

Uneasy Green: The Value of a Semi-Autonomous, Productively Critical Green Architecture

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INTRODUCTION

It is now beyond question that the global environmental crisis is the singular issue that will define the work of architects in the 21st century, if not beyond. While the work presented in this paper is a response to this mandate, unlike the vast majority of “green” or “sustainable” architecture it is not merely an uncritical reaction to it. Rather, it is a proposition—a proposition not only about the relationship between the practice of architecture and the planetary environment, but as well about the relationship between the discipline of architecture and the culture it addresses.

This latter relationship has witnessed a long decline, and its deterioration has profoundly impacted both the practice of architecture and its discourse. Long accustomed to speaking broadly to a unified culture through its works, and to deriving value and cultural status through its ability to do so, architecture has been increasingly frustrated as culture has become ever more heterogeneous, ideologically diverse, and chaotic. In the present cultural milieu, with its non-hierarchical platform for the immediate exchange of ideas via global networks, and through which the public has become not simply a passive audience but a highly differentiated multitude of idea generators as well, architecture has been unable to reconcile its traditionally monolithic, enduring, and unilateral nature with the fluid, temporal, and multivalent tempest of ideas, beliefs, and interests that characterize contemporary culture. Consequently, with an audience too embroiled in its own tumult of competing conversations to listen, architecture has struggled repeatedly, and vainly,

to discern amid the din some common denominator of value or interest to guide its efforts.

For the most part this has resulted in two primary responses: either an attempt to deploy architecture’s unrivalled formal expertise to produce monolithic works that appeal to culture’s unquenchable thirst for novelty, or else a foregrounding of architecture’s technical and organizational prowess in order to meet culture’s ever-present appreciation of performance and pragmatism. Both of these approaches, however, are problematic. As primary motivators for design, both novelty and performance fail to produce works that rise to the level of significance that has traditionally been expected of architecture, and whatever meager value they are able to assert is in any case only briefly retained in the face of inevitable formal or performative obsolescence.

From a disciplinary standpoint, moreover, such work is counterproductive. Although it might charitably be regarded as an opportunistic attempt to operate within an unfavorable cultural and economic context, in the long term such an approach only threatens to reify that context—legitimizing the lazy equation of architecture with either amusing novelty or else with technically performative, but otherwise mundane, building and, in the process, irreparably limiting the opportunities available to architects to do anything more profound. Absent a collective ideological common ground to serve as a basis for architecture to relate its works to the larger culture, the discipline can never hope to produce work of lasting significance, nor to appropriately distinguish itself from other practices.

However, the environmental crisis—a crisis which is of unprecedented significance and scope—could finally be that collective conversation that would allow architecture to address the culture as a whole and to thereby once again produce work of broad cultural significance and lasting value. But, as of yet, it has failed to do so. Instead, most of the recent work that seeks to engage environmental concerns has so far only adopted the aforementioned tendencies toward either empty formal novelty or else unremarkable technical performance. Rather than capitalizing on architecture's unique ability to change the way that people see and experience the world in order to convincingly demonstrate the possibility of a new, transformative green reality, architects have instead disappointingly offered either dubious formal experiments excused by specious performance-based arguments, or else unimpressive showcases of exceedingly banal green technologies—technologies whose ordinary or even invisible nature is specifically designed to make green-ness seem easy, conventional, and innocuous: three qualities which would normally be considered antithetical to architecture.

In sharp contrast, the work presented in this paper demonstrates a more appropriate way for architecture to respond to the environmental crisis, one in which the discipline's expectation to speak to the culture at large is finally redeemed through its unique ability to address broad-reaching and significant issues. While these projects do not reject the realities of the world by offering only utopian fantasies or else an overly critical negation of the real, neither do they hopelessly seek to produce effects through a myopic and uncritical engagement with the status quo. Instead, the projects presented in this paper are collectively focused on *transforming* the real—transcending the popular but otherwise false dichotomy of critical autonomy and post-critical engagement by asserting the value of a productively critical *semi-autonomous* position for architecture.

