

From Semper to Phenomenology: Making and Tacit Knowledge Acquisition in a Beginning Design Studio for Graduate Students

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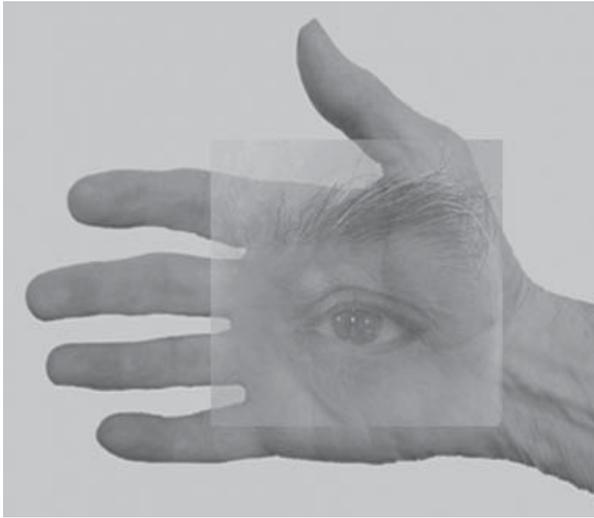


Fig. 1. From hand to eye tacit transference (after El Lissitzky).

Over the past several years considerable attention has been focused on “making” in architecture. During that time, I have not found a convincing argument that explains the relationships between body, behavior and knowledge not to speak of the more difficult questions about those between action, the imagination and intuition. In this paper, I draw on recent research and theories to begin to lay the groundwork for a coherent argument in support of making as an important form of education in architecture. While this is only a piece of a much larger puzzle, it seems to suggest other extended arguments to map out the other more problematic relationships.

I am interested, for example, in the way in which the knowledge that arises from the experience of the hand is transferred to the eye. The two interact: visual interest is modified by experience.

Drawing and building, for example, contribute to the shaping of the “desire of eyes,” to use Le Corbusier’s phrase, although his argument is that it is mathematics or calculation and economy of means that emerges in a new and modern way of seeing.¹ How do we explain this transfer from the hand to the eye or, more broadly, from the body to the mind and the other senses? What are the relationships between sense perception, knowledge, and imagination?

Before addressing some of these questions, however, let me first give you an overview of the studio I have been teaching for the past few years to beginning design graduate students in our 3.5 year program. The broad objectives of this studio are to introduce students to studio culture, work ethic, discipline, and teamwork. In addition, the studio is intended to develop the students’ already nascent constructive imagination, i.e., the imaginative engagement with basic construction principles such as in layering and repetition in linear construction systems and molding and casting liquid materials. The more specific pedagogical objective, and the one that I will address in this paper, has to do with the relationships between the body and mind, the other senses, and the imagination, a complex array of entanglements that are somewhat organized around the concept of tacit knowledge. The studio is designed on three levels: 1) skill building in model making materials and assembly which is the basis for an understanding of the “phenomenology of making”; 2) correlations between skill building exercises and full-scale building materials and construction techniques; 3) both are set against a background historical trajectory from the late nineteenth-century proto-modernist theories of the origins of architecture by Gottfried Semper to the late twentieth-century

phenomenological theories of site, tectonics, details, and the bodily experiences of orientation and sense. It is my assumption that the history/theory background forms the context for the acquisition of knowledge and skills related to materials and construction practices.

The first half of the semester is based on Semper's theory that separates building into stereotomic foundation, tectonic framework, and skin. This lays the groundwork for an understanding of modernism. As Kenneth Frampton argues in *Studies in Tectonic Culture*, Semper's theories preceded modernism and became a harbinger of later arguments about structural expression, the separation of structure and skin as in the curtain wall, and economy of means.² The first eight weeks are devoted primarily to skill building exercises intended to introduce some of the various modeling skills and principles necessary for successful studio production and for the exploration of the students' "constructive imagination" and intuition concerning construction practices. Students read Frampton on Semper and Frampton and Frascari on detail.³

During this time, the students are given three exercises that afford the opportunity for thought and discussion about making and building, historical/theoretical interpretations of the acts of making/building as the basis for architecture, and the practices and processes in working with liquid, plastic, and stick materials. These exercises include tutorials in hydrocal and casting/mold-making, basswood and tectonic construction, plastics/acrylics and sheathing, and wire soldering. Each of these exercises explores the material and spatial qualities of major building elements, their interrelationships, and their relationships to site (an artificial site made of a steel beam and two "c" channels on horses). Modeling exercises also make it possible to discuss questions concerning representation and, more importantly, correspondences between the construction of models and the construction of buildings.

