

MOTH WING SCREEN

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ABSTRACT

Inspired by contemporary Nordic design—characterized by fluidity of form, material innovation, tactile warmth, natural reference, and ties to a strong craft tradition—the Moth Wing Screen is a modular partition and design research project. The following essay describes the work’s goals and origins, beginning with first person reflections by the author on the sensory and tactile lessons of water skiing, a formative childhood preoccupation. Paired with excerpts from essays on seeing, drawing, and sensing by Juhani Pallasmaa, these reflections frame the discussion and provide a means of viewing the work through a lens of tactile warmth and softness. A description of the project follows, alongside drawings, diagrams, prototypes, and illustrative examples from the work of Alvar Aalto, Finn Juhl, Tapio Wirkkala, and others. The project and its description argue in favor of creating a role for softness in modern design, with softness defined in terms of form, surface, density, materiality and meaning. The Design Case Paper format provides a rare opportunity to present the project’s conceptual underpinnings—in the form of a formal paper presentation—alongside an exhibit of prototypes, original drawings, and the built artifact.

ORIGINS

An excess of childhood is the germ of a poem. (Bachelard 1971: 100)

Growing up, I spent summers with my family on a wooded lake in the northern part of the United States, in rural Michigan. My friends and I rode bikes and played sports. We made up games and waited for the sun to burn the dew from the grass, anxious for the warm part of the day, because whenever possible, we spent our time in and on the water.

Most families on the lake had boats, and among the many shapes and profiles I had a favorite. Made of wood, it rode low at idle, thrumming with power and poise like a predatory animal, able to spring to the surface and roar off with a thrust of foam and spray of water. Its deep glossy finish seemed inspired by the flashing, enigmatic surface of the lake itself, and I imagined its curved wood sides—like the body of a cello—amplifying the throaty resonant power of its inboard engine. It was a ski boat, able to pull a dozen skiers at once. But my favorite spectacle was to see it pull a single skier at twilight, the skier weaving a graceful sinuous pattern back and forth across the boat’s wake, trailing a silver curtain at each turn, the startled, hovering water filled with the day’s last light.

In time I also learned to ski, working through the awkward initial stages, gaining confidence and developing a feel for the water. Water skiing is a balance of opposing forces—the push of the water against the pull of the tow rope—translated through the body of the skier. It involves rhythm and anticipation, the skier at times moving twice the speed of the boat, at other times nearly stopping, sinking momentarily in the pivot of a turn as the boat gathers slack in the rope and moves ahead.



Figure 1. Skiing at twilight: water at its softest

When I was eleven or twelve, I saved money and bought a ski of my own. Unable to afford something new, I bought a used wood ski from a neighbor, its finish peeling, its rubber bindings cracked, outmoded, short, and stiff. I worked that winter to strip its finish, removing the old fin and bindings, and subtly (or so I imagined) shaping its bottom surface and rails to improve its performance. The ski was made from three narrow strips of wood, two symmetrical dark lengths surrounding a light wood center. When I bought the ski, I liked this feature; I found it attractive. When I began stripping and sanding the ski, I realized there was more to it: the light colored wood at the center (probably ash, in retrospect) was harder; more difficult to sand, and stiffer. The many hours I spent, carefully sanding the ski by hand, working incrementally up through the numbers from course to fine grit sandpaper, were also hours spent daydreaming, imagining myself skiing, practicing technique in my head, and reading ad copy from ski catalogs. I did my best to duplicate the form of skis I saw in magazines.

In subsequent summers I skied at every opportunity, any time of day. If someone would pull me, I'd ski; whether it was windy or still, sunny, or raining. Through its flex, slice, and bounce, I felt the many states of water. Water is fluid and forgiving, but as anyone who's done a belly flop knows, it can also be hard enough to leave one breathless.