This *semi-autonomous* position—sufficiently engaged with culture and the market to produce real and positive effects yet not so subsumed by it that it has lost its critical distance—allows the discipline to make plausible propositions that have the potential to critically redirect the flow of the mainstream, rather than being constrained by it. In the case of the cultural as well as architectural response to the environmental crisis, such a course correction

seems necessary—and unlikely to occur through the discipline's present embrace of an indiscriminant post-critical engagement with the market.

A CRITICAL, EXPRESSIVE APPLICATION OF TECHNOLOGY

To date, the cultural and architectural responses to the environmental crisis—epitomized by the concepts of “green-ness” and “sustainability”—simply reinforce a long-standing and problematic conceptual division between humanity and the natural world. This division, which is mediated by technology, is anthropocentric in nature and artificially frames the environment as a human *resource*—or, in Heideggerian terms, a “standing reserve.” In fact the concept of *sustainability* is premised on this anthropocentric, resource-centered understanding of the environment—encouraging responsible consumption and targeted technological intervention in order to conserve the resource value of the planet.¹

It is arguable, however, that no real solution can be found to reconcile the earth's burgeoning population with its limited capacity without a more fundamental—and difficult—ideological shift away from the dominant anthropocentric understanding of the world based on technological control and toward a more ecological one in which humanity is seen as continuous with the larger environment, and finds its place within this multilateral ecosystem through a continually negotiated equilibrium rather than through a unilateral mastery.

Since technology is the interlocutor between humanity and the environment, it is therefore crucial in establishing the framework through which humanity understands its relationship to the world. Accordingly, the work presented herein takes careful aim at the uncritical manner in which technology has so far figured into environmentally conscious architecture. In contrast to the prevailing “green” or “sustainable” architecture that continues to endorse the idea of the environment as a resource and humanity as its (increasingly responsible) master, the projects presented in this paper critically exploit the rarely acknowledged *expressive* potential of technology—leveraging that expressive potential to fundamentally and positively change the way that humans understand their place within the planet-wide ecosystem, and to thereby promote increased environmental consciousness and

a way of interacting with the environment that is more ecological and viable over the long term.

The following two projects are intended to serve as a demonstration of this more positive approach—offering immersive spaces that allow its occupants an experience *outside of* the dominant anthropocentric paradigm of human technological control and consumption of the environment. Each provides a semi-autonomous experiential environment that challenges the prevailing anthropocentric and resourcist framework within which the natural world is understood, a space in which a technologically-driven assumption of equilibrium and control is scrutinized and challenged. In the process, the occupants are encouraged to let go of the dichotomous, hierarchical, and anthropocentric framework through which they currently understand the world at large and their relation to it (and which is, in fact, implicit in the very term *environment*)², and to instead arrive at a more holistic, mutualistic understanding.

THE ELEMENTALS

The Elementals—a series of four unique eco-tourism cabins that have been proposed for sites throughout California—have been designed to create experiences of the environment that counteract the prevailing logics and assumptions that are based upon an abstract, resourcist perception of the environment.

Located at sites of intense resource-based activity, each of the *Elementals* are designed specifically to experientially implicate the individual as an active consumer of the natural environment, and also to critique this exploitative relationship by creating unique environments for viewing the landscape in which acts of consumption or control are foregrounded, problematized, and contested. This is accomplished in the case of each of the *Elementals* by creating an inhabitable scenario in which the primary desire of the occupant—namely, the view of the surrounding landscape—is cast in the role of a *limited resource* that is inextricably linked to an aggressive act of occupation. In order to consume this visual resource, the occupant must participate in an occupational act that both transforms the landscape in a dramatic way and also underscores the limited nature of this visual resource.

In the case of the *Water Elemental* (Fig. 1), for example, the view of the surrounding landscape is

slowly denied as water is consumed. Located on a small promontory thrust into the midst of the Hollywood Reservoir, this particular cabin is held aloft by a framework supported by two large hydraulic cylinders whose pressure is governed by the hydraulic pressure in an adjacent water well. When the water column in this well is at full capacity, the pressure in the system is sufficient to hold the cabin fully aloft, allowing the occupants a dramatic view over the crest of the Mulholland Dam to the skyline of the city below. However, the non-potable water used by the occupants of the cabin is pumped directly from this water well. Every time an occupant uses the shower, turns on the faucet, or flushes the toilet this act of consumption reduces the volume of the water column, which reduces the hydraulic pressure and therefore lowers the elevation of the cabin, thus blocking the dramatic view of the city skyline.

