Articulating Affordances: Towards a New Theory of Design
Sarah Robinson

The rocking chair is the soul of the porch. Remove it and all you have left is white pine for the carpenter ants.
—John Hejduk

The poet’s gift is to distill the essence of something complex to a few lines. Here the poet is also an architect who, seemingly innocent of the pretenses that burden his profession, gets straight to the point. The rocking chair unites body with place, makes the porch a place fit for human habitation. Yet, in architecture we have little regard for chairs, much less those that rock, and we certainly no longer speak of souls. That a rocking chair could be the soul of the porch is contrary to everything we learn in architecture school. We are still taught according to the Renaissance conception that understands man as the subject and the world and nature as objects—one that renders architecture a static form in which other, lesser objects are contained; not something to be inhabited, but an object to be fetishized from afar. I remember feeling annoyed when I was asked to do a furniture layout in my floor plan because I did not want to be mistaken for an interior designer, so thoroughly did I swallow the tacit notion that the almighty realm of architecture did not bother with matters so mundane.

But here, Hejduk suggests another alternative: the chair rocks in rhythm to our movement, and this rocking is the beating heart of the porch. This is more than the subject, the hypertrophic “I” encountering an inert object, it is a fusion of subject and object in their mutual animacy, as well as the fusion of form and function: the form of the porch at the outcropping of the building affords a place for a chair, which in turn affords rocking, which in turn releases cascades of pleasure and relaxation in our body, which in turn adjusts our affective state, which then modulates our attitude towards the world. Without the chair, there is no possibility for human habitation—the chair renders an otherwise inert object into a building/porch/chair/body/pleasure system. This example provides a way of thinking about architecture not in terms of objects within objects, but in terms of relationships, links, connections, couplings of action and movement. Architecture and furnishing are no longer completely distinct, nor are environment and action, nor are form and function; here architecture is understood as a matrix of dynamic interdependent relationships.

To truly understand architecture as a verb—as the dynamic tissue of connection, means rethinking some of the basic tenets that our profession holds so dear. And this rethinking is also a reimagining—one that calls us to leave behind familiar terrain so that we might return to it

Figure 2.0: Front porch with rocking chairs. Image by Ronnie Vlonner on Flickr
https://www.flickr.com/photos/photobyronnie/2183753116/in/photostream/

with fresh eyes. And thankfully there are those who have forged ahead of us who can serve as our guides along the way. J. J. Gibson and his partner Eleanor are two such pioneers, their discovery of ecological perception, which was radical in their time, is the consensus view of perception held today. Yet, in the intervening five decades we have scarcely considered the implications of their theories for architectural design. Truly reckoning with the profoundly ecological nature of the way we exist in the world means that we must reimagine our discipline on terms of movement rather than stasis, embedded umwelts rather than from isolated atoms, verbs instead of nouns—to go from form to forming, from opposition to complementarity, from space to place, from time to occasion, from anonymity to atmosphere and from abstractions to affordances.

From Vitruvius to the Body Electric

The most basic ground of our inquiry must begin with the way we understand our bodies. If you think I am exaggerating when I claim that architectural thinking still adheres to an obsolete paradigm, consider the way we continue to conceive of the human body, the rightful subject of our architectural designs. The Vitruvian man splayed over a geometric grid is the primary image that has guided our discipline for centuries, even though the context from which that ideal arose has radically changed. For Vitruvius the ideal proportions of architecture derived from the ideal proportions of the human body. In his Ptolemaic world picture, cosmic proportions were reiterated in the natural world, the human body was considered the most perfect expression of natural and cosmic order and was understood in terms of this larger system. The Renaissance reaffirmed the Vitruvian ideal considering man as the measure of all things; and it is important to remember that the essential meaning of the word measure meant ‘boundary’ or ‘limit’—measure implied moderation, and had a relative and qualitative, as well as a quantitative meaning. Beauty, wisdom and health were the consequences of moderation, mental and physical balance was the consequence of having everything in its proper measure. By the time Le Corbusier’s modulor man arrived, the body had been reduced to a static yardstick—and “ideal” proportions were exemplified a 6’0” tall male body builder. The body had long since been torn from its biological and cosmic matrix, and was considered to be a machine. We lost the sense of measure as a boundary and a proportion and retained only its quantitative significance, which for centuries was considered to be of only secondary importance.

Understanding the body not as a complex and dynamic boundary, but as an object among objects specified by its outward quantitative specifications is a habit of thinking that we have yet to fully overcome. Consider the example of study conducted by the Cleveland School of Medicine in 1943 whose goal was to determine the dimensions of the average or “normal” woman. In order to do this, they averaged the data gathered on 15,000 young adult women and created the statue named “Norma” (Figure 2.1 and 2.2). To their surprise, they found that less than one percent of the actual women came even close to matching even half of Norma’s dimensions. Seven years later, the US Air Force, in their effort to understand why so many of their fighter jets were crashing—sometimes up to 17 times per day—deduced that perhaps the cockpits were no longer sized to fit the pilots. In high speed, fast acting situations, the cockpit and the pilot demanded a hand in glove fit. Figure 2.3. To test their hypothesis, they conducted a study to find the size of the average pilot. In their analysis of the bodily dimensions of 4063 men, they found...
that not a single pilot fit within an average range on all 10 dimensions, and less than 3.5 percent were “average” on only three dimensions. Like the story of Norma before them, they found that not one living breathing pilot matched the average. But, unlike the Norma study, they did not blame the actual, living breathing women for not matching the ideal—instead, they innovated. They designed adjustable hand controls, seats, foot pedals, all the features that are now standard equipment not only in cockpits, but in every automobile.

Today, thanks to breakthroughs in the biological sciences we now have a more refined understanding of the astonishing sensitivity and connectedness of the human organism than ever before. Not only can the body not be reduced to a static Platonic form, or crunched into a norm, the body is inseparable from the environments that we inhabit, and inextricably bound to the interpersonal, social and cultural relationships on which our lives depend. Our bodies do not stop at the surface of our skin. As the ecological psychologist J.J. Gibson said five decades ago, “The surface of an organism, it should be remembered, is actually a boundary between the organism and its environment, and the boundary is not always or everywhere as clean-cut as the hairless human philosopher tends to think.” Indeed, the old dualisms between body/mind/world have finally given way to an understanding of the living human organism embedded interactively in our environments. Our images of the body must begin to express this body/mind/ecological system. Even the Air Force figured out seven decades ago, that we need to design for a moving, dynamic body—but now we must go further, to design for a vulnerable, aging, multi-gendered body extending interdependently into its surroundings—one that by its very nature cannot be reduced to a static ideal.

From One Size Fits All to Umwelt

J.J. Gibson would perhaps have appreciated the example of cockpit redesign, because implicit in the story is that the capabilities of the pilot were constrained or afforded by the design of the cockpit. Optimal performance depended upon the appropriate fit between the pilot’s body and the controls of the airplane. The cockpit is a very real extension of the pilot’s body, enabling both to do what neither could do alone. One could even say that the cockpit is the pilot’s umwelt. Umwelt⁵, which is German for life-world, is a term the Estonian biologist Jakob Von Uexküll coined to express how an animal cannot be understood apart from its particular environment. While many animals share the same habitat, each is tuned to that habitat in its own particular way. A spider is sensitive to the forces and features of the habitat relevant to its own particular needs. To truly understand the spider’s lifeworld, we would have to experience that world the way that a spider does. It is impossible to truly understand an animal apart from the environment in which that animal evolved and to whose features its perceptual systems have adapted.

Of course we human animals also occupy our own lifeworlds, our perceptual bandwidth is not tuned to ultraviolet light like the spiders, nor do we sense ultrasonic sound like dogs can, our lifeworlds emerge according to our own particular needs and purposes. This is another way in which our sensorimotor and perceptual systems extend into, and are reciprocally conditioned by our lifeworlds; and it is exactly this mutuality that J.J. Gibson devoted his lifework to elaborating. His ecological model of perception challenged traditional cognitive theories of perception and laid the foundation for today’s embedded, embodied, enactive, extended theories of cognition—his ecological model of perception was the original “E.”

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It is interesting that Gibson undertook much of his early work on perception during his tenure as the director of the Aviation Psychology Program during the Second World War. His theory of perception as the active, direct extraction of information from an ambient flow of energy grew out of his interest in trying to understand how pilots were able to accomplish skilled flight, which the then prevailing notions of perception failed explain. The skilled sensorimotor coupling essential to aircraft flight remained a stirring question to him, and perhaps contributed to his later introduction of the notion of affordances, the key to understanding his ecological psychology. Gibson defined an affordance quite broadly as a possibility for action in the environment that refers “to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment.”

Affordances refined and textured Von Uexküll’s umwelt by articulating the concrete and specific features of the life-world that constrain or afford behavior, which then leads to modulations and changes to both organism and environment in a complementarily manner. Returning to our earlier example, the pilot’s umwelt is detailed and furnished with the tools, levers, seats and mechanisms complementary to the pilot’s sensorimotor perceptual systems, the two systems are united via the pilot’s actions which those details and furnishings enable and allow—understood in this way affordances serve as the connective tissue between animal and environment.