Figure 2. Developing a feel for water

Done correctly, a skier's anticipation, balance, and movement create the appearance of fluid, continuous motion, but the reality is a series of disjointed, singular

sensations. The water, as sensed through the ski, feet, legs, and body, feels different at each stage and under every unique condition. On a windy day, the water surface is a staccato slap, slap, slap. Crossing the boat's wake is a jackhammer to the senses. Accelerating out into smooth clean water on a calm day or at twilight, the surface is so velvety smooth the ski hums, practically purrs beneath one's feet.

A SENSE OF SOFTNESS

Naturally, these sensations and tactile memories live inside my consciousness. There is more similarity between carving a tight, smooth slalom turn on a water ski at thirty miles an hour and sanding a shallow depression into the surface of a piece of wood than one might imagine. Both acts require complex body movements, real-time judgments and adjustments translated through what Finnish architect Juhani Pallasmaa has called the skin of the self. In his essay, *The Thinking Hand*, he writes:

Our contact with the world takes place through the skin of the self by means of specialized parts of our enveloping membrane. All the senses, including vision, are extensions of the tactile sense; the senses are specializations of skin tissue, and all sensory experiences are modes of touching, and thus related to tactility. (Pallasmaa 2009: 100)

The preoccupations of my youth continue to inform my sensibility as an architect today. My preferences are tied indelibly to countless physical/mental experiences and tactile sensations. Like my favorite wooden ski boat from childhood, certain works and genres resonate. Reading again from *The Thinking Hand*:

When entering the extraordinary space of the marble-paved courtyard at the Salk Institute...by Louis Kahn,...I felt immediately compelled to walk to the nearest concrete wall surface and sense its temperature; the suggestion of silk and live skin was overpowering. Louis Kahn actually sought the grey softness of 'the wings of a moth' and added volcanic ash to the concrete mix in order to achieve this extraordinary inviting matte softness. (Pallasmaa 2009: 103)

Pallasmaa's sense of softness in Louis Kahn's concrete recalls the title of Peter Høeg's 1992 novel, *Smilla's Sense of Snow*. The title refers to the lead character's capacity to see beyond the surface of a mysterious case, to sense something sinister in what others perceive to be nothing more than a set of footprints in the snow. Her background and training allow her to see connections, to intuit deeper meaning, to see what lies beneath the obvious surface. Likewise, Pallasmaa's sense of tactile vision tells him something extra-sensory: beyond what we know empirically about the hardness of concrete,

Kahn's careful treatment yields a surface that feels soft like silk, live skin, or the wings of a moth.

MOTH WING SCREEN

Inspired by this passage, I have undertaken a small research project examining the nature of softness, paying careful attention to several ways an object can be perceived as soft: based on form, surface, density, materiality, or meaning. Called the Moth Wing Screen, it consists of ten modular translucent resin blocks attached to a rigid steel frame. The blocks, though rectilinear in profile, have fluid, undulating surfaces (see figure 6).

Taken as a whole, the ridges and hollows recall natural forms sculpted slowly by the effects of time and weather. Like boulders in the stream behind my house, for example, the blocks are literally hard, but visually soft. Daily, I observe the various pathways traced by water, down through cracks and fissures in these boulders, carving deep channels in places, producing broad, smoothly curving hollows in others. The Moth Wing blocks benefit from these observations.

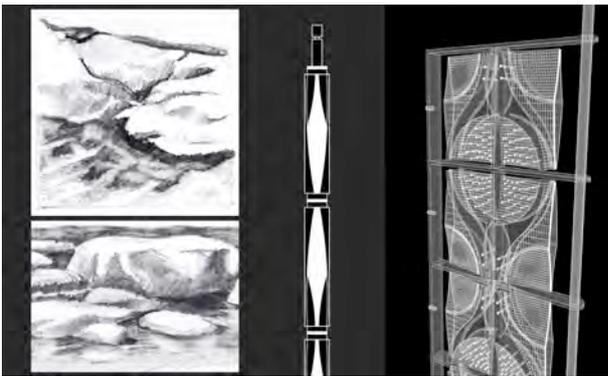


Figure 3. Boulder sketches and details, *Moth Wing Screen*

In addition to being a vehicle for studying softness, the screen has a functional role as well. Designed to add definition, privacy, and elegance at the entry to my house, the proportions and rhythms of the Moth Wing Screen match an adjacent set of glazed wood doors.