In the *Ground Elemental* (Fig. 2), the very cabin that provides the sheltered area from which the panoramic view takes place also threatens the ability to sustain that view. Located near Avenal, CA, the site for the cabin is a flat hilltop that overlooks a broad expanse of the vast agricultural landscape of the San Joaquin Valley. However, the cabin itself is stored beneath the site in a recessed bunker hidden under four large hinged trays planted to match the surrounding grasses. In order to access and occupy the cabin, a control box in the parking area below must be activated, which causes the grass trays to fold upward to form the pitched roof and side walls of the cabin. These are completed by a floor assembly that raises up from below, and which includes the front and rear glass facades. However, the grass trays that make the characteristic house-shaped enclosure for the cabin are oriented with the planted surfaces facing the interior. Over time, the repeated action of raising the cabin out of the ground, the lack of sunlight and rainwater to feed the grass, and the protracted exertion of gravity will combine to cause the grass and soil to slowly rain down upon the occupants, undermining the ability of the cabin to successfully serve as a sheltered space for viewing the landscape. This scenario therefore transforms the sheltered view into a limited resource consumed over time by the occupant.

The *Wind Elemental*, meanwhile, renders the view completely dependent on the availability of wind energy. Sited within the heart of the San Geronio pass, which is one of the windiest places in Califor-