Project I, *Foundation*, focuses on foundations, "earthworks," and stereotomics as both form and concept, and on the process and spatial ramifications of molding and casting.

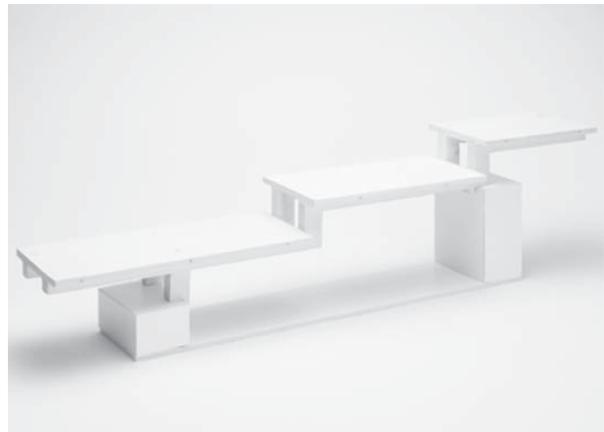


Fig. 2: making, William Helm.

Fig. 3: foundation, William Helm.

Project II, *Framework*, or tectonics, continues the investigation into space-making through the construction of tectonic frameworks. Students concentrate on interpretations of light frame wood construction techniques as a means of designing floors, walls, and roofs, using their foundations as a base.

Project III, *Skin*, asks students to use acrylic/plastic materials to sheathe their evolving designs, continuing to explore the spatial logic of the first two exercises.

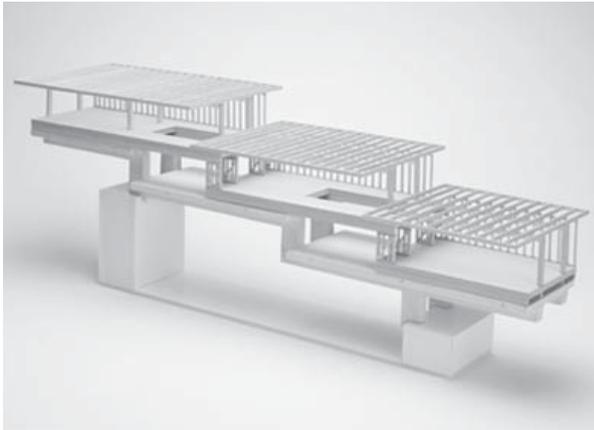


Fig. 4: framework, William Helm.
Fig. 5: skin, William Helm.

The second half of the term extended the exploration of tacit knowing to an explicit investigation of phenomenology. As an important late twentieth-century paradigm, phenomenology has had a significant impact on architecture in the last thirty years, especially on architects' attitudes towards construction, tectonics, and the role of the detail (Frasconi, Gregotti, Frampton) and site (Norberg-Schulz, Frampton, Pallasmaa, to name only a few).⁴ Students read Frampton, Norberg-Schulz, and Pallasmaa on the phenomenology of detail, site, and the bodily experiences of light and shadow, materials, and tectonics.

The Final Project, "*Genius Loci*," asked students to move from the abstractions of the first three assignments to the "concrete" experience of a lake-side site on the outskirts of a major city. A simple building program, "House," makes it possible to advance model and building skills and knowledge while also enhancing students' understanding of architecture in contemporary terms through discussions of the cultural and psycho-social issues associated with domestic life.

