Skin Problems

> … the essential fact is that [our] time is mentally ripe for the methodic attempt to compare three-dimensional space crudely defined as such by physics to a three-dimensional biologically defined membrane that exists between our body as a plasmatic weak substance and the latent or intangible bio-structural minute forces of the spheres.
>
> — Siegfried Ebeling, *Der Raum als Membran*

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The Cooper Union

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Figure 1: Siegfried Ebeling, *Der Raum als Membran* (1923)

In 1926, German architect and Bauhaus theorist Siegfried Ebeling published a pamphlet-sized manifesto entitled *Der Raum als Membran (Space as Membrane)*[1], an obscure, marginalized text that, despite having a profound influence on Mies van der Rohe's conception of architecture as an organic assembly of "skin and bones", was until recently an all but forgotten episode in the history of architectural discourse. In the pages of this small but explosive text, Ebeling, dismissive of many of the tenets of the burgeoning modern movement, instead envisioned a "biological architecture" that privileged the sensual over the rational, the plasmatic over the plastic, and the atmospheric over the concrete. Indifferent, if not antagonistic, towards the novel structural systems and tectonic organizations that industrialized materials and construction enabled, Ebeling was concerned with the production of a physical and psychic "space-membrane" that expanded outwards from the skin of the body, a continuum of the human organism that actively engaged with a myriad of forces in the surrounding environmental context. A predecessor to Banham's *Architecture of the Well-Tempered Environment*, Ebeling's vision, predicated upon a responsive skin that mediated the exchanges of energy radiation, light modulation and air ventilation between interior and external environments, challenged the medium of architecture itself. Citing and evoking architectures that were materially and performatively diverse as glass wall cavities filled with saline solution for managing and distributing solar gain, metals for conducting electromagnetic energy from the atmosphere, circuits for measuring and modulating light levels in the domestic interior, and the harvesting of the psychological energies emitted from inorganic site material,[2] Ebeling's "biological architecture" was about finding an equilibrium with, rather than the negation of, the external environment in order to produce a new type of architectural organism.

In relation to the current global environmental crisis, Eberling's theoretical propositions for a "biological architecture" seems almost prophetic, as many of the

architectural qualities described in Space as Membrane have resurfaced in contemporary architectural practice in the guise of sustainability. The enormous pressure on architecture both as a cultural discipline and as a material practice to produce environmentally conscious buildings is intensifying. Architects, engineers and contractors, while maintaining expediency and economy of the building process, are now forced to reevaluate building material choices, the processes of construction, and the performative properties of the architectural object in relationship to environment, at both the scale of the global and local ecology. This has had a profound impact on the technical development of the building envelope, as the diverse variety of ecological properties of biological skins have served as powerful and robust precedents in the development of the building skin.[3] Engineered, layered and articulated to possess a range of dynamic and responsive properties in relation to various environmental stimuli, building skins, at least through the eyes of the engineer, are operating more and more like biological organisms, exhibiting a range of almost animalistic behaviors through technical means. Increasing in sophistication and complexity, the proliferation of facade consultants and engineers are becoming more and more necessary to mitigate these growing demands.[4]

There is something curious in this development however, in that despite of all the advancements and professional attention sustainability has accrued in recent years, it has had little impact on the discipline of architecture or on the critical discourse of form. In a lecture given at the Cooper Union in 2011, Jesse Reiser and Nanako Umemoto noted that while sustainability has emerged as an important issue in the practice of architecture and the architect has an ethical responsibility to engage with sustainable issues and environmental forces, sustainability, at its core, is not an architectural issue. Contrasting 41 Cooper Square by Morphosis and the G. W. Bush Presidential Library by Robert A M Stern Architects, Reiser observes that "if projects by Thom Mayne and Robert Stern can both achieve LEED Platinum ratings, then purely performance-based sustainability fortunately has no architectural consequences."[5] Thus, the technological beefing up of the envelope has had little influence on architecture itself, the versatility and malleability of its systems and articulations having been virtually divorced from, or rather made subservient to, the formal and aesthetic objectives of the architect. This can be seen as a positive attribute, in that it does not contaminate that which internal to the discipline or impede formal expression, however one could also make the case that the lack of engagement with these forces, based partly in fear of disciplinary obsolescence, ultimately limits and stagnates the discipline.

