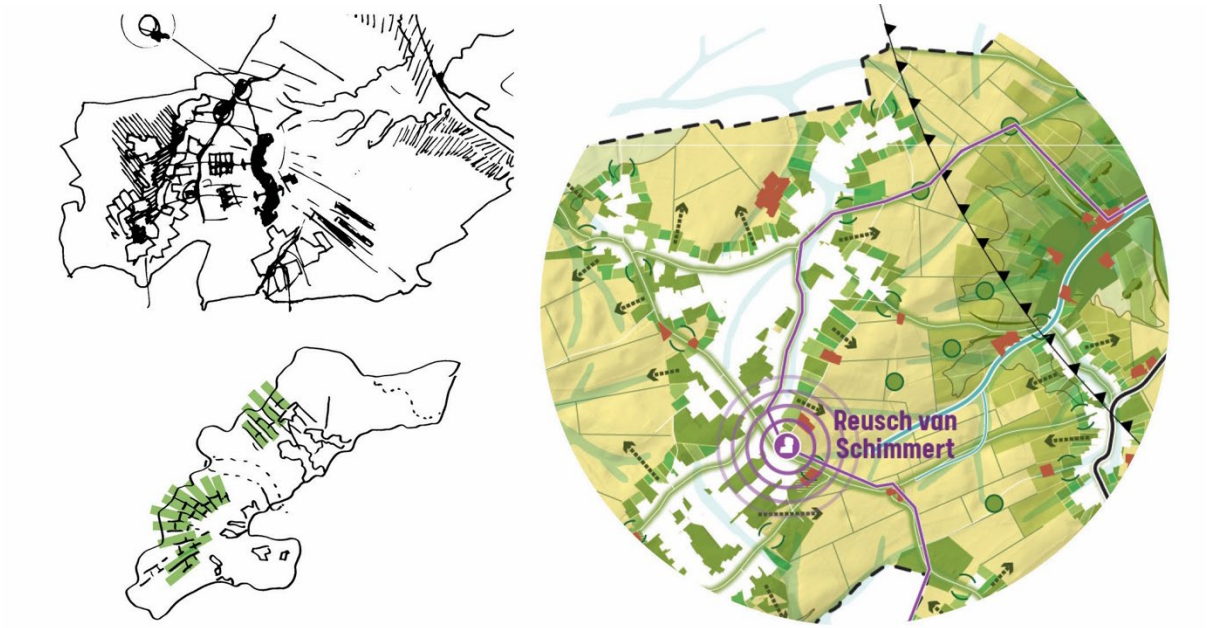

Figure 6: Two types of parcellation and their orientation (left, below), settlement patterns and road networks (left, top) considered with the altitude in mind. In the end, we proposed a new type of parcellation derived from characteristic features in the geomorphology and existing structures (right). (Author, 2022)

This insight made it possible to project into the landscape a new set of potentials, apprehending a possible order that was immanent in it, but that could be recognized only through a careful, mimetic, and above all, gesture-based form of engagement.

Gestures, as carriers of meaning, emerge within an integral sequence of thoughts, gestures, concepts and representations that is experienced as a more-or-less continuous tapestry of meaning. Each gesture is oriented towards action and the future (Gallagher, Martínez, & Gastelum, 2017). Simultaneously, the gesture already retains contents from former experiences. Through this in-forming dialectic, meaning emerges in the present through the interplay of past and future.

The epistemic process implied here progresses via a phenomenological, lived method for meaning-making. It is an unfolding of understanding, remembering and learning through gestures. Any concepts emerging from such a practice bear little resemblance to "concepts" in the sense of systematic abstractions. Sheets-Johnstone calls them "concrete concepts" or "corporeal concepts" (Sheets-Johnstone, 2010). Gesturing activates and embodies knowledge through bodily, lived experience, shaping thoughts, thinking habits, sensibility, and consequently one's creative space. Knowledge acquired through a gestural process possesses a phenomenological depth that far surpasses theoretical abstractions. It imbues newly acquired knowledge with a bodily, grounded, first-person aspect, thereby becoming *lived meaning* rather than dry fact. In this context, Haarmann has spoken of an "aesthetic epistemology": a way

of acquiring and evoking insights via an aesthetic rather than logic-based pathway (see, e.g., Haarmann, 2019; Root-Bernstein, 2002).