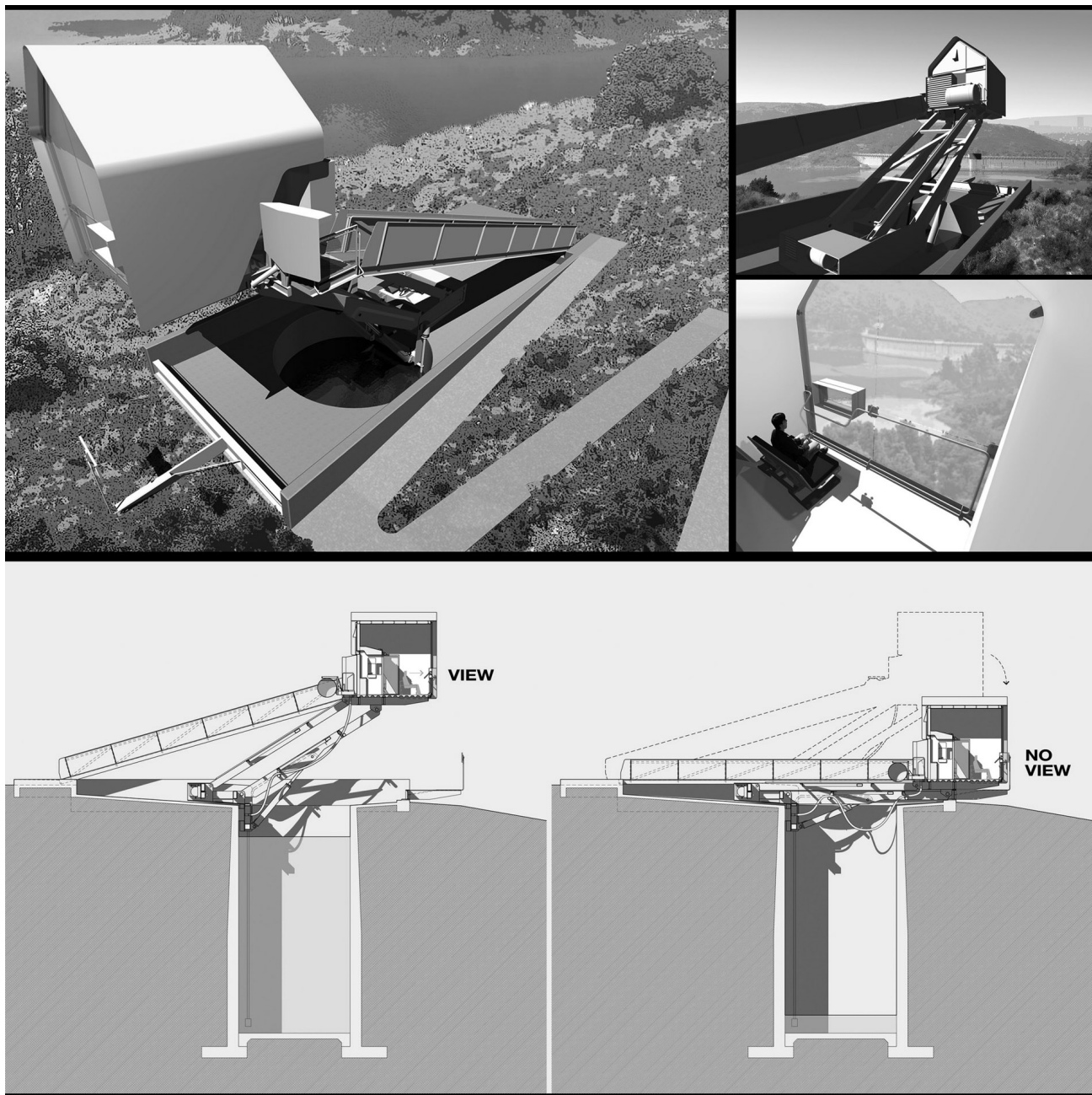


Figure 1. The **Water Elemental** transforms the view from the cabin into a limited resource that cannot be conserved. The view from the cabin of the city skyline depends upon the elevation of the cabin above the rim of the Mulholland Dam. This is maintained by a system of hydraulic actuators that are linked to the water pressure in an open water column. While the pressure in this column varies somewhat due to rainfall accumulation and evaporation, the water in the column is also the source of all non-potable water used by the cabin's occupants. As this water is consumed in the course of the occupation of the cabin, the pressure in the water column decreases, which causes the cabin to lower below the rim of the dam—thereby eliminating the view. As such, the *Water Elemental* provides an immersive experience in which the occupant is confronted with an instructive sense of technological futility that has otherwise been obscured in both the prevailing framework by which humanity relates to nature as well as in contemporary "green" architecture. (image: Doug Jackson)

nia, this cabin features an elevated viewing platform that offers breathtaking views of the surrounding

San Bernardino and San Jacinto Mountains, as well as the over 3000 wind turbines that comprise the