This condition could be referred to as the Caffeine-free Diet Coke syndrome, which cultural theorist Slavoj Zizek describes as an object that is 'nothing in the guise of something…in effect merely an envelope of a void."[6] The same psychological forces that shape an object like Caffeine-Free Diet Coke, a product deprived of all of its malignant properties, are also present in our current state of architecture. The desire for a sustainable or eco-friendly building that has a zero-carbon footprint while maintaining the historical and stable image of architecture is, in effect, the desire to produce architecture in the semblance of architecture while removing from it all of its impurities, much in the same way Caffeine-Free Diet Coke operates. In the manifestation of this irrational desire, we eventually end up with a "surface form deprived of content," and prevent the possibilities for a new, or at least different, engagement with the ontology of architecture.

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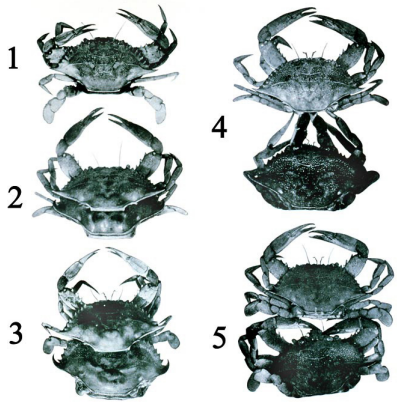

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Figure 2: Section through human skin, magnified 1000x

Figure 3: Series of pictures showing the progression of ecdysis in the blue crab

In order to fully realize Ebeling's provocation for a "biological architecture", perhaps these problems need to be addressed from the inside-out. If one were inclined, for example, to advance a series of disciplinary, as opposed to technical, problems founded on the skin, it would become evident where the limits of the skin analogy are currently delineated. There is a wide swath of properties possessed by a biological skin that are abandoned due to the fact they no longer apply to the stable disciplinary concepts of architectural envelopes and tectonic systems. The techniques of shedding, scabbing, scarring, wrinkling, puckering, blistering, freckling, as well as the range of reflexes and measures that cause goose bumps, calluses, rashes, and pimples, (not to mention the qualities and functions of other material arrangements suspended within or somehow arrayed across an animal skin, such as hair, fur, spines, manes, lashes, air sacs, scales, quills, feathers, setae, settles, and cuticles,) while perhaps bordering on the absurd, potentially provide the fodder for architectural invention via the building skin.

While architectures that share physiological traits and morphological resemblances to these aforementioned skin conditions, or use them in a metaphorical and/or rhetorical sense to structure conceptual ideas, are legitimate avenues for design research, a more radical approach might be to take these biological concepts deeper within the discipline of architecture to the organization and categorization of its core concepts, in order to question what Clement Greenberg referred to as the "limitations of the medium."[7] Such a transdisciplinary approach would have the potential to provoke, destabilize, and ultimately transform, architecture's internal assumptions and definitions, exposing a range of disciplinary criteria that are suddenly put into question. While this would undoubtedly be seen as a form of disciplinary heresy, this critical endeavor has the capacity to reinvigorate the discipline by rescribing its boundaries, thus challenging notions of autonomy and the definition of the discipline itself.