Extended Organisms - Nested Dynamic Systems

Taking seriously the implications of the co-emergent coupling of organism and umwelt, leads to some rather startling conclusions. In his book, The Extended Organism, the physiological ecologist J. Scott Turner meticulously illustrates how animals exploit the physical properties of their surroundings to their advantage, posing the deceptively simple question: “Are animal-built structures properly things external to the animals that built them, or are they properly parts of the animals themselves?” Where do we draw the line between organism proper and the organisms’ umwelt? If we choose to draw the line at the envelope of the organism’s body, we find that this outermost layer is quite permeable, allowing a steady influx of matter and energy to flow through it. Cut off the flow of energy and the organism will perish. “It is not the boundary itself that makes the organism distinctive,” he writes, “but what that boundary does. In other words, the boundary is not a thing, but a process.” He illustrates how earthworms manipulate the physical properties of the soil to serve as an accessory kidney, how mole crickets construct trumpet shaped burrows that help amplify the sound of their mating calls and how the spectacular mound nests of African termites not only house the colony, but serve as gas-exchange systems allowing them to adapt to a wide-range of environmental conditions—effectively extending their physiology in the structures they build.

The slipperiness of the line between organism and environment has been importantly elaborated by philosopher Andy Clark, who with David Chalmers introduced the Extended Mind hypothesis in 1998, asserting that body/brain/world involve a dynamic system. He argues his case citing the example of the bluefin tuna (Figure 2.4) who also treats the environment as an equal partner. According to studies by fluid dynamicists, the anatomy and musculature of the tuna render it physically incapable of swimming as fast as it does. Tunas reach their remarkable speeds by sensing naturally occurring currents, and using their tails to create additional vortices that propel them faster than their strictly physiological capabilities alone would allow. Clark writes, “The real ‘swimming machine’ therefore, is not the tuna alone, but the tuna in its ‘proper context’—the tuna, plus the water, plus the vortices it creates and exploits.”

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8 Ibid
If we understand the structures we build not as inert objects but as physiological extensions and amplifications of our own capacities, that is, if our buildings are to us, as the cockpit is to the pilot, we must consider them in terms of a nested dynamic body/brain/building system. And, to get at the full import of what Gibson meant by an affordance, we must understand an affordance as it is positioned—that is nested—within the context of a dynamic system. The units of measure used in physics made no sense in Gibson's terrestrial ecology. “The components and events of the environment fall into natural units. These units are nested. They should not be confused with the metric units of space and time.” Gibson consistently referred to affordances in terms of spatial and temporal nesting—places are nested within other places, events are nested within other events: “For perception this nesting is what counts, not the metric dimensions of empty time with its arbitrary instants and durations. Time as such, like space is not perceived.” The relative and qualitative dimensions of measure are here restored, umwelt and organism are scaled and tempered according to each other. Gibson's affordances provide an alternative to the conceit of a static ideal, to the absolutes of space and time—affordances are inherently situated, dynamic, relational, complementary and embodied.

Towards a New Theory of Design

In 1976, Gibson opened his talk at a symposium entitled “Perception in Architecture” by declaring that, “Architecture and design do not have a satisfactory theoretical basis. Can an ecological approach to the psychology of the perception and behavior provide it?” Because this a rare instance in which Gibson addressed the concerns of architecture most directly, focusing on and developing these points can be particularly useful because it is here that Gibson proposed that affordances could provide a foundation for a reinvigorated theory of design. “The hypothesis that things have affordances, and that we perceive or learn to perceive them, is very promising, radical, but not yet elaborated.” Gibson consistently referred to affordances in terms of spatial and temporal nesting—places are nested within other places, events are nested within other events: “For perception this nesting is what counts, not the metric dimensions of empty time with its arbitrary instants and durations. Time as such, like space is not perceived.” The relative and qualitative dimensions of measure are here restored, umwelt and organism are scaled and tempered according to each other. Gibson's affordances provide an alternative to the conceit of a static ideal, to the absolutes of space and time—affordances are inherently situated, dynamic, relational, complementary and embodied.

What about this statement constitutes a sound theoretical foundation for architecture? There has of course been considerable work done in elaborating affordances in design, cognitive science, architecture, dynamic systems theory that we can build upon in this effort. But for now, let's take Gibson words directly: “Things will look as they do because they afford what they do . . . Herein lies the possibility for a new theory of design. We modify the substances and surfaces of our environment for the sake of what they will afford, not for the sake of creating good forms as such, abstract forms, mathematical and elegant forms, esthetically pleasing forms. The forms of Euclid and his geometry, abstracted by Plato to the immaterial level, have to be rooted in substances and surfaces and layouts that constrain locomotion and permit or prevent our actions.” What about this statement constitutes a new theory of design? First let us clarify what exactly we mean by theory which derives from the Greek theoria, and shares the same root as theatre. Theory is rooted in the meaning to view, to make a spectacle, to speculate.” So, if we take theory to mean a certain view of things and understand architecture according to Gibson's way of seeing, then is through the filter of ecological perception, some basic architectural principles assume a completely new meaning. To design things for the sake of what they will afford, not for how they look, but for what they do, would go far beyond the dictum that form follows function, to imply that form itself is a verb—form forms. The shape of things, shape our movements, invite or disclose possibilities—are worn and grooved by the shape of our habits. Here Gibson intends form in the Aristotelian sense, form not as outward and fixed, but form as process—“an inner forming activity which is the cause of the growth of things.” Or, as Paul Klee put it—“form is the end, death, form-giving is life.”

According to Gibson, architects have misunderstood form because they have been taught form as a graphic exercise, treating form as a painter would treat formal. In this way, “No one is ever going to understand form . . . the use of the term only promotes confusion.” Indeed, how many architecture schools still engage in formal exercises—carving styrofoam solids, and manipulating the cube may have their value as playful, creative experiments, but they perpetuate the obsolete notion that the goal of architecture is to dress up and hollow out a Platonic solid, failing to realize that treating form as an end in itself is, as Klee...
insisted—death. “What architects are concerned about,” said Gibson, “is the layout of surfaces.”19 And to consider surfaces in the way that Gibson intended—that is, trading the word layout for “formal arrangement”, replacing the noun form with substance, reserving the word form for use only in its active sense—would be radical indeed. And going a step further, what if we understood surfaces not for what they are, but for what they do. Treating surfaces as boundaries that are, like we must now understand the boundary of our skin, not as things but as processes—surfaces as the site of intense interactions.

### Primacy of Movement

Gibson’s ecological model is inherently dynamic, so it is not surprising that he proclaimed, “Architects need to pay attention to the affordances of locomotion and action in the layouts they design.” The long practiced but shortsighted goal to produce “esthetically pleasing forms” rests on an obsolete understanding of perception, one that considers the static picture as the rule, rather than an exception—this is exactly the model that Gibson overturned more than fifty years ago. Perceiving is active, exploratory and sequential, “We are never frozen in the moment,” as Gibson insisted, what we see when we look around, “Is not a patchwork of forms but the possibilities of support, of falling, of resting, of sitting, of resting . . . of taking shelter.” Similarly, Juhani Pallasmaa has long advocated for understanding architecture as a verb, “Its true essence is always an invitation to action. It is this verb-like tendency towards active search and exploration that unites architecture and the human mind.”20 His statement echoes Gibson’s insistence on the exploratory nature of perception, when we move through places we are searching for, “The possibility of entering the next vista.”21 We now know that every act of perception is also an act of the imagination, that the two faculties share an inseparably common ground, and we are beginning to appreciate the extent to which they are both rooted in movement. Not only is movement primary to architectural experience, movement is primordial to thought and feeling. Gibson’s refusal to relegate the mental and the physical to opposing realms has now found a wealth of empirical corroboration. Numerous studies have documented the complementarity between posture and gesture and thought and feeling. Assuming various poses triggers changes in our endochrine system that match the import of the gesture, striking a Wonder Woman pose, for example, literally makes us feel more powerful.22 As Colin Ellard has noted, “We feel because we do.”23 Gesture and posture have their own complex emotional and chemical signature. Further, a recent neuroscience experiment indicated that cortical potentials vary as a function of bodily affordances available in the physical environment, implying that cognition is intimately related to potential bodily movements24 (Figure 2.5). Gibson also confirmed that knowledge unfolds through movement. We learn places by moving through them, places are disclosed through successive opening of vistas and he

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19 Ibid
21 Gibson, 1982, 416.
24 Amy Cuddy’s Ted talk: “Your Body Language May Shape Who You Are”
insisted that we not only perceive, but proprioceive.\textsuperscript{23} This reiterates the philosopher-dancer-biologist Maxine Sheets-Johnstone’s assertion that, “What is distinctive about thinking in movement is not that the flow of thought is kinetic, but that thought itself is. It is motional through and through.”\textsuperscript{26} Both our most humble and noble capacities are saturated with movement; it is indeed the very sign of life.