For the final project, students were asked to construct a site model at $\frac{1}{4}'' = 1'-0''$ scale and to work as a team to construct the model. Questions of representation arise not only in relationship to models and real buildings as in the first three ex-

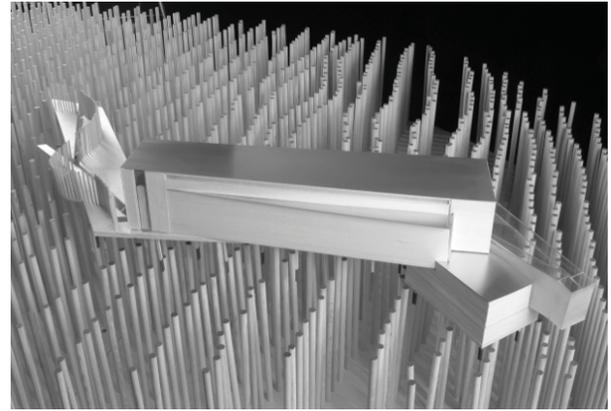


Fig. 6: house, Joseph Carline.

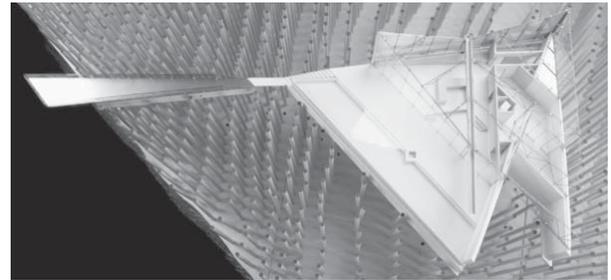


Fig. 7: house, William Helm.

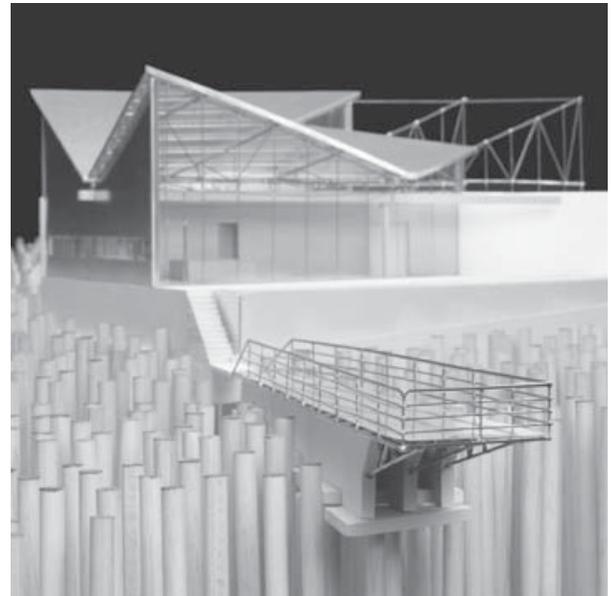


Fig. 8: house, William Helm.

ercises, but also the reverse in the construction of a site model. After visiting the site and recording their phenomenological experiences, students assembled site plans and contour maps to aid them in building the site model.

Now to the questions concerning the impact of making on visual perception and the imagination. My primary source in developing this pedagogy are arguments that ground the popular concept of making and knowledge acquisition in broader concepts of embodiment, in particular, the ideas that Michael Polanyi has developed over the years in relation to his concept of tacit knowledge. The term "tacit" comes from the Latin *tacitus* 'silent', from *tacere* 'to be silent'. The idea of tacit knowledge is understood as implied without being stated.

One of the fundamental assumptions in making is that the sensed conditions of direct experience and the knowledge accrued by means of bodily engagement are assimilated as tacit, implicit, and ineffable. Tools become extensions of our bodies, forms of prosthesis that extend outward the points at which we make contact with the things outside ourselves. These experiences make them part of us; they are incorporated or interiorized. As Michael Polanyi has indicated, "We pour ourselves out into them and assimilate them as parts of our own existence."⁵ This sets up a dynamic spatial model of perception that also assists us in drawing correspondences with theories of empathy and projection that I will touch on at the end of my paper. Let me first describe the basic tenets of Polanyi's assertions.

The first major assertion is that our attention in the acquisition of skills moves from what he calls focal to subsidiary.

"When we use a hammer to drive in a nail, we attend to both the nail and hammer, *but in a different way*. . . The difference may be stated by saying that the ['feelings in our palm and the fingers that hold the hammer'] . . . are not, like the nail, objects of our attention, but instruments of it. They are not watched in themselves; we watch something else while keeping intensely aware of them. I have a *subsidiary awareness* of the feeling in the palm of my hand which is merged into my *focal awareness* of my driving in the nail."⁶

"The physical experience of the hammer becomes subsidiary to our focal attention to the nail and the fingers and thumb usually associated with this activity, a process also referred to by physiologists as subception."⁷



Fig. 9. Acquiring tacit knowledge.