What would it mean, for example, for a building to "shed" its skin? What would be the aesthetic, disciplinary and discursive potentials in such an operation? Of the taxonomy of shedding techniques found in the animal kingdom (those deemed the necessary, natural process that are vital for the growth and health of an organism,) two processes stand out: desquamation and the dual operation of apolysis and ecdysis. In the case of desquamation, (the procedure by which human beings shed their skin,) individual keratinocytes (skin cells) are shed from the outer most layer of the epidermis as newly formed keratinocytes, produced in the lower regions of the epidermis, migrate their way up through the elastic matrix towards the surface in a constant state of tectonic upheaval.[8] Though an apparently discreet process, desquamation mitigates substantial material loss (the average adult human being sheds approximately one million cells per day) and regeneration (the epidermal layer of the skin is completely regenerated approximately every twenty-seven days). Despite the constant dissolution and reconstitution of the skin, the morphological and physiological characteristics remain the same, maintaining a stable appearance. Once shed, the individual discarded cells lose their correlation to the body entirely and with it their capacity for representational value, becoming loose organic particles, degrading into aformal agglomerations and fields of dust, where they engage in fascinating and disgusting micro-ecologies. Apolysis, the separation of the internal organism's cuticle from the inelastic epidermis/exoskeleton in order for a new one can be formed, and ecdysis, the actual molting of the former skin and the emergence

of the organism with a new, larger exoskeleton, are the shedding processes for a range of invertebrates. Unlike desquamation, where the procedure is a constant yet gradual process, ecdysis is a periodic event, the shedding of the skin happening all at once. As a result, there is little to no breakdown in the morphology and structure of the skin due to the rigidity of the chitin, thus leaving behind a ghostly vestige of the body in the form of an empty casing, a representation without content. The discarded icon maintains its representational value while simultaneously being an index, or trace, of the molting process.

The concept of a regenerative or transformative tectonic, the embracing of entropic processes and obsolescence, and the shedding and discarding of representational layers are all foreign to the discipline of architecture. These properties go against the most basic, if not primal, aspects of architecture and are in fact the very forces architecture resists. The impetus for an architecture, founded in its most primordial origins that linger to the present day, is the desire for a transcendental edifice, a monumental construction with the purpose of conveying stability, continuity, and permanence.

That is not to say that some of these concepts derived from the skin have not been explored before or are completely anathema to architecture. In line with Ebeling's thinking, many of the conceptual and performance art practices from the 60's and 70's, from Kaprow's *Happenings and Actions* to explorations of indexical processes and the "dematerialization of the art object"[9], were in fact well-positioned attacks on what were perceived to be the controlling and rigid boundaries of the artistic disciplines, incorporating themes such as planned obsolescence, immateriality, (prompted by Marshal McLuhan's writings on the new media), and the erasure of cultural signifiers in order to produce of a new forms of subjecthood.

One particular theoretical expression from this moment in history worth noting is that of the *Expendable Ikon* by John McHale. In the essay with the same title, he begins in stating:

> "The rise of mass communication coincides with the mass production of identical, replaceable products for astronomical numbers of consumers... Such accelerated changes in the human condition require an array of symbolic images of man which will match up to the requirements of constant change, fleeting impression and a higher rate of obsolescence. A replaceable, expendable series of Ikons."[10]

The convergence of kitsch aesthetics, accelerated mass production technologies and distribution networks, and the properties of new media produced conditions ripe for such an investigation into the ontological and metaphysical nature of objects. In tracing the hypothetical trajectory of an amorphous globule of material (in this case aluminum) as it goes through a series of "ikonic" cycles, being incorporated into several objects ranging from the head of a lighter, to a satellite launched into outer space, and then into the bumper of a car, we see a substance that is malleable enough to accommodate a diverse array of cultural representations. Sharing aspects of both desquamation and apolysis/ecdysis, the expendable ikon, in one sense, is a prescient theoretical position in relation to the necessary practice of recycling and takes into account many of the central themes from the shedding process of the skin: material transformation and dynamic signification within structured temporal fields. In this light, it becomes evident that the concept of removing and adding semiotic representational value