**Experiential Space**

The metrics of Gibson’s terrestrial ecology were not those applied in the physical sciences, they were nested units whose values were always relative, that is, relational. The obstacle to thoroughly applying a relational understanding to architecture is that we continue to assume along with classical physics that the universe consists of isolated bodies in space. Gibson was constantly trying to get us to break this habit, “What we perceive first of all is not abstract color and space . . . but surfaces and their layout.” Space is a term that reverberates through

We now understand space as layered energetic envelopes that are extensions of our nervous systems, known as peripersonal and extrapersonal space. Our experience of space is conditioned by our emotional and somatic states—this again has been confirmed by numerous studies. We now know that hills seem steeper to a person wearing a heavy backpack\textsuperscript{28} and to someone who is hungry or not physically fit.\textsuperscript{29} Another amazing example of how we extend into the space around us, comes again from the world of aviation. Because flying an aircraft relies almost exclusively on visual perception, many of the problems occur when atmospheric conditions impair a pilot’s vision. This is another affirmation of Gibson’s insistence that we do not perceive space, indeed, without reference points that are scaled to the human perceptual field, we cannot perform even the most basic tasks, much less fly an airplane. To address this problem, the U.S. Air Force augmented visual perception by devising the Tactile Situation Awareness System; which is a full-body suit pilots wear with “tactile simulators” integrated inside it. (Figure 2.6) The garment delivers small puffs of air controlled by complex sensors that correspond to various flight parameters, the airspeed, the way the plane is tilting, etc. The pilot feels a puff of air on the side of her body that corresponds to the direction of the tilt, and adjusts the plane in that direction to make the puff on her body disappear. The body feels as the plane moves. Notice how they choose their words carefully—this is not a garment, but a system that includes situational conditions; velocity, atmospheric pressure, oncoming threats, the aircraft, the suit, the pilot, the controls. This system is so effective that even inexperienced pilots can perform difficult tasks while blindfolded. The space of the aircraft and the space of the body morph into a shared dance—the connective tissue between them is the TSAS suit that affords flight.

**Time as Event**

And of course we cannot properly understand space without addressing the problem of time. Indeed, Gibson did not see time or space as problems per se, but as underdeveloped concepts in need of reinterpretation in terms of ecological perception: “Perceptual research needs a program newer than the one formulated in Newton’s Principles and

\textsuperscript{23} Gibson, 1982, 416.
Locke’s Essay Concerning Human Understanding.” This inherited conceptual framework is unfit to speak of human experience—we need to develop a vocabulary for understanding time scaled to human perception. We do not experience abstractions—like space and time—what we do experience are places and events and both are co-perceived. In terms of ecological perception, we experience time as change, animate movement and flow—and he called all such changes, events. The notion of empty time, as if time is somehow a container that must be filled is alien to human experience. And this idea, again, is based on an outdated division between mental and physical realms. Our awareness of the environment, which both persists and changes is simultaneous with our awareness of our persistent and changing self—our self-awareness and environmental awareness are complementary, concurrent and interdependent. Awareness of events therefore seamlessly encompasses psychic and physical dimensions. Memory and imagination are triggered by and nested in place. Our memory of an event arises simultaneously with the living context in which the event took place. What then, does this entail for architects? Gibson, in his very matter of fact manner, insisted that our concern must be with surfaces and substances and their layout—I would suggest that

humanizing time has very much to do with the manner in which we treat these surfaces and substances—texture captures light by casting shadows and seeming to slow down light’s passage, smooth surfaces reflect light in a blinding glare, a candle’s glow casts the halo that transforms an event into an occasion. The play of light is time’s humane messenger.

Articulating Affordances

Now that we have updated some longstanding issues in architecture: understood form as process, affirmed the verb-like, dynamic nature of architecture, movement as characteristic of thought, feeling and experience, established the complementarity of organism/umwelt proportioned in nested units, the extended, plastic nature of our perceptual systems and the experiential nature of space and time—we can take a fresh look at Gibson’s claim that affordances offered a basis for a reinvigorated theory of design. Gibson acknowledged that affordances were not without their precedents, and explicitly stated that the term is reminiscent of aufforderungscharakter, a German term Kurt Lewin coined that has been translated to English as invitation-character (by J.F.Brown in 1929) and later as valence (by D.K. Adams in 1931) and later by Gestalt psychologists as demand-character. Although he followed a similar line of theoretical development, Gibson contrasted affordances by giving them an independent character. Affordances were invariant features of the environment that did not change as the observer changed—the edibility of a substance does not depend on the animal’s hunger but rather offers what it does, because of what it is. “The affordances of the environment are permanent, although they do refer to animal and are species-specific. The positive and negative valence of things that change when the internal state of the observer changes are temporary. The perception of what something affords should not be confused with the “coloring” of experience by needs and motives. Tastes and preferences fluctuate, something that look goods today may look bad tomorrow but what it actually offers the observer will be the same.”

Endowing affordances with this invariant character enabled Gibson to resolve the subjective-objective duality that plagued the Gestalt psychologists forty years before him. Possibilities for action exist in the environment regardless of your mood or fleeting physiological state. On this Gibson was very clear: “Affordances are invariant combinations of properties of

Figure 2.7: Cover of Desert Works by Rick Joy, Steven Holl, and Juhani Pallasmaa. Courtesy of our friend Rick Joy

Gibson, 1982, 403.

Ibid, 418.

Gibson, 1982, 409.

Ibid, 410.
things (properties at the ecological level) taken with reference to a species or an individual. I now add: with reference to its needs (biological as well as social) as well as to its action-systems and its anatomy. The affordances for behavior and the behaving animal are complementary.\textsuperscript{34}

**Atmospheres and Attunement**

In order to articulate affordances, due attention must be given to the nature of atmospheres, as atmospheres and affordances share critical common ground: “An important fact about the affordances of the environment is that they are in a sense objective, real, and physical, unlike values and meanings, which are often supposed to be subjective, phenomenal, and mental. But, actually, an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective/objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer.”\textsuperscript{35} The key overlap between atmospheres and affordances is the manner in which they both baffle the categories of subject and object and the physical and psychical and for this reason, both notions have given architects a way to think beyond the divide. Our language and philosophy have been so shaped by the dichotomy that any tendency to confine affordances and atmospheres, is an indication of the poverty of our alternatives. And it this poverty, I think that makes it important to articulate and enrich our vocabulary of alternatives, and for this reason it is helpful to distinguish between the two.

What if we understand an atmosphere as an irreducible quality of experience that is neither subjective or objective but a dynamic fusion of both. Tonino Griffero characterizes atmospheres as quasi-things\textsuperscript{36} to acknowledge the way in which atmospheres are “out there” in the world. I would compare the ontological status of atmospheres to that of color—Merleau Ponty’s\textsuperscript{37} paradigmatic example of the way perception works. Color, like light and sound and mood is immersive, lacks a front and a back, does not obey perspective, is multidirectional, multisensorial, cannot be contained or reduced to its component parts without losing its life. What if we think of atmosphere as a general term whose manifestations include light and sound, scent and feeling—all of these are fluid and permeable and have moving, temporal qualities.

In an affirmation of their undeniably pervasive physical presence, Griffero has also advanced the notion that atmospheres have affordances.\textsuperscript{38} Yet, taking Gibson at his word, it seems doubtful that he would have gone quite so far. Gibson categorized affordances as objects, substances, places, events, other people, animals, but he clearly stated that affordances, “Are not phenomenal qualities of subjective experiences (tertiary qualities, dynamic and physiognomic properties, etc.) I also assume that they are not the physical properties of things as now conceived by physical science. Instead, they are ecological, in the sense they are properties of the environment relative to the animal.”\textsuperscript{39} This very claim suggests that Gibson himself did not quite fully overcome the bifurcation of nature\textsuperscript{40} that the classical categorization of qualitative properties presupposes. That is, to overcome the subject-object divide is to overcome the division between primary and secondary qualities—those physical properties that belong to things are not ontologically different from the experience of those things. In order for affordances to fulfill their role as the interdependent tissue between animal and environment, the properties relative to the animal cannot be primary or secondary in importance. It would seem then that if one cannot admit the divisions of primary or secondary properties, one certainly cannot admit the category of a third—or tertiary qualities.

I would interpret Gibson’s imprecision on the categorization of properties as evidence of his commitment to the concreteness of affordances. He wanted to preserve the open character of affordances, while retaining their physicality, declaring there is no such thing as an “abstract object.”\textsuperscript{41} The key criterion that differentiated his affordances from Gestalt terms like demand and invitation character was that affordances were invariant—what something afforded was immune to one’s psychosomatic state. An apple affords edibility, regardless of

\textsuperscript{34} Ibid.
\textsuperscript{35} Ibid, 129.
whether or not you are hungry or like how it tastes. The apple is colored red for complex evolutionary motives—red makes it stand out from the background, evokes erotic desire, excites my nervous system—but is the color red here an affordance because it makes me want to bite the apple? First it would seem that in order for something to qualify as affordance it must pass the invariant test. Second, despite its conceptual inconsistency, yet respecting Gibson at his word—it cannot be a phenomenal quality—the color red, then would seem to fail on both accounts. Which is not to say that red does not modulate my mood or elicit my desire, it just means it cannot strictly be considered as an affordance. For these reasons, affordances cannot properly be applied in the context of atmospheres, to do so, would be to extend Gibson’s radical notion to its breaking point. I would suggest that a more fitting verb to use to describe the capacity of atmospheres to do, would be the verb *attune*[^42], as one would tune an instrument, “To bring into harmony.” Atmospheres can move us powerfully, pervade us with their certain intangible signature, tune us according to their own particular harmony or dissonance. For the sake of my aim here, rather than articulating affordances as features of atmospheres, I suggest that in the effort to enrich our vocabulary of alternatives to the subject-object dichotomy it is more helpful to consider atmospheres and affordances separately (see Figure 4.2 in Dr. James Hamilton’s essay as a reference).