As a result of this observation, Polanyi concludes that the hammer becomes a part of our body; it is incorporated and our sense of our body extends to include it. He describes this spatially in his later book, *The Tacit Dimension*: "in an act of tacit knowing we *attend from* something for attending *to* something else; namely, *from* the first term *to* the second term of the tacit relation. In many ways the first term of this relation will prove to be nearer to us, the second further away from us."⁸

His earlier characterization of this experience is that "we shift outwards the points at which we make contact with the things that we observe as objects outside ourselves."⁹ Later, he would characterize this as an "expanding" of the body outward into the world:

"Because our body is involved in the perception of objects, it participates thereby in our knowing of all other things outside. Moreover, we keep expanding our body into the world, by assimilating to it sets of particulars which we integrate into reasonable entities. Thus do we form, intellectually and practically, an interpreted universe populated by entities, the particulars of which we have interiorized for the sake of comprehending their meaning in the shape of coherent entities."¹⁰

The movement outward initiates a spatial model of dynamic perceptual experience in which we, or our sense of our body, expand to integrate the objects we encounter: hammer, pencil, pen, X-acto blade, etc.. This outward movement is consistent with other theories, such as those of The-

odor Lipps (empathy [*einführung*]), Elaine Scarry (making), and, more broadly, Sigmund Freud (projection).¹¹ In addition, it bears some similarities with Lacan's and Foucault's use of the mirror metaphor in which the self is split into image and body, here and there, etc. Although I cannot expand on these in this paper, I discuss these architectural spatializations in other publications to which I would refer you.¹²

In describing the expanding body, Polanyi also raises the second important point about his spatialization, i.e., interiorization. This is already evident in the subsidiarization of attention that takes place in the integration of the experiences associated with objects outside our bodies.¹³ By this he means that when we move our attention from the body to the object, making the object the focus of attention and the bodily experiences subsidiary, we interiorize the physical experiences to which we are not attending.¹⁴ Thus, Polanyi's theory contains a double movement in which we gain knowledge by directly engaging the world and extending our body into it, an act, and the learning that comes with it, that also are internalized.

The concept of interiorization is important for many reasons, most importantly in this context for the fact that it provides the means by which bodily experiences are transferred between the senses, such as the experience of the hand to the eye: "the way we see an object is determined by our awareness of certain efforts inside our body. . . ."¹⁵ I have explored some of the questions associated with the bodily impact on visual perception elsewhere focusing more specifically on Le Corbusier's "desire of our eyes" as a characterization of this condition.¹⁶

The process of internalization affects not only the senses but also the ways in which we think: "tacit thought forms an indispensable part of all knowledge. . . ."¹⁷

"the structure of tacit knowing. . . shows that all thought contains components of which we are subsidiarily aware in the focal content of our thinking, and that all thought dwells in its subsidiaries, as if they were parts of our body. Hence thinking is not only necessarily intentional as Brentano has taught: it is also necessarily fraught with the roots that it embodies."¹⁸

It follows from these observations, that all knowledge contains our tacit understanding of the body's engagement with the objects of the world. "This endorsement of our native powers of making sense of our experience according to our own standards of rationality should also make it possible for us to acknowledge the ubiquitous contributions made by sense perception to the tacit components of articulate knowledge."¹⁹

And, finally, the process of internalization reaches the unconscious.²⁰

This movement outward and inward informs and transforms our senses, our ways of knowing, and, further, our ways of making sense of the world, our beliefs, values, ideas, and even our sense of truth.

"A transition takes place here from a heuristic act to the routine teaching and learning of its results, and eventually to the mere holding of these as known and true, in the course of which the personal participation of the knower is altogether transformed. . . . Personal participation changes from an impetuous pouring out of oneself into channels of untried assumptions, into a confident holding of certain conclusions as part of one's interpretive framework. The driving power of originality is reduced to a static personal polarization of knowledge; the intellectual effort which led to discovery and guided its verification is transformed into the force of a conviction which holds it to be true – in exactly the same way as the effort of acquiring a skill is transformed into a sense of its mastery."²¹

The experience of the hand, therefore, transforms the desire of our eyes, our visual perception, our constructive imagination, and our aesthetic interests.