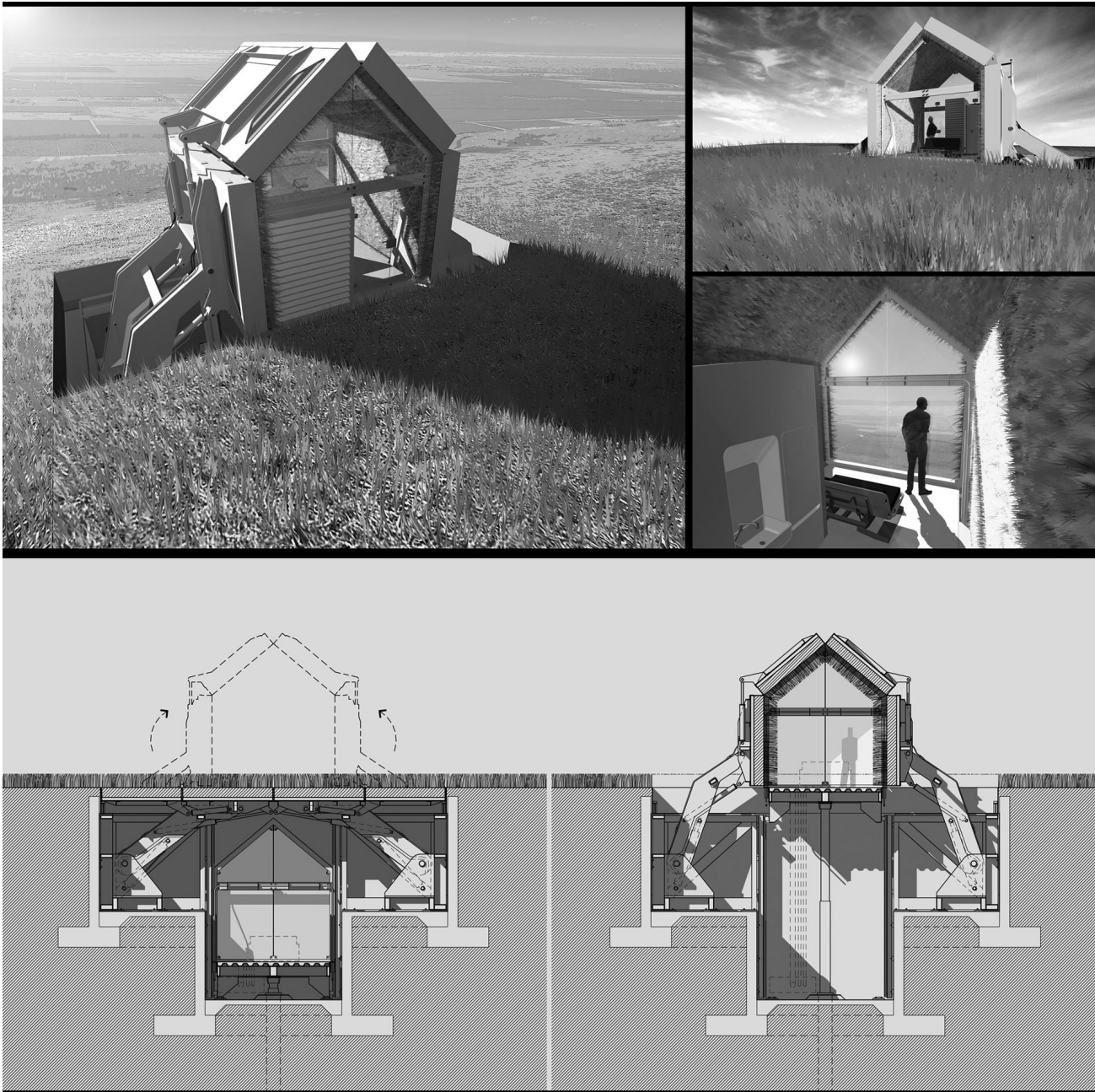


Figure 2. *The **Ground Elemental** transforms the view from inside the cabin into a limited resource that cannot be conserved. When the cabin is unoccupied it remains stowed below ground, with a covering comprised of adjoining earth-filled grassy panels. To occupy the cabin and enjoy the view, the panels are raised to form the primary enclosure of the house—however, the panels are configured so that the earth and grass is on the inside of the cabin. In the absence of sunlight and rain, therefore, the grass will eventually die and the roots will no longer be capable of holding the grass and soil in the panels. The grass and soil will therefore slowly fall to the cabin floor, rendering the cabin unoccupiable. Consequently, the **Ground Elemental** provides an immersive experience in which the occupant is confronted with an instructive sense of technological futility that has otherwise been obscured in both the prevailing framework by which humanity relates to nature as well as in contemporary “green” architecture. (image: Doug Jackson)*

San Gorgonio Pass Wind Farm.³ The viewing platform is designed such that the wind determines

both the orientation and duration of the view: like a monumental wind sock, the platform rotates to

align with the direction of the prevailing wind and contains an inflatable fabric tube that serves as the viewing oculus. Since the only possibility of a view is through this inflatable viewing oculus, a lack of sufficient wind will fail to inflate the fabric tube and thus prevent the possibility of a view. Furthermore, to actually enjoy the view the occupant(s) must stand on the platform in such a way that they partially block the intake of wind into the fabric tube. This has the effect of disturbing the inflation of the viewing tube, thereby foiling the ability of the viewing oculus to sustain the view for the occupant. Consequently, like each of the other *Elementals*, this cabin creates an inhabitable scenario in which a dramatic view is framed as an unsustainable resource that is threatened by the occupant.