Figure 4. *Moth Wing Screen*, elevation in context

The screen is a hospitable gesture, designed to soften the act of arrival, placed to accommodate the gracious reception of visitors arriving from the porch. Its translucency and radiating hole patterns provide a veiled glimpse beyond the entry, through to the living spaces beyond.

Early studies for the screen were more directly derivative of wing forms, or scales, leading me to research a number of other modular room dividers and privacy screens, including Airflake, by Stefan Borselius (See figure 7). Airflake, made of molded polyester fiber and a laminated textile surface, attaches to a wall or hangs like a curtain, making a delicate edge within a space, softening a room visually and acoustically through a thoughtful balance of solid and void. Its elegantly simple geometry creates a rich pattern of secondary circular figures. These characteristics inspired a productive tangent and a new direction for the Moth Wing Screen.

Looking more closely at patterns and profiles of moths' wings, I noticed the spots some species have evolved as protection from predators. It occurred to me these "eye" spots could inspire a strategy for composing bolt holes and points of connection. As a result, exposed connections create a symmetrical pattern in the assembled screen, each resin block bolted through the thick portion near its center. The joint, thus articulated, recalls the delicate, tapered connection between a moth's wing and torso.

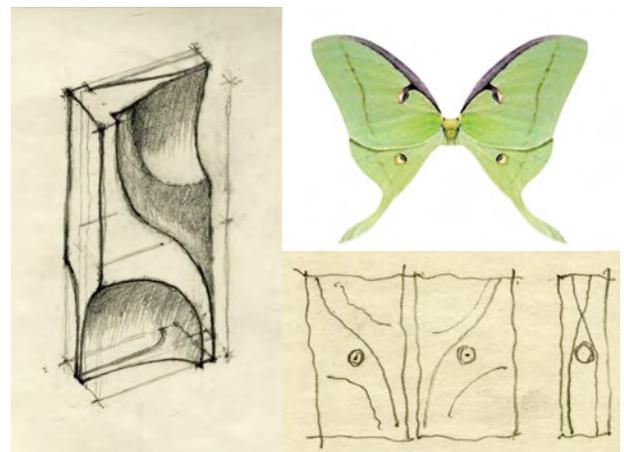


Figure 5. Moth wing inspiration and studies

Using my computer and benchtop CNC milling machine, I have made several half-size study models of the Moth Wing block. The CNC mill yields a roughly machined form, with geometric tool paths incised into the wood. After milling each face into opposite sides of a block of basswood, I used a table saw to slice them free, then glued the two halves together. Next, I sanded the entire block, patiently smoothing its faces and rounding its corners, an especially gratifying step.

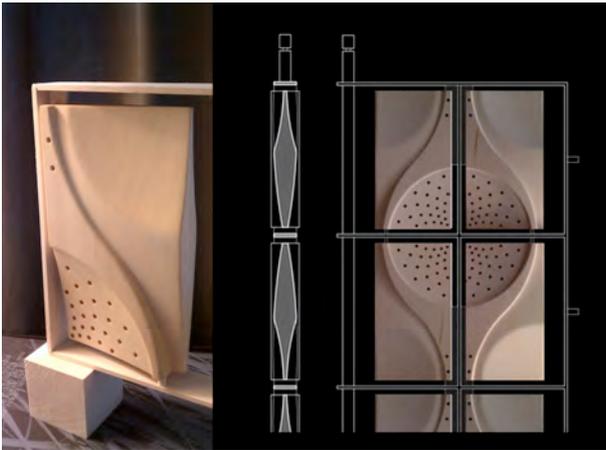


Figure 6. Prototype, section detail, and partial elevation

FORM AND SURFACE

As we look, the eye touches, and before we see an object, we have already touched it and judged its weight, temperature and surface texture. The eye and the hand constantly collaborate; the eye carries the hand to great distances, and the hand informs the eye at the intimate scale. (Pallasmaa 2009: 101-2)