**Performative Affordances**

As opportunities for action, affordances always imply bodily coupling, they are shapes in the world that shape the body and vice-versa. Performative affordances are designed with a specific purpose, to evoke a prescribed response. This does not mean that the affordance will not perform other unforeseen gestures and responses, but that it is configured according to a very specific purpose. An outstanding example of an umwelt with nested performative affordances that work in concert in a dynamic system is Alvar Aalto’s Paimio Sanatorium—this is a rare example of a building that was intended to do, rather than being an assemblage of “esthetically pleasing forms,” yet whose outcome is exceedingly pleasing. The building was designed for patients recovering from tuberculosis, and was informed by Aalto’s own personal experience. When Aalto himself was hospitalized, he realized that hospitals are rarely designed from the patient’s point of view, who is almost always lying down. Instead at Paimio, “The room design is determined by the depleted strength of the patient reclining in his bed. The color of the ceiling is chosen for its quiet, the light sources are outside the patient’s field of vision, the heating is oriented towards the patient’s feet and the water runs soundlessly from the taps to make sure that no patient disturbs his neighbor.”[^43] Windows and the placement of beds were based on solar considerations and daylighting, balconies were colorful and located to optimize resting in the sunshine. He designed communal spaces for interaction, and mutual resting in the sun. He and his wife Aino carefully designed the furniture, fixtures and door hardware to afford comfort and aesthetic delight. Because the rooms were intended to be shared by two people, sinks were designed to be noiseless so as not to disturb one’s fellow patient, handles were designed to be easily and silently opened. The iconic Paimio armchair’s sensuous curves were not designed purely for visual delight, but were shaped according to the patient’s spine to facilitate easier breathing. Aalto acknowledged the precedent in Marcel Breuer’s Wassily chair (Figure 2.8), but intentionally used wood instead of metal because metal conducts heat away from the body. For this reason, the handrails on the stairs are made of wood, a material that is porous, because it once too breathed. Being porous, it is more responsive to the ambient environment. We tend to see this chair in isolation, as an object, but in their original context, the chairs they were

[^42]: For Martin Heidegger the verb attunement was critical to his characterization of Mood, Heidegger, Being and Time, trans. Joan Stambaugh New York: SUNY Press, 1996. 313.  
arrayed in a communal room, situated in a sun-lit ensemble. Every detail, the affordances of handles, faucets, sinks, windows, the handrails, the symphony of chairs in the communal rooms of the patients’ umwelt was considered with attention to their healing process. Aalto explicitly stated that his aim for the building to function as a “medical instrument.”44 And I don’t think he intended instrument in the mechanistic sense, but rather in the sense of a musical instrument, one that in concert with the human breath and movement is animated to make music. The building was an umwelt for healing, outfitted and detailed with affordances to invite and organize actions, postures and gestures and colored and lit to attune person and place in a total atmosphere of well-being.

“Affordances do not cause behavior but constrain and afford it.”45 insisted Gibson, and while he was clear that affordances do not cause behavior, in the case of performative affordances they can limit the alternative actions to the extent that they intentionally shape, and therefore to a large extent favor certain behaviors over other possible alternatives. Aalto’s medical instrument, like a musical instrument, was designed in a way to elicit certain sounds and not others, and yet it allowed each player, to mark the performance with their own personality. Another classic example of a performative affordance is the layout of the British House of Commons Chamber, whose destruction provoked Winston Churchill’s memorable statement, “We shape our buildings and thereafter, they shape us.” After years of experience working in the parliament chamber he came to deeply appreciate how the rectangular chamber forced the adversarial parties to face one another, unlike the semi-circular or horseshoe configurations commonly used by other governments. When it came time to rebuild the chamber, they retained not only the configuration, but also its relatively small size with only 427 seats to accommodate 646 ministers—so that they could maintain the intimacy and liveliness of their debates. Another example comes from South Pacific islanders whose leaders meet in a room with ceilings so low that one cannot stand up inside of them. When people are angry they stand up and wave their fists, and the low-ceiling prevents this from happening. The ceiling height constrains behavior so that the leaders are more likely to resolve disagreements peacefully. Given what we now know about the correlation between gesture and endochrine levels, the dominant pose of standing up likely releases testosterone and perhaps exacerbates aggression levels.

Generative Affordances

Affordances can be performative but not deterministic, and when they are more loosely composed and open-ended, rather than suggest certain behaviors, their very openness can favor improvisation—I call these generative affordances, because they generate unforeseen responses. If the musical instrument was the analogy for a performative affordance, designed to allow certain sounds yet flexible enough for them to be played in different ways, the analogy for generative affordances is the surfboard. The surfboard affords surfing, it is true, but it has also generated many other sports and subcultures to go along with them. The non-specificity of the shape affords a certain flow. The film, Dogtown and the Z. Boys documents how on days when the waves were not big enough to surf, surfers attached wheels to what was essentially a miniature surfboard and rode around Los Angeles, eventually improvising skateboards to cruise around inside empty swimming pools. This of course is the origin of skateboarding, and even today, skateboard parks are designed with the features that emulate the old lima bean shaped swimming pools with concrete rims that populated Los Angeles in the 1970’s. Skateboarding translated to snow became snowboarding. You could trace all of these developments back to the open and flowing shape of the board.

The evolution of board sports has changed the topography of our cities—where one sees a bench, another sees a curvature that could generate a possible trick. The tool of the board has opened a different way

44 Ibid
45 Gibson, 1982, 415.
of perceiving the environment through the many possible movements it affords; and those flowing movements seem to seek out contours that will allow that particular gesture (Figure 2.9). Each topos—the Greek word for place—suggests movements that go along with it; and, understood in this way—forms form. It is not just that skateboards move some ways and not others that causes the skateboarder to favor certain shapes and contours over others—skateboarding has generated its own subculture—a network of postures, gestures, linguistic expressions, clothing and attitudes in rhythm with the flowing movements afforded by the skateboard. Board sports require loose-fitting clothing that accommodate the movements, the general outlook is open, experimental and anti-authoritarian and the role of performance is more akin to dance as an artistic expression and spectacle, than it is to other athletic performances. The tool of the skateboard generates behavior as well as a culture and local topography that supports that behavior. This is yet another illustration that, “We feel because we do,” or we feel because of how we move, that is, our affective dispositions are calibrated by our movements, actions and gestures and those dispositions in turn trigger a cascade of further consequences and this spectrum of activity is an untapped dimension of design. What and how we design impacts the way we move, think and feel.

To design things for the sake of the movements, actions and gestures they will afford, not for how they look—but for what they do, which is essentially Gibson’s advice for architects resonates uncannily with the work of Aldo Van Eyck who worked at roughly the same time.46 Like Gibson’s rejection of Euclidean form for its own sake and insistence on design as the layout of surfaces—Van Eyck was concerned not so much with what things look like, but with what things do. Architecture was not a search for ideal forms, but a configurative discipline whose task was to, “Get closer to the center of human reality and build its counterform.” Van Eyck’s47 notion of a counterform illustrates the interactive formative dialogue between the shapes of things and the way those things shape us. According to Van Eyck, design elements should be configured to support the shapes and rituals of everyday life: “A wall, a seat or some steps on which to repose, talk, wait or watch; a table around which people gather for an occasion; a balustrade, wall or lamppost against which one can lean and smoke a pipe, a door that allows one to tarry with dignity. All these things are not spaces as such but they constitute place in the most physical sense.”48 And like Gibson’s understanding of space as place and time as event, Van Eyck memorably said, “Space has no room and time has not a moment for man . . . Whatever space and time mean, place and occasion mean more. For space in the image of man is place, and time in the image of man is occasion.”49 Both Gibson and Van Eyck understood the power of design to shape everyday life, to structure movements and even to modulate thought and feeling. Design had its most potent effect not so much in grand schemes as it did in the intimate topography of ordinary gestures and movements. “Large structures (infrastructures) must not only be comprehensible in their own right, they must above all—this is the crucial point—assist the overall comprehensibility of the minutely configured intimate fabric which constitutes the immediate counterform of each and every citizen’s everyday life . . . Each citizen would thus ‘inhabit’ the entire city in space and time.”50 Van Eyck’s notion of the counterform illustrates my point about how skateboarders seek out shapes and contours in the urban fabric that support their movements; one’s actions, gestures and movements seek out a physical support—a counterform—and a place that includes and welcomes those movements is a place one can truly inhabit, one that is affirming, a place in which one feels like they belong.

The architect’s task, according to Van Eyck was to “provide the urban ‘interiors’ society needs; the built counterform of its dwindling identity.”51 And some of his most important built work that embodies this philosophy are the hundreds of playgrounds that Aldo Van Eyck designed around Amsterdam after the Second World War. These playgrounds reinvigorated the empty pockets and sites of demolished buildings, and he intended for them to, “To become part of the city’s everyday fabric . . . to respond to the child’s elementary inclinations and movements and activate his imagination.”52 The playgrounds would accomplish this because they were, “Conceived of these simple vital things—only then will imaginative non-abstract constructions and forms be evolved. As long as attention is directed not to aesthetic effects, but to experience value, archetypal ideas valid for different parts of the world in varied form will soon ensue.”53 The playgrounds are configurations of simple structures that are open-ended, in the sense that they invite multiple ways to respond and play with them, the benches are arranged judiciously so that caretakers could

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46 Gibson lived from 1904-1979 and Aldo Van Eyck from 1918 to 1999.
47 As quoted in Robert MCarter, Aldo Van Eyck, New Haven, Yale, 118...
48 Ibid, 117.
49 Ibid
50 Ibid
51 Ibid
52 Ibid
53 As quoted in Robert McCarter p. 117.
keep an eye on the children without encroaching on their activities and they succeeded in becoming part of the urban fabric because they are not fenced in.