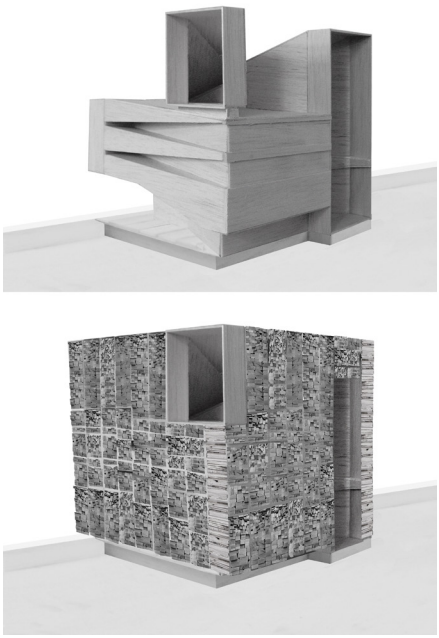

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Figure 4: CODA,Blookdline Self-Consuming Grill Pavilion

to an object is a critical aspect of shedding processes. Two minor projects that operate at the fringe of the discipline, though very different from one another, appropriate literal ideas about shedding: CODA's *Bloodline Self-Consuming Grill Pavilion* and Bittertang's *Microcosm Aquaculture*.

CODA - BLOODLINE SELF-CONSUMING GRILL PAVILION

CODA's folly entitled *Bloodline: Self-Consuming Grill Pavilion*, located on the grounds of the Akademie Schloss Solitude outside of Stuttgart, Germany, is the result of focused research on the conflict between ideal form and idiosyncrasies of program found in the eightieth-century Rococo palace. Finding interest in the "fire spaces," the compressed asymmetrical spaces that were relegated to the poche and used by the house servants to access the fireplaces in order to stoke and maintain the fires proper, CODA produces an object whose geometric logics are derived from its formal predecessors, the fire spaces in the Schloss and the nearby Ludwigsburg Castle. Using the cube as an extrinsic constraint, the pavilion consists of three interlocking tectonic systems: the awkwardly shaped poche element that is the offspring from the lofting the profile of a grill-window and an ashes-bench; the cubic frame the provides the scaffolding for the grillholz (German for "fire wood," used for the bbq); and the layer of cladding, formed by the dense aggregation of grillholz. The fireplace now transformed into a barbecuing and cooking pavilion, the grillholz is incrementally consumed by the grill throughout the summer, shedding layers to slowly reveal the different formal strata and gradually reveal the "asymmetric fire-space."[11]

Despite being rife with evolutionary and genetic metaphors, the pavilion is, in terms of its discursive thinking, heavily influenced by the late indexical project, present in the work of Peter Eisenman and Greg Lynn. A key difference however, lies in contrasting notions of temporality. In the indexical project, a set of legible formal procedures (such as shifts, shears, rotations, mirrorings, and later, lofts and morphs) are performed upon a stable set of geometric figures and organizations within a conceptual, or depicted, temporal field, represented through an exhaustive set of diagrams that describe the complexities of the process. The final result is a static object, materially inert and theoretically/conceptually operating atemporally, as to acknowledge either would undermine the formal narrative and negate the ability to evaluate the aesthetic qualities of the project, that the architecture is the index of the range of conceptual forces that are read by a close-reading subject. Despite the necessity for a depicted temporality to provide the space for the process to unfold, any form of manipulation, formal or otherwise, happening in the literal temporal field would be perceived as degradation of the theoretical and metaphysical concepts that ushered the building into being. While aspects of CODA's project resonate with this theoretical framework, (the mining of geometric and narrative material from the site and deploying a sequence of formal procedures that reveal conceptual connections between the object and the site,) the physical and conceptual treatment of materiality and temporality differ greatly. While the early work of Eisenman resists the physical aspects of materiality, opting for a more stable and inert concept of matter, in order to read form as an abstract notational system,[12] the material aspects of the wood play a vital aspect in the Bloodline pavilion. The simple programmatic operation of cooking devours the wooden skin of grillholz while simultaneously eroding the platonic form of the cube, an index of the programmatic forces operating on form. Therefore the processes behind the formal erosion of the skin are not conceptual in nature occurring in a virtual space, but rather are the actual

physical and material process based on the forces of program in a literal temporal field.