Further inspiration for the Moth Wing Screen came from Teppo Asikainen's *Swell Soundwave*, an acoustical panel made of recycled polyester fiber (see figure 7). This material, soft like felt or wool, lends the project its acoustic properties, but *Swell Soundwave*'s sense of softness also comes from its form and surface: a repeating grid of semi-spherical, raised domes. Each square tile contains a central dome, with its four corners terminating in raised quarter domes. Assembled, the pattern completes a gridded, bumpy field.

Unlike *Swell Soundwave* the Moth Wing module is rectangular, rather than square. Instead of raised domes, it is composed of concave hollows, scooped from opposite corners. Between hollows, a sinusoidal curve runs from top left to bottom right. This line is designed to connect and flow in modular fashion when multiple blocks are assembled. The flat plain between the perimeter of one quarter-circle hollow and this sinusoidal curve creates a figure that recalls the swallow tail dangling from the tip of a Luna Moth's wing. Carving back the surface adjacent to this swallow tail figure, in a gently sweeping convex curve, the swallow tail protrudes beyond adjacent portions of the block and frame. With its edges slightly rounded, light plays softly across its surface.

This characteristic of softened edges and eased transitions owes a debt to the work of Tapio Wirkkala—in particular, the *Silver Wing Table Service* designed in 1955. Like Wirkkala's silver, undulations and indentations create a shimmering topography of light and shadow, an invitation to touch.



Figure 7. Inspiration: Teppo Asikainen, *Swell Soundwave* (left); Stefan Borselius, *Airflake* (right)

This tactile appeal is vital, because, as Pallasmaa points out, "The sense of touch mediates messages of invitation or rejection, nearness or distance, pleasure or repulsion. [It] provides a domicile for the touch of our bodies, memories and dreams." (Pallasmaa 2009: 102)



Figure 8. Tapio Wirkkala, *Silver Wing*

Few designers produce work so graceful and inviting as Finn Juhl. The fluidity of line and profile on pieces such as the 1951 Baker Sofa and Model 45 Armchair (see figure 9) provided clues about how to vary thickness and mass on the Moth Wing Screen module. The Baker Sofa's wrap around back—with its flared lobe ends, and cozy, enveloping, cave-like space—inspired the hollowed voids sculpted into the surface of the Moth Wing block. Juhl's handling of the relationship between wood frame and upholstered seat body also proved useful.



Figure 9. Finn Juhl, seated comfortably in a *Chieftans Chair* (left), *Baker Sofa* (top right), and *Model 45 Armchair* (bottom right)

In both the Baker Sofa and the Model 45, the seat and back float within the wood frame, clearly expressing the role of each part. The Model 45—with its curving, tapered armrests, and its turned, attenuated wood legs—inspired the soft, rounded, leading edge of the Moth Wing block (see figure 6). This smooth, tapered edge, facing away from the frame, is the Moth Wing Screen’s most fluid, touchable moment.

DENSITY, MATERIALITY, AND MEANING

As discussed, form and surface are two important qualities contributing to a sensory impression of softness. Next, I would like to discuss how density, materiality, and meaning are also informing development of the Moth Wing Screen.

In the work of Alvar Aalto, one can find numerous examples of spaces softened with baffled, indirect light and obscured views. Inside the front door of the Villa Mairea, a series of vertical poles partially screen one’s view upon entering. More poles surrounding the adjacent stair further filter the view. The uneven, apparently random placement and spacing of the poles creates an effect similar to being in a forest, surrounded by slim vertical tree trunks. Having arrived in the house from the surrounding Finnish countryside, this visual analogy would be obvious and would provide a sense of familiar comfort, entering into what would otherwise be a foreign, strikingly innovative house. The Villa Mairea’s front door handle similarly combines notions of modernity and softness, cast in bronze, but shaped to recall the natural wood branch traditionally used as a door pull for rustic Finnish cabins.