These playgrounds are outstanding architectural examples of generative affordances, and the great deal of analysis (Figure 2.10 and 2.11) that they have since received can help us understand why they have worked so well and are so beloved. The playground equipment was non-specific, in the sense that it did not suggest a narrow mode of use. Van Eyck was explicitly against “abstract forms” which uncannily echoes Gibson’s refusal to acknowledge the existence of “abstract objects” yet his critics have praised this playground equipment for being so abstract. Van Eyck was a friend and admirer of Constantin Brancusi, famous for his genius in distilling the emotionally charged act of something like a kiss into a powerful sculptural gesture. And like Brancusi, Van Eyck’s aim was not for abstraction, or reduction—but for distillation; eliminating the extraneous in order to create “vital things.” Taking to heart his friend’s words, “Simplicity is not a goal in art but one reaches simplicity in spite of oneself, by approaching the real sense of things.” Always dimensioned according to the mutating shape of children’s bodies, Van Eyck’s play structures consisted of repeated elements: sandpits nested within low walls of varying shapes, steel tubes bent into arches, domes and cones and stepping stones of differing shapes and heights. “What is perhaps most striking about Van Eyck’s playgrounds,” as Robert McCarter has noted, “is that each one is an entirely unique design for a specific site; each one turns often seemingly irresolvable existing conditions to advantage; each one uses the same limited set of common elements; each one is clearly part of a family of forms—and yet the particular arrangement of each design is never repeated.”

Like musical compositions and performances, the playgrounds configured repeating elements in relationship to factors unique to their situation, their vitality was generated in the relation between the elements, the pause between the notes.

This attention to the configuration of solid elements in terms of the dynamics of the relationship generated between them comes forward most powerfully in the fact that none of the playgrounds were fenced in. At the time, playgrounds were cordoned off and patrolled to insure the safety of the children. Van Eyck was able to create the sense of a protected, magical world without such rigid enforcement. Rather than playgrounds per se, they more closely resembled furniture arrangements, with toys for kids and benches for grown-ups. And this is exactly how they functioned, the lack of a hard boundary, turned the invisible boundary into a sort of live edge, a porous membrane which contained the young and old together, as if they were inhabiting a protected precinct much like a room (Again see Figure 2.11). Certain etiquette developed around these nodes of activity, a shared code of conduct naturally emerged which created its own protected circle of behavior. The playground equipment is obviously a generative affordance, but what about the ambiguous edge that also generated certain behaviors—is that an affordance, too?

The verb afford is rooted in the word for “to further, forward, onward,” which has a definite developmental meaning and when used in reference to things means, “to be capable of yielding,” which speaks to the flexibility, elasticity and even generosity inchoate in the term affordance. When understood in this light I would say that the ambiguous
edge of the playground is a generative affordance, its ambiguity generates improvisation, allowing for growth and emergence—the processes of life. The playground design manifests the import of the Zen master Shunryū Suzuki’s saying that, if you want to keep your cow close to you, give her a big pasture.\textsuperscript{57} Indeed, the absence of an outward restraint causes one to create an inner boundary—the lack of an outward structure of control, causes one to generate one’s own with the tools at hand. Yet, we cannot fully appreciate how a generative affordance functions unless we understand it in the context of its role in a larger dynamic system. And while this is not the place to launch into a summary of dynamic systems theory, for our purposes it is helpful to improvise some of their basic principles.

A dynamic system is self-organizing; its organization and structure emerge from diverse elements that interact on multiple levels in nonlinear and time-sensitive ways. Dynamic systems have an inherent tendency to create pattern. Behavior and development are constructed through process according to the organizational principle of soft-assembly.\textsuperscript{58} Understood as dynamic systems, the very openness of the playgrounds’ layout, the relationship between soft (spatial) and hard (solid) elements, the non-specificity of the equipment excited the imagination to invite multiple interpretations. The ambiguous boundary itself generated a living protective edge because the system self-organizes and has a tendency to create pattern, and in a sense builds a functional fence where no physical fence exists. That is, because there is no explicit boundary, caretakers have to pay more attention to the children to assure they were weren’t wandering too far, rather than becoming overly engrossed in reading their newspapers. Without a fence, children can feel free and exercise their own sense of limits. While at the same time, caretakers have to be present in the moment—and this presence, this awareness could be considered as an integral component of the system itself. In this way, the configuration of objects was a pattern that patterned attention and awareness. The principle of soft-assembly describes the way development happens through the multimodal and spontaneous appropriation of the tools at hand; these tools can be “hard” as in playground equipment, or they can be “soft” the way that human awareness is soft but no less real or relevant to the way actions, movements or places and events are organized and come into being. Soft-assembly describes how development is constructed through process, how children learn to become self-regulating when given the opportunity to exercise their limits and receive feedback from their environment. Yet this can only happen when they have been given “a large pasture” as the Zen saying goes. As Suzuki says, “Even though you try to put people under control, it is impossible. You cannot do it. The best way to control people is to encourage them to be mischievous. Then they will be in control in a wider sense. To give your sheep or cow a large spacious meadow is the way to control him. So it is with people: first let them do what they want, and watch them. This is the best policy. To ignore them is not good. That is the worst policy. The second worst is trying to control them. The best one is to watch them, just to watch them, without trying to control them.”\textsuperscript{59} Here Suzuki summarizes the elusive, yet very real potential of generative affordances.

Affordances is a general term, as well as a generous and generative one, and articulating different ways that affordances function is not intended to be a pedantic exercise, but rather to stimulate thinking about the endless ways to engage our bodies and minds in the ecology of our daily lives. Articulating affordances can take us from abstractions to actions, from general behavior to specific gestures and can open more sensitive levels of awareness. When we architects interpret our brief in terms not of forms, but of potential movements and become aware of how those movements shape mood, attitude, disposition, memory and imagination, we engage the soft dimension of human consciousness into our configurative discipline. Details will speak not only to the trained eye of our peers, but to the contours and sound of the human hand, the curvature of the spine that affords breathing, the shape of the basin that directs a splash into a cascade, and the rhythm of rocking that animates the soul of the porch. The circle of play and the bench that makes a place, the circle of light illumined by the candle that makes an occasion, the attention paid to these specifics has been the missing link in the education of an architect concerned with the top down approach that fails to consider and support the rituals of daily life in pursuit of the abstract ideal. In the words of Aldo Van Eyck, “Whoever attempts to solve the riddle of space in the abstract will construct the outline of emptiness and call it space. Whoever attempts to meet humanity in the abstract will speak with an echo and call this dialogue. Humans still breathe in and out. When is architecture going to do the same?”\textsuperscript{60}

\textsuperscript{58} Ibid
\textsuperscript{59} Ibid
\textsuperscript{60} Aldo Van Eyck, Aldo Van Eyck Writings, vol. 1- The Child, the City and the Artist, edited by Vincent Ligtelin and Francis Strauven. Amsterdam, SUN, 2008.
Although the theme of this talk is the idea of affordance within the humanities today, I would like first to consider the idea in an economic sense. Designers have limited time and money to put into the conception and realization of a building, and the question I would like to pose is on what exactly should they spend this time? What is the role of the architect in designing, documenting, and overseeing the project? A score of talented engineers can now provide nearly all of the technical specifications that go into a design, and a team of good contractors are capable of building almost any creation or aberration that the architect may concoct. So, what role does the architect play?

Some may argue that designers come up with the overarching “idea” of the design—that is, they provide the framework or what is sometimes referred to as the “aesthetic” expression of the building’s functions. Yet this view rings somewhat hollow to me, because it leaves out many other things. It seems to reduce the designer’s role—if I might borrow the binary option of the late Robert Venturi—to designing the wallpaper for the decorated shed, or sculpting the feathered locks of the duck. Wherein resides this so-called aesthetic idea, in any case? Even philosophers as deliberate as Immanuel Kant, as we shall see, were unable to find it. A little more than sixty years ago the great Finnish architect Alvar Aalto, in a lecture entitled “The Architect’s Dream of Paradise,” offered what I think is a more gallant and noble response to the question of the designer’s role, when he noted that “Every building, every architectural product that is its symbol, is intended to show that we wish to build a paradise on earth for man.”

Now these are high aspirations, because the notion of paradise is fecund with both lush images and historical meanings. The lost or future paradise stands at the core of the Hindu, Buddhist, Judeo-Christian, and Islamic religions. The Greek word ἄρδεισος, which appears twice in the Alexandrian translation of the Hebrew bible, comes from the Persian word پاریدیزگا, which mean an enclosed or walled-off garden. Thus, the word paradise is most generally associated with the garden.

This is also true with the great rulers of the ancient world. The famed Hanging Gardens of Babylon, as we now know, were actually located in the Assyrian city of Nineveh (present-day Mosul), and King Ashurbanipal went to great lengths to describe not his palace but the gardens that he had designed. The great imperial cities of China were built around

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Figure 3.0: Giulio Romano, 1499–1546, Italian painter and architect, Fresco on the south wall of Palazzo del Te. (Public Domain)

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the emperor’s palace, which was generally centered within or adjacent to the imperial garden. The city of Kyoto, the one-time capital of Japan, exists today as a city defined almost entirely by its imperial and monastic gardens. Plato and Epicurus gave their lectures in gardens. Hadrian built his imperial city at Tivoli (for a resident of one) in a vast garden. And the mesmerizing mosaic depiction of the wide-eyed Empress Theodora in the church of San Vitale in Ravenna is portrayed inside a garden pavilion. Early Christian monks who left their towns for the isolation of desert caves or forest huts alluded to them as paradises. Later in the Middle Ages, the reform-minded Cistercians referred to the cloisters of their austere stone abbeys as paradises. Imagine for a moment how indeed paradisical were their churches with their extremely high reverberation times, the aural spectacle of one hundred monks in a candle-lit midnight mass interlacing the precisely times phrases of their Gregorian chants (Figure 3.1). They must have imagined the collective sound as emanating from heaven above.