This aspect has some affinity with the concept of the cosmetic as described by Jeff Kipnis in relation to the work by Herzog and DeMeuron, where a highly calibrated engagement between materiality and natural phenomena, such as light or water, change and augment the material qualities and appearances of the skin, thus constantly shifting perceptions of the building and destabilizing the normative methods of aesthetic engagement and critique. In the case of the Ricola Europa Warehouse, for example, the precise control of water runoff that flows like a thin skin over the concrete, "causing it to reflect like glass when wet,[13]" perceptually renders it "lighter" than the printed translucent glass. The architecture is no longer a stable object with finite qualities, but now perceptually operates like an atmosphere, resulting in the disappearance of the body of architecture. While similar in its conceptual structure, the Bloodline pavilion differs in that the material engagement with natural phenomena (in this case fire) is not a cosmetic effect of material responding the climatic conditions, as the erasure or disappearance of the body is a much more aggressive act and the actual form of the building is altered through the meticulous and cyclical subtraction and addition of material. Thus, the building reveals the formal strategies that brought it into being through the season long dismantling and removal of layers, and, by no longer being stable as an object, is no longer relegated to be read through a "close reading subject" and resists previous modes of legitimacy.

BITTERTANG - MICROCOSM AQUACULTURE

Bittertang's *Microcosm Aquaculture* is not quite a building in the conventional sense and perhaps is a more extreme antecedent than the previous example. As with CODA's Bloodline pavilion, the concept of a shedding and "self-consuming" architecture is the result of the clever synthesis of formal narrative and programmatic function. Envisioned to be free-floating orbs operating in the murky medium of water, these inexact spheres are no longer satisfied with an architecture that mimics the effects and performance of biological skins. *Microcosm Aquaculture* incorporates living organic material in its "gelatinous wall section… allowing the spheres to be both reef and farm - the outer surface can nourish, shelter and provide substrate for various wild animals while the interior can be used as an unmanned an un-maintained fish hatchery or aquaculture pen.[14]" A "building" that is all skin and no bones, the *Microcosm Aquaculture* is primarily a material investigation that embraces ecological and entropic systems, mediating a larger web of ecological relationships beyond human beings and a diverse array of marine life. Composed of a membrane that is composed of kelp, sponges, and sea cucumbers that provide a safe environment for a range of bottom feeders and fish, that then dissolves within a pre-determined time frame, the *Microcosm Aquaculture* investigates the use of a literal green wall that serves not as a the application of rhetorical or representational device, but rather as an active material agent in a burgeoning temporal ecology.

Rather than relying on the inherent tension in the depicted/literal dialectic, Bittertang's pushing of the building material towards a literal biological and organic membrane prompts a new range of problems that are purely ecological in nature, allowing for the *Microcosm Aquaculture* to refrain from engaging a range of normative disciplinary problems and indulge and respond specifically to a range of ecological problems. Bringing to the surface that the material fact

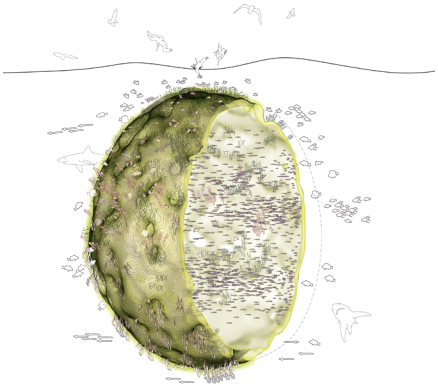

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Figure 5: Bittertang Farm, Microcosm Aquaculture