Finally, in the *Sun Elemental* this consumption of the view is correlated to the consumption of solar energy in the form of stored electricity. Located in the high desert of the Antelope Valley northwest of Lancaster, CA, this project features a sweeping view of numerous large solar energy farms.⁴ Like those very subjects it surveys, when unoccupied this cabin is also a massive solar energy collector, with the surfaces that comprise its floor, walls, and roof unfolded to produce a large, flower-like solar array. The solar energy harvested by this array is then stored in a large battery bank, whereupon it remains ready to power the electrical systems of the cabin during its occupation. The duration of this occupation, however, is governed by the amount of stored electrical energy, which is consumed not only as the occupants use such common electrical systems as lighting and air conditioning, but also a specially designed viewing portal that requires electricity to be continuously consumed in order to provide the only view available from inside the cabin. This is achieved by the integration of a large horizontal-axis rotating panel within the viewing portal: when this system is turned on, the rotating blade spins at a sufficiently high velocity to allow the occupants to see through it to the landscape beyond. In addition, as this rotating panel also serves as the blower for the air conditioning system, it supplies conditioned air to the uninsulated cabin in order to render it temporarily habitable in the desert climate. However, when the system is turned off, or if the batteries are drained of power, then the rotating panel is fixed in a vertical position, thereby blocking both the supply of conditioned air as well as the access to the view—both of which make the cabin essentially unoccupiable.

As a whole, the *Elementals* are not intended as *models* for green or sustainable building; rather, the intention of each of the *Elementals* is to create a heterotopic experiential vignette within which the consumptive actions of the occupants are monumentalized and clearly correlated to negative, transformative effects. As a result, the occupants are immersed within scenarios that critique the implicit logic of resourcist-based ecological perspectives that presume to be able to afford a continuation of the contemporary way of living within the world through a vague appeal to “sustainable” practices and new “green” technologies. The occupants of the *Elementals* are therefore confronted with situations in which no modification of behavior nor any appeal to new technology will allow the status quo to be sustained. Instead, individuals are provided with a rare opportunity to instructively inhabit a *no-win scenario*—one which most closely resembles the contemporary world, and within which the only positive way forward is a radical paradigm shift in the way that humans perceive their relationship to the larger ecology.

BLINK HOUSE

Unlike the *Elementals*, which provide a necessary wake-up call by revealing the futility of technological intervention to sustain the status quo, the following example ultimately provides an environment that is more hopeful—one in which technological control over the environment is neutralized in order to encourage more positive perceptual and behavioral changes on the part of the occupants. This project, the *Blink House* (Fig. 3), is an environmentally-themed demonstration house and small gallery space intended to be rented and occupied by private individuals and organizations who wish to experience a way of living that is more environmentally sensitive. Like other eco-sensitive demonstration houses this project employs such “green” features as recycled and easily recyclable materials, low-consumption appliances and fixtures, and novel technologies for harvesting energy from the environment. However, unlike the majority of such demonstration houses, these materials and technologies are also enlisted to transform naturally occurring environmental variation into destabilizing architectural effects which, in turn, act to undermine traditional assumptions about human control and consumption of the environment through the agency of technology. The goal of this highly de-

stabilized condition is to cultivate and sustain an enhanced consciousness of the environment, and to thereby promote an awareness of the need to actively maintain an equilibrium through continual negotiation as opposed to technological mastery.

Sited on the roof of an office tower on Wilshire Boulevard in downtown Los Angeles, and cantilevered dramatically over its southwest corner, this demonstration house has the potential of stunning 360° views of the city, the Hollywood Hills, and the ocean. However, the entire perimeter of the house is clad in an articulated, energy-harvesting skin that constrains, limits, and constantly varies the views available as it continually adjusts itself to varying environmental conditions. This articulated skin is a two-layer construction, with the outermost layer a solar energy collection system comprised of photovoltaic fabric panels stretched over a flexible and pneumatically-operated aluminum frame.⁵ The inner layer is a wind