Do this mean that Aalto was misguided in his hope that designers could build another paradise? Or have we, as designers, lost our way in the muddy philosophical backwaters of semiotics, postmodernism, poststructuralism, deconstruction, and computer-generated software—all of which at least has had the benefit of wringing the last molecule of life out of a tedious and exhausting line of architectural theory. Like the Sirens of the Odyssey, theory has lured architects into the belief that the purpose of design is to play conceptual games or be edgy, as it were, through the manipulation of society’s cultural emblems. In doing so, we have overlooked the fact that architecture is predominantly a “whole body” experience—a multisensory, emotional, hormonal, and phenomenal one grounded in the entire bodily organism. This experience also arises in the dynamic interplay of the ecological, social, and cognitive environments. If design studios have emphasized the need to be creative in a fashionable display of glass boxes or twisted cutting-edge objects, Aalto’s notion of paradise was much simpler. He was simply voicing the desire to create an environment in which people would thrive and be happy.

II.

Yet how do we save our ship from being pummeled on the rocks of our own unchallenged design premises? The problem is not an easy one because of the great complexities of what we now refer to as global culture.

But perhaps we should start by admitting that we have, in recent years, been a little intellectual lazy. After theory crashed and burned sometime around the start of the new millennium, we have been coasting along a little too smugly. We continue to view the world in Cartesian dualities, such as the belief that we have material bodies into which are crammed the gray matter of thinking minds, or that we are subjects cast within an objective world somehow standing apart from us, something that we can manipulate at will. We continue to characterize culture as something out there in the world, something given and not of our making, something over which we have little or no control. We continue to ignore the fact that in the last quarter-century philosophy, the humanities more broadly, and the biological sciences have undergone a significant paradigm shift—to borrow a phrase from Thomas Kuhn. It is one that has uprooted many centuries-old ways of viewing the world. If we wish to start fresh in our pursuit of Aalto’s paradise, then perhaps the first thing that we do is to work with an up-to-date understanding of who we are as living organisms.

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In part, this new view of ourselves can be summarized by this passage of the philosophers Evan Thompson and Francisco Varela:

“The nervous system, the body and the environment are highly structured dynamical systems, coupled to each other on multiple levels. Because they are so thoroughly enmeshed—biologically, ecologically and socially—a better conception of brain, body, and environment would be as mutually embedded systems rather than as internally and externally located with respect to one another.”

There are two crucial points for architects that can be extracted from this summation. First, we cannot extract the organism from the environment in which it is embedded; our very existence is bound with it. Second, because architects build environments, they contribute largely to the environmental and social cultures in which our lives unfold. A little over a year ago, a group of European architects and planners at the annual gathering of world leaders in Davos, Switzerland, issued the proclamation that we urgently needed a holistic, culture-centered approach to the built environment. What does such an approach entail? We might start with the underlying premise of the new biological field of niche construction—that is, when an organism alters its environmental field, it also changes the natural-selection pressures of that organism. Saying it another way, every time we pollute the environmental field with poor objects of our own design, we demeane ourselves as a species.

Three interrelated terms stand in the forefront of the contemporary humanistic discourse: embodiment, enculturation, and enactivism. To say that we are embodied organisms by virtue of our bodies borders on a tautology, yet from a cognitive perspective it is important to clarify one essential point. Cognition in itself does not exist in the brain somewhere—ecologically and socially—a better conception of brain, body, and environment as dynamically structured systems mutually embedded. The original meaning of the word “culture,” taking it back to its Latin root, is growing or cultivating something in the soil of a prepared medium. The humanities and sciences are today actually returning us to this meaning. In architectural terms, culture is tending to the human organism within its built and social environments—the inseparable environmental and cultural medium in which our particular organism either thrives or diminishes.

The idea of culture is also related to that of enactivism, which is the idea that we are not bodies separate from and cognitively assessing an objective world apart from us. Rather, there is a dynamic interplay between the two, which cannot be suspended. Our constantly changing cognitive systems, through each individual and generational change, enacts or constructs the meaning of what we perceive. Each of us, living in a cultural medium, enacts a somewhat different world. And our different experiences, in turn, are a result of the mutual interaction between our sensorimotor capacities and the environment in which we dwell.


III.

And here we come to the idea of “affordance,” the theme of this particular seminar. In 1934, the biologist Jakob first approached the idea with his notion of the Umwelt, the surrounding world, or how our perception is defined by the sensory carriers of meaning particular to our organism. In 1979 the psychologist James Gibson carried this notion forward when he defined a “niche”—that which we as architects are presumed to design—as “a set of affordances.” He also noted that a “niche” stands apart from the idea of “habitat, because it refers more to how an animal lives than to where it lives.”

I will make the case that this distinction between “how we live,” as opposed to “where we live,” is crucial to a more responsible approach to design. It is pivotal because it suggests that we should be focusing less on what a building means to the occupant or to the designer (for the latter, usually a reaffirmation of the latest fashions), and more on how people experience them. Take these two somewhat random images.

One is the almost prototypical American urban street: little direct sunlight within the canyons of the tall buildings, concrete sidewalks, glass boxes with no detailing—in short, a cold, boring, and lifeless design offering no sensory spark or engagement. Various studies have shown that people pick up their pace when walking past such buildings, in order to move away from them as quickly as possible (Figure 3.2). Unfortunately, the glass box adjacent to it typically provides only more of the same. The American anthropologist Edward T. Hall, back in the 1960s, made the observation that the failing of modern architecture was precisely its lack of scale and tactile stimulation. As he described the problem: “Our urban spaces provide little excitement or visual variation and virtually no opportunity to build a kinesthetic repertoire of spatial experiences. It would appear that many people are kinesthetically deprived and even cramped.”

This statement was made fifty-three years ago, and yet we seem content with making the same mistake. Perhaps an even more embarrassing question is why are we content with designing with the architectural palette of a half-century ago?

The other image, admittedly situated in a better climate, has, by contrast, sunlight, greenery (so important in relaxing the optic nerve), texture, scale, history, and of the affordance of multiple transportsations, which allows us the healthy exercising of our biological organism (Figure 3.3). Why is it that architects, and even those studying architecture I dare say, still tend to gravitate toward the so-called solution on the left? It is because we are focused on the object and not the experience of the urban inhabitant. Designers are looking for a technological solution rather than creating a human niche that allows people a set of affordances.

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points of high congestion, and shadowed streets on which many people walk past these glass boxes in a very unhappy frame of mind. Parisians, living within a different cultural niche, interestingly still restrict their high rises to the outskirts of the city.

I once lived in Chicago, and from the 35th street station on the Red Line, one can look north to the impressive skyline of Chicago. People commuting into the city on freeways from the west also view the skyline as they are arriving, no doubt with some pride or sense of self-importance. Yet over many months of the year, people walking those downtown streets do so with little joy. The cardinal grid channels the howling winter winds into the glass-and-concrete canyons at great intensity. Trash litters the sidewalks. The ambient noise level of the overhead mass-transit system and the horns of the automobiles are only slightly less disturbing than standing at the end of a runway at O’Hare Airport. The air is fowl, and the tens of thousands of commuters emerging from their parking garages or bleak subway stations, twice a day, have to endure this hellish experience of walking to or from their offices—where, if their desk is less than twenty feet from the window walls, they will shiver away their body heat all day long. I think my point is now rather obvious. Architects radiate a distinct glow when asked by fawning critics to expound upon the inspiration behind their glass towers, aesthetically fashioned with the latest twists and bends. Yet the experience of the residents negotiating the city on a daily basis is more often than not a hellish one—even if their iPhones can direct them to the nearest pub or pizza parlor. How did we come to this present state of affairs? Why do we employ such vacuous standards in our designs? There is a line from a Clint Eastwood movie that pretty much explains it: “We became civilized.” The legacy of these dumb glass boxes plopped in every city across the globe will nevertheless remain with us for quite a while. Whatever happened to Aalto’s dream of paradise?

IV.
Just what can designers afford? Andy Clark defines affordance this way: “Affordances are the possibilities for use, intervention and action which the physical world offers a given agent and are determined by the ‘fit’ between the agent’s physical structure, capacities and skills and the action-related properties of the environment itself.” Like in particular the idea of a “fit” between the human organism and “action-related” qualities of the environment. And because one perceives the built environment through one’s sensory and emotional engagement with it, the architect’s task would seem to be creating environments that are intriguing or compelling in some manner, environments that are adaptive to our organisms, environments that are restorative or restive, or more simply, environments that make us happy. Conversely, people shun environments that are dangerous, annoying, tedious, and injurious to their health.

Yet because we, as a society, seem unable to repair the impoverished or dilapidated parts of our cities, or maintain our dark and filthy mass-transit stations where we are jammed into overcrowded trains, or relieve our suburban commuters of their two hours of bumper-to-bumper travel on so-called expressways—we run up against the difficult question of what can architects really afford? Can we really think of changing the patterns that have been set down over generations, as it were? Can we any longer contemplate, as Aalto once did, a vision of something different? In what way can we realistically provide a better “fit” or attunement of the human organism with the action-related prospects of its surroundings?