The design outcomes of a high level of mimetic awareness are not straightforwardly replicable across all contexts and cases, because much depends on the design skill of the individual, the changed plasticity of body, brain and mind, and the context in which they apply them. However, the efficacy of this method is generalizable as a skill. A competent piano teacher might teach all the techniques to students to foster performative excellence, but cannot expect that all students will turn into concert pianists. Yet, without providing these techniques, any chance of becoming highly skilled is forestalled from the very beginning. A similar case can be made with regard to mimetic awareness. Just like a feeling for composition, process control and aesthetic acumen, this skill exerts a diffuse, yet essential practical effect, diffusely influencing design competence for the better. This fact has three principal implications.

First, it has been established that gesturing while describing design features facilitates perspective-taking. (Mittelberg et al., 2017; Paans & Pasel, 2020). For instance, someone might—supported by gestures—describe the properties of their design to someone else, or they may describe it from a first-person perspective, or even from multiple perspectives. This way of gesturally "simulating" certain features of the design aids comprehension, as it engages with multiple embodied, perspectival and functional aspects of the design proposal. In turn, this deepened understanding changes the designing subject, as they come to grips with what their decisions entail.

Second, gesturing, like sketching, transfers mental contents (thoughts, notions, ideas, etc.) from the mental realm into the realm of semantic content. So, fluid and open ideas are (partially) materially fixed and become thereby the object of (collective) inquiry. Through such translation, implicit ideas, assumptions, or tacitly accepted notions often come to light, as well as anomalies, underlying patterns or inconsistencies. By visually and gesturally "working through" the material, the process of mimetic awareness gradually progresses, as formerly subconscious mental contents are drawn into the conscious domain, thereby fully assimilating themselves in the body's repertoire of awareness.

Conveying the development of awareness presents challenges, but also inviting opportunities for engaging in auto-ethnography, or first-person reporting of design experiences (see, e.g., Schouwenberg & Kaethler, 2021). By describing, analyzing, and carefully reflecting on how the interplay of gesture, thought, and drawing aids comprehension, embodied experiences that are otherwise hard to communicate can be made intelligible. This practice is irreducibly and irrevocably subjective, but we might consider this an obvious advantage: who other than the persons themselves can better describe the process of understanding that unfolds in and through them?

Working through gestures situates knowledge through a familiarization that is thoroughly context-bound. In Southern Limburg, the geomorphology is a determining factor underneath a variety of landscape processes. It influences water run-off, the distribution of vegetation, erosion patterns, spatial contrasts, and microclimate. In abstracting these features and surgically tracing them out, one acquires a bodily sensibility that is layered, yet not fragmentary; context-sensitive, yet also largely generalizable; local, but also amenable to various scale levels. Walking through the landscape one has traced out once, it begets depth, relationality, and a logic all its own. It becomes active and organic rather than abstract and purely visual.

Third, such creative, embodied practices change and shape the bodymind. They cultivate an awareness to the fineness of grain, the interconnectedness, the multiple actors at work in the world and the processual nature of reality. In short, these practices allow for connecting to the world in different ways, tapping in to the full range of interactions (physical, gestural, haptic, emotive, intellectual) that the embodied being is capable of. Once the entire bodymind is activated in this manner, we organize our perceptions and concepts differently, leading to a deeper appreciation and valuation of reality itself. They appear against the background of a new horizon. In turn, this allows for our perception of reality to undergo a *Gestalt* shift itself, which we have called *creative piety* (Hanna and Paans, 2022). Through practice, appreciation, engagement and humility, one can alter one's perception of the world.

This has a particularly important consequence: through this practice, one can construct a new transcendental viewpoint from which to regard the world with "new eyes". By now, however, we should realize that even this way of speaking is misleading – it is once more ocularcentrism at work. A better way of putting this point is to say that we learn to grasp the world again, caressing its contours and shaping them. Our embeddedness becomes active, and not just a kind of Heideggerian and tragic thrownness. And once we are ready to assume an active role in shaping the world, we can choose to do so in a moral way, by assuming our role as citizens of the cosmos.

6. Conclusion

Only through corporeal entanglement with the subject matter can the embodied mind acquire and actively "hand-scape" the sharpness, sensitivity, and acumen required to judge whether a given design proposal is effective or desirable. This knowledge is acquired through a phenomenological pathway and is deep, layered and meaning-laden. There is a single phrase by Pallasmaa in his study on the thinking hand that catches it with breathtaking precision: the new, he says, "continuously emerges" under our hands (Pallasmaa, 2009). And, we should add, under the inquisitive tip of the pen as well.

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