of architecture, independent of their discursive and disciplinary confines and the purported ideologies they support, is always engaged in and shapes local ecological relationships in the surrounding context, Bittertang is able to bring this ecological discourse as a novel set of criteria into the architectural discourse on form. Due to the fact that the *Microcosm Aquaculture* is in a Hieronymous Bosch-like aquatic environment allows for it to divorce itself from the metaphysics of ground. As the form of the sphere has always represented ideas of buoyancy as well as an antagonism towards the ground, the architectural methods of demarcating and scribing political and cultural boundaries are put into question. Additionally, familiar questions of program are also no longer relevant, as architecture viewed as a medium for social and cultural engagement are replaced by environments for exchanges of energy and co-existing temporal habitats. Human beings do not engage the *Microcosm Aquaculture* as they would any other building or piece of architecture but rather as a form of nature, a natural habitat that begins to produce its own specific ecological culture. This push towards the literal embracing of biological and natural systems makes the *Microcosm Aquaculture* simultaneously both architecture and nature, and, paradoxically, not architecture and not nature at the same time. Thus, the *Microcosm Aquaculture* benefits and suffers from the both/neither condition,[15] that ironically have a tendency to push the experiments outside their originally prescribed disciplinary boundaries, producing extra-disciplinary objects. Much like the experiments that produced cubist collage or the minimalist object, the *Microcosm Aquaculture* is a new disciplinary species.

What is central to the examples mentioned above is that the skin condition is now the primary driver for disciplinary experimentation. Driving architecture to critically reconsider its inherent conceptions of space, manipulations and engagements with the extreme environments, and the subject/object relationships to which it has grown accustomed, the experiments above might, through a number of critical iterations might not only allow the rescribe the boundaries of the medium unearth aspects at its core, but discover new mediums beyond the perceived periphery of the discipline.

ENDNOTES

1. Siegfried Ebeling, *Space as Membran***e** (Katherine Schoefert, Trans). In Pidgin 1 (Dalton: Studley Press, 2006) pp 88-107.
2. see Spyros Papapetros, *Envisioning the Architectural Skin of the Future* in Pidgin 1 (Dalton: Studley Press, 2006) pp 74-87
3. For examples on how engineering disciplines how used biological systems and properties as inspiration, see Janine Benyus, *Biomimicry: Innovation Inspired by Nature* (New York: Harper Perennial, 1997).
4. Frequent collaborations between OMA and Front (that include the Seattle Public Library and CCTV Tower), Zaha Hadid architects and Buro Happold, and the recent opening of the facade engineering division at Ove Arup are all examples of this recent trend.
5. Jesse Reiser and Nanako Umemoto, Lecture at the Cooper Union, Oct 25, 2011. see https://vimeo.com/36263506.
6. Slavoj Zizek,The *The Fragile Absolute* (New York: Verso, 2009), pp 22-23.
7. Clement Greenberg. "Modernist Painting" in *The Collected Essays and Criticism, Volume 4: Modernism with a Vengence, 1957-1969* (Chicago: U of Chicago Press, 1993), pp 86-88
8. The largest organ of the human body, the skin of an average human being alone has an average of 1.6 trillion skin cells, and sheds approximately thirty to forty thousand skin cells per hour, adding up to the loss of approximately one million skin cells daily. Over the course of a single year, the average adult body produces approximately 8 pounds of discarded skin in the form of dust, and if that is not enough to make one gag, are then consumed by the two-three trillion of dust mites that are living in the avg home.
9. see Lucy Lippard, *Six Years: The Dematerialization of the Art Object from 1966 to 1972* (Berkeley: U of California Press, 1997)
10. John McHale, *The Expendable Ikon: Works by John McHale* (Buffalo: Albright Knox Gallery, 1984) pp 57.
11. Caroline O'Donnell "Bloodline: Self-Consuming Grill Pavilion." *http://www.co-da.eu*
12. see Peter Eisenman, Cardboard Architecture in *Inside Out: Selected Writings, 1963-1988* (New York: Yale U Press, 2004) pp 28-29
13. Jeff Kipnis, "The Cunning of Cosmetics" in *A Question of Qualities:Essays in Architecture* (New York: MIT Press, 2013) pp 107-111
14. Michael Loverich. "Microcosm Aquaculture." *http://www.bittertang.com*
15. This "both/neither" condition was first articulated by Clement Greenberg in his Collage essay. Clement Greenberg, "Collage" in *Art and Culture: Critical Essays* (Boston: Beacon Press, 1961) pp 75

THE PROBLEM