Although there may be no timely or inexpensive solutions to the many failings of our present environments, we can at least start by reforming our profession, and in this regard, I would like to begin with a radical reform of architectural education. For a start, I would like to see significantly less studio time devoted to coming up with the “idea” for a design, or how we might ape the latest trends in our glass boxes, and more on research into the human experience of designed environments—that is, serious research funded by federal agencies such as the National Science Foundation or National Institute of Health, or private foundations. It should be research carried out with the very sophisticated technologies we have at our disposal today to evaluate better how we engage with our environments. In the 1960s the Green Movement first articulated our shortcomings with regard to the impact our poor designs were having on our natural environments. Today it is time to address the equally pernicious effects our designed environments are having on us—how we think and how we socially engage with each other. Some may argue that this time spent on research will lessen our skill as designers and thwart creativity, yet I believe the opposite to be the case. Architecture students are very smart and can handle both tasks, and school is a time for learning and not to suffer an indoctrination into the unwritten rules of the profession.

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Understanding better who we are and our intensely social natures will open up fresh and creative approaches to the design of our cultural niches. Moreover, without such documentation, architects will never have credibility with zoning boards, planning commissions, or the heavy arm of the ever-expanding and oppressive political state. We should reinforce the point that our ultimate objective is good design, or even better, beautiful design. And in considering design from a human perspective, we will put an end to the intellectual fashions that seem perpetually to plague the field of design.

Now what kinds of research do I mean? The range can be quite extensive but let me give you a couple of examples. You are a mostly young audience, who have not entered into the tedium of the workforce, and therefore you have not yet been forced to come to terms with the idea of a precious two or three-week vacation each year, where people go fishing, rent a cabin in the mountains, visit a foreign country, or stay at a seashore resort. Now why do people feel the need to do such things? We of course have the appropriate technological metaphor for needing such a thing; we say we do so to recharge our batteries. We mean by this that we need periodically a place to relax, to relieve our anxieties and tensions, to take in new sensory stimulation, and forget the fact that we are nine thousand dollars in debt on our credit cards. Yet we are also saying something else when we take on these annual treks. We are saying that beaches, golf courses, mountains, or a trip to a foreign country are in their own way paradises, which are remote from our everyday designed or built environments. The more dismal our local urban environments are, the more these trips are necessary to maintain biological equilibrium and good health.

Yet these trips also tell us something else, which can inform our everyday environments. A few decades ago the psychologist Roger Ulrich looked at the recovery rates of patients after a surgical procedure that on average required six days in the hospital. He looked at patients in a hospital wing that had two different outside views. One part of the wing faced a brick wall; the other part of the wing opened onto a green meadow. He discovered that the view of nature, in and of itself, has a restorative effect on the human body. Those patients with a view of the meadow stayed in the hospital one day less, had few complications after surgery, and took fewer pain medications. This study not only told us something important about ourselves, but, as it turned out, it also had a profound effect on the design of hospitals, which today are being designed and built around gardens, which I, following the ancient Persians, will call paradises. It also opened a new realm of design thinking—biophilic design—or the integration of nature into all of our designs. Think of this the next time you design a building with a view of a brick wall, or worse, a parking lot.

We have many other areas in which research is needed today. Ulrich’s study of hospital rooms concerned the homeostatic regulation of the body within the built environment, through the medium of evidence-based design. Yet with the same techniques we can study the effects of poor environments, or what might be called environmental deprivation. They are many, well-documented studies of the negative effects of such environments, among them, obesity, disease, depression, stress, crime, drug addiction, alcoholism, asocial behavior, psychological and personality disorders, and higher rations of morbidity. We have known these problems for years, yet we as a society seem to be incapable of improving our poor urban environments—helpless as we seemingly are. Conversely, we have done virtually no research on what constitutes good or enriched environments, although studies with rats have shown that sensory and socially enriched environments can double the size of brain cells and greatly enhances synaptic connectivity. Does this mean that good environments can make us smarter?

We also have another way of thinking how we engage or experience the built environment, which revolves around our sensory systems. We have proprioceptive, kinesthetic, sensorimotor, and mirror systems; emotional, visceral, and hormonal systems; visual, auditory, and olfactory systems; and then there is the breakthroughs in how we engage with form and space. The discovery of mirror systems in the 1990s, for instance, will in the future have profound implications for the field of architectural design. Through a process that has been called embodied simulation, mirror systems in the premotor and parietal areas of the brain, for example, allow us to simulate not only the actions and intentions of others but also the physical characteristic of the environment, such as the perception of form, space, light, scale, color, texture, materials, among other features. Where are these topics within your design-studio curriculum?

A third area in which we, over the past few decades, have made important progress about ourselves is the recognition of how profoundly we are social animals. Only very few architects, such as Christopher Alexander, have wandered into this terrain, and he did so with only modest and sometimes questionable social-science models. Today we have made major advances into understanding the parts of the social brain allowing us to network with others, the environmental factors imperative for the full development of the social brain, our much longer evolutionary history, and the ubiquity of human rituals, which lie at the foundation of our behavior. Once again, I ask the question: Where is this topic within your design-studio curriculum?

There is far too much here to discuss today, so I will limit myself to two areas of interest to architects. One is the role that emotion or mood plays in the experience of a designed environment. The second is the seemingly quaint idea of beauty, which I will obviously not be discussing by the standards of architectural design juries.

The idea of emotion and mood actually has had a lengthy pedigree in architectural discussions going back through architectural history—that is, before the advent of the modern movement short-circuited it. Aestheticians of the 19th century also seem to have had a good grasp of mood and perception, matched only by what we have learned in the past few decades. Both Robert Vischer and Heinrich Wölflin, for instance, argued that the experience of architecture was emotional and physiognomic—a process by which we feel ourselves into and understand the world around us. August Schmarsow made precisely the same argument with architectural space—that is, spatial perception is not a neutral or Euclidean field but something that changes with the position, orientation, and affordances of our bodies.11

Traditional psychology textbooks of just a few decades ago defined mood or emotion as a response of an organism a sensory stimulus, the way we typically think of emotions such as love or anger. Present models, however, view mood in a much more complex way. For many within the field of affective psychology, mood is defined as an ongoing, endogenous kinesthetic activity onto itself, the predisposed movement of an organism within an environmental field. Mood is not something that rises up from some mysterious place below; rather, it is a “whole-organism” event motivating our movements and actions. If we walk into a social environment of other people, for example, we immediately understand the mood of the room. If we walk into a boring architectural environment, our first impulse is to leave or tune it out.

Just as the appearance of a morning sun seems to brighten the prospects for our day, or a drizzling rain seems to dampen it, so does every architectural environment alter our mood or way of thinking. Upon entering a room in a northern climate, for instance, we might instinctively move toward a sunny window, both to enjoy the warming heat of the sun and to rest our eyes if there is a pleasant view of paradise outside. Again, if it is spring and the window is open, we might enjoy a whiff of a fragrance emanating from a garden, without being aware that this sensory experience in itself puts us into an amiable state of mind. Please note that inoperable windows do not allow this affordance. Maxime Sheets-Johnstone has emphasized that “affective feelings and tactile-kinesthetic feelings are experientially intertwined.” Mood is already “a postural attitude” or “corporeal readiness to act.”12 We might then think of the open window as more than just sunlight or view of a garden; it is an affordance that swells our mood, perhaps with memories. Giovanna Colombetti argues that emotion pervades cognition through and through, and thus emotion “is integral to both perception and action.”13

Architects can exploit this connection. We can design spaces that are permeable, or offering different courses of action. We can modulate these spaces through the play of light, scale, color, texture, relation, materiality, movement, sound, olfaction, and the depth of layering effect upon effect. A long and indirect approach to a building or a narrow path into an expansive room—both build a mood of anticipation or arousal, thereby intensifying the hopeful emotion of delight upon one’s arrival. Similarly, beautifully crafted detailing also pleases everyone. Why? Because with our mirror systems we emulate the talent or hand-crafted effort that went into the ingenious result.

Mood also varies with the experience of atmospheric and conceptual effects. For instance, in medieval France there was a 12th-century movement called Marianism, a Christian fondness for the Madonna, which resulted in a bevy of Gothic churches dedicated to “Our Lady” or Notre Dame. Why was this the case? One reason was that Christian theology up to this time had been emphasizing the idea of the Last Judgment, the possibility of fiery and eternal damnation. Mary, with her head slightly tilted to the right, thus came to be seen a merciful intercessor on one’s behalf, someone more empathetic and approachable. Thus, this stained-glass window of Mary in the chancel of Chartres Cathedral, one of the original windows of the 12th-century church (later rebuilt after the fire of 1194), is a masterpiece of color and light, because it fosters the mood of hope and salvation. It did so with the demeanor of the Madonna, but also with the seemingly supernatural nature of light filtering through, which was entirely fitting for a building that medieval architects viewed as the doorway to paradise, if not paradise itself. Aalto no doubt applauded the efforts of this master craftsman of glass.

Mood can be manifested in many other ways. Hans Scharoun’s Berlin Philharmonic Hall, despite its cosmopolitan location, evokes the spirit of a small town’s music festival. Not only does the tent-like ceiling project the festive mood of a special holiday and its provisional structure, but the stepped tiers on all sides afford one to experience not only the orchestra and its powerful auditory vibrations but also the view of another’s response to what you are experiencing. Scharoun’s building is thus intensely social in its mood.