In the studio I described above, we assume that the experience in making models as well as 'real' construction instructs the students' "constructive imagination." The act of making -- the weight, strength, and capabilities of materials, linear and liquid, and the tools and processes associated with them -- become a part of our visual interests. These experiences begin to transform the ways in which students attend to architectural works. Through tacit knowledge we begin to map out a

network of relationships between the hand, the eye, and the imagination.

ENDNOTES

1. Le Corbusier, *Towards a New Architecture* (New York: Dover Publications, 1986).
2. Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge: MIT Press, 1995). Note that I am using Kenneth Frampton's interpretation in this context, although it should be pointed out that Semper was also interested in the symbolism that carries over from original tectonic interests to other materials which are designed to emulate the visual conditions created in the original construction, it is uncertain whether Semper extended his theory to the same cosmological dimensions that Frampton does.
3. Frampton, *Studies in Tectonic Culture*, 4-8, 85-91; Marco Frascari, "The Tell-The-Tale Detail," in Kate Nesbitt, ed., *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory, 1965-1995*, (New York: Princeton Architectural Press, 1996), 500-514.
4. All Readings are from Kate Nesbitt, *Theorizing a New Agenda for Architecture*: Marco Frascari, "The Tell-The-Tale Detail," 500-514; Vittorio Gregotti, "The Exercise of Detailing," 494-497; Kenneth Frampton, "Rappel à l'ordre, the Case for the Tectonic," 518-528; Christian Norberg-Schulz, "The Phenomenon of Place," 414-428; Kenneth Frampton, "On Reading Heidegger," 442-446; Juhani Pallasmaa, "The Geometry of Feeling: A Look at the Phenomenology of Architecture," 448-453.
5. Michael Polanyi, *Personal Knowledge* (Chicago: University of Chicago Press, 1962), 59.
6. *Ibid.*, 55.
7. Michael Polanyi, *The Tacit Dimension* (New York: Doubleday, 1966), 7.
8. *Ibid.*, 10.
9. Polanyi, *Personal Knowledge*, 59
10. Polanyi, *Tacit Dimension*, 29.
11. Theodor Lipps's work was based on Wilhelm Worringer, *Abstraction and Empathy: A Contribution to the Psychology of Style*, trans. Michael Bullock (New York: Meridian Books, 1967); for my work on Sigmund Freud, see English, H. and A. English, *Comprehensive Dictionary of Psychological and Psychoanalytical Terms: A Guide to Usage* (New York: David McKay, 1958) and J. S. Grotstein, *Splitting and Projective Identification* (New York: Jason Aronson, 1981), 123 ff; Elaine Scarry *The Body in Pain: The Making and Unmaking of the World* (New York: Oxford University Press, 1987).
12. Jean La Marche, *The Familiar and the Unfamiliar in Twentieth Century Architecture* (Champaign-Urbana: University of Illinois Press, 2003).
13. Polanyi, *Tacit Dimension*, 18.
14. *Ibid.*, 24.
15. *Ibid.*, 12.
16. Jean La Marche, *Self and Surface: The Mirror of Architecture* (Berkeley: University of California at Berkeley Person-Environment Theory Series; Center for Environmental Design Research, 1993) and *Desire of Our Eyes* (Berkeley: University of California at Berkeley Person-Environment Theory Series; Center for Environmental Design Research, 1992).
17. Polanyi, *Tacit Dimension*, 20.
18. *Ibid.*, x.
19. Polanyi, *Personal Knowledge*, 98.
20. *Ibid.*, 61-2. Arthur S. Reber concurs. In his book, *Implicit Learning and Tacit Knowledge: An Essay on the Cognitive Unconscious* (New York: Oxford University Press, 1996), Reber discusses the cognitive unconscious, including and especially focusing on the problem of implicit learning, the acquisition of knowledge that takes place independently of the conscious attempts to learn and largely in the absence of explicit knowledge about what was acquired.
21. *Ibid.*, 172.