Figure 10. Alvar Aalto, *Villa Mairea*

Around the same time Aalto designed the Villa Mairea, he also designed the Aalto Vase (see figure 11). Partly a pun, the word *aalto*, in Finnish, means wave. The softness of the vase’s wave form combines with the material characteristics of glass, its transparent glow creating a softness and warmth that takes advantage of glass’s inherently liquid, flowing elegance. These combined features observed in Aalto’s work, of partially screened views, subtle, abstracted reference to the

familiarity of place, and a liquid, transparent flowing materiality will drive ongoing development for the Moth Wing Screen.



Figure 11. Alvar Aalto, *Aalto Vase*

The next step is to generate a silicone rubber mold from the half size model I’ve made. With the mold, I will cast transparent resin prototypes, studying density, degree of transparency, and color, seeking the liquid glowing warmth of amber.

Positioned as it is, near the entry to my house, the amber resin will be touched by sunlight early and late each day. Its curving surfaces will collect and hold this light, shimmering like the silvery curtains of water tossed up by a water skier at twilight. The regular return of this tinted, softly glowing light will, I hope, recall the steady flow of water across time-softened boulders, the light gradually draining down through the screen’s softly scooped hollows, a silent tribute to the passage of each day.

REFLECTIONS

Why begin an essay on softness with a description of water skiing? Because the feel for water is an essential force within me. Because activities and obsessions from childhood—the source of tactile experiences and memories—are the root of empathy, and empathy is the bridge to newly encountered objects and spaces. Carved wood, in the hands of Tapio Wirkkala—even when studying a knife to be made of silver—becomes soft, fluid, and eminently touchable. Finn Juhl designs wood forms that taper, flare, bend, sweep, and connect so gracefully they appear just as smooth and soft as the upholstered cushions they support. Alvar Aalto spent his career combining the avant-garde language of the new functionalist architecture with softer, curving forms, natural materials, and patiently crafted ergonomic details tied to Finnish tradition. Juhani Pallasmaa visited Kahn’s Salk Institute and came away describing the concrete in terms of silk, live skin, and the soft grey wings of a moth.

Charles and Ray Eames wrote, “Take your pleasure seriously.” Water skiing is an important resource to my sense of softness, and it is this sense of softness that provides a key to appreciating projects on a visceral level. Having spent hours weaving back and forth behind a ski boat, a sine curve now holds special meaning for me; I appreciate its form mathematically, *and* viscerally. I look at water and imagine how it would feel, skimming beneath my feet at thirty miles an hour. The ability to imagine the impact of a designed project on an observer is linked to this repository of visual, tactile sensations. By empathizing with this imagined observer, the soft project reaches out to people, offers a handshake, and invites literal and figurative connection. The link between memory, empathy and imagination are vital; bound indelibly together, they lie at the heart of the design process.

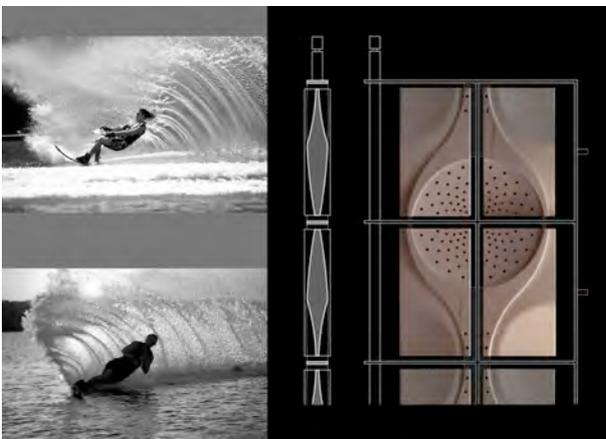


Figure 12. Detail, *Moth Wing Screen*

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