Not all emotional experiences, however, have to be so intense or expressive. Jørn Utzon’s own house in Mallorca achieves its emotional power or through its utmost simplicity: the social anticipation of conversational seating, exposed stonework, and a sublime Mediterranean view exploited with a deep perspectival frame (Figure 3.5). Robert Adam was another master of mood, someone who could dramatically alter one’s mood from one room to another. Can one think of a more compelling artistic production than his library at Kenwood, Hampstead, London.

Another master of mood was Henri Labrouste in this design for the Bibliothèque Nationale in Paris, now unfortunately retired for its original purpose. Once again, a festive mood was exploited with the books, the paradisical gardens depicted in the murals, and the porcelain umbrellas filtering natural light for reading. Not to be overlooked in this regard was the tactile sensation of the infill panels of the desktops—glare-free and a soft, perfectly muted surfaces for the requisite lead writing instrument. What could be more paradisical for the work of the scholar. Architects of the 18th and 19th century knew how to exploit mood in subtle ways that many designers have since forgotten. The library at Mount Angel Abbey in Oregon, is approached from a courtyard paradise on the entrance side, but the reading room is situated on a hilltop to survey an agricultural landscape interrupted by treescapes along rivers and streams. Aalto, it seems, viewed buildings as experiences.
Let us turn to the idea of beauty, and in an unconventional way. Architects typically do not like to speak of beauty, yet they do talk, sometimes endlessly, about the aesthetic inspiration underlying their designs. And in this regard, we already have a level of corruption creeping into practice. The English word aesthetic comes from the Greek word Aisthētikos, which has the meaning of “perception, feeling, or sensible cognition.” In this regard, its meaning is grounded not in reflection or judgment but in the sensory or corporeal senses. Alexander Baumgarten, who first plucked the word from the past and introduced it into the German language in the 1750s, understood this very well. He emphasized its emotional coloration by defining aesthetics as the “science of sensible cognition.”

Problems became apparent a few years later, however, when a host of philosophers debated whether the judgment of beauty was objective or subjective, whether it resided in the outlines or contours of the artistic form, or in the mind of the viewing subject. In almost all cases, the idea of beauty was bound with the idea of making a judgment. Immanuel Kant, in his Critique of Judgment, considered the issue of beauty and went to great lengths to preclude the idea of “feeling” or “emotion” from the act of judgment. At one point, as we suggested earlier, he even proffered the ghostly notion of “aesthetic ideas”—that is, conceptual ideas involving the imagination without any “definite concept.” Yet only a few pages later, he flatly contradicted himself by invoking the philosopher Epicurus, who had insisted that all aesthetic “pleasures, at heart, issue from a bodily sensation.”

Kant’s reasoning aside, this 18th-century fascination with “judgments” of taste or beauty has kept Western thought in its lurch until the present day. Conceptual art is but one manifestation of this disease, which unfortunately seems to have no expiration date.

Yet the idea of affordance, which involves the “fit” between the human organism and the sensory or action-related qualities of the environment, allows us to approach the idea of beauty in a different way. When people outside of the arts say that their lover is beautiful or that this artistic work is aesthetically satisfying, they are not making a conceptual statement. They are referring to a sensory impression, one that fits with the action-related qualities of their immediate environments, and one whose intense feeling they have a genuine desire to express. When someone stands before this particular mural in the church of San Vitale in Ravenna, one is immediately attracted to the colorful mosaics, but upon further study one is also drawn into the enlarged eyes of the people within the retinue of Empress Theodora. These are eyes into which we read the souls of people who lived almost seventeen hundred years ago. Art history books may refer to this particular mural as iconographic, but art historians often miss the point. This mural is paradisiacal because it is deeply social in its bearing. We say it is beautiful because it tells us something profound about ourselves.

As another example, let us take the painting Primavera by Sandro Botticelli, a work of the early Italian Renaissance (Figure 3.6). He was closely associated with the Medici family in Florence, one of whom seems to have commissioned the work for a wedding. Once again, art history textbooks devote nearly all discussion to its iconography. The title of the painting, Primavera, of course, refers to the season of spring, and the rounded bellies of most of the ladies portray the ripeness of the new season. The male figure of Zephyrus on the right, who represents the cooler winds of winter, is about to kidnap the nymph Chloris, whom he will wed and transform into the goddess of spring, Flora, who (after her transformation) is the woman in the floral gown scattering rosebuds on

the ground. Mercury stands at the far left. He was the god of medicine and is therefore another allusion to the Medicis. To his left are the three graces of pleasure, chastity, and beauty, and it is the middle figure chaste, with the trim figure, who is about to be nabbed by the arrow of Eros. Even the fact that the painting takes place in an orange grove is representational, because oranges were depicted on the Medici coat of arms.

It is when we come the haloed figure in the center—Venus, the goddess of love—that we realize something else is going on here. The intense sexual overtones of the figures surrounding her are there to induce a particular passion, a lustful feeling for love, yet Venus stands apart. The gesticulation of her right hand is a pose that many early Renaissance painters chose for the Madonna in the Annunciation, and the head tilt to the right and the facial structure of Venus is nearly identical to that of Mary we saw in the Chartres Cathedral. We have here a very interesting passage between two cultures: the high morality of Christianity and the more carnal or pagan underpinnings of the new Humanism taking hold—and not without its peril to the career of Botticelli himself.

We can see this also in Botticelli’s painting of a few years later, The Birth of Venus, also commissioned for a wedding celebration. A few of the earlier figures reappear, but here the deity born in the clam shell off the isle of Cytherea, which incidentally was always portrayed in mythology as a garden paradise, is given center stage. In her full nudity, we have a more human and sensuous figure, yet once again she has the head tilt and the somewhat Gothic appearance of the Madonna. My point is that both paintings by Botticelli are social expressions in their subject matter, expressions that we experience not through words but through our own social and emotional natures. And it is no mystery why these two works remain widely recognized as beautiful today. Although executed within a distant and somewhat remote culture of the past, they retain their emotional power because of the rich social expression they so elegantly convey. From the perspective of an affordance, we can say they perfectly define the “fit” between the human organism and the sensory or “action-related” qualities of the social environment in which we too, in our own way, are living.

It is certainly no coincidence that both paintings were completed during the time that another Renaissance writer was completing his erotic novel Hypnerotomachia Poliphili, set in a series of gardens, through which Poliphilo must wander to find his true love Polia. He eventually weds her at the altar of Venus on the island of Cythera. The interesting thing about this novel, written in the spirit of troubadours, is that while the author devotes much time to describing the ravishing beauty of the nymph Polia, he spends an equal, if not greater amount of time, describing the various gardens he visits as well as the architecture that he discovers. This has led at least one architect, Alberto Pérez-Gómez, to argue that architecture originates in a similar erotic impulse. I do not contest him in this belief. In fact it might be a way to think of design once again in paradisical terms.

The point of my foray into the world of art is twofold. First, I believe the profession has today succumbed to what Max Horkheimer and Theodor Adorno once referred to as the “culture industry.” We are being forced into a dreary cultural conformity of Big Brother’s making, where the same “art objects” are being restyled or repackaged each new season. The city of Arles or the Philadelphia Museum of Art does not need another museum or addition by Frank Gehry to mark its cultural niche. To put it more simply—in focusing on buildings and objects and not on the environment field in which we dwell, our priorities are wrong. I believe that we need to turn our present thinking around, because Aalto’s dream of paradise, like it or not, is deeply imprinted within our enculturated natures. Every social compact disassembles when people are unable to work within or enjoy their living environments.

Second, a viable culture of beauty has to be built on a solid social foundation. The current research on our mirror systems, for instance, is today demonstrating that we have a neurological resonance with the intentions and feelings of others, and “these other-within-self intersubjective representations,” as Jaak Panksepp and Colwyn Trevarthen explain the matter, “establish sympathetic resonances, and intersubjective contagions, probably by intrinsic affective systems situated much lower than the neocortex, making complementary adjustments to the intelligence and feelings expressed in gestures of other bodies and sensed by sight, sound and touch through neocortical processes that are epigenetically
The gist of this statement is that we are deeply connected to each other socially or culturally, although the drift of society today seems to be moving in the opposite direction.

Joseph Rykwert, back in the era of Robert Venturi’s fascination with the Las Vegas, warned architects not to succumb to “the techniques of advertising and the night joys of neon,” but rather attend to the physical form itself, “the stage on which the action occurs, in his words,” the “demarcation of a place as a social situation” (Figure 3.7). The task of good designers, he went on to say, is “to clarify, to reconcile, to fortify,” and “the savant exercise of their skill is the real contribution which they can make to the creation of a valid human environment.” Hans-Georg Gadamer has similarly argued that every genuine work of art “signifies an increase of being” or “sensuous abundance,” and when embodied in rituals or festivals, it brings people together in a swelling moment of conciliation.

Seen in this light, the search for beauty is nothing less than a moral and professional obligation. Beauty and the architectural making of culture are, in the end, forms of ritualistic behavior. And examples of human action free of this ceremonial instinct, as Wendy James has noted, “are impossible to find, because all human action relates in some way to arenas of culturally specified significance we participate in with others.” Beauty and culture are in their own way social activities underlying Aalto’s vision of paradise. Both are similarly affordances—those which allow us a moment of fit and fullness, and those which the designer should have the calling to create.

Figure 3.7: The courtyard of Louis Kahn’s Salk Institute (1972) gathers the ANFA congregation to await the equinox sunset aligning with the central water trough. Here architecture frames events of human life. (image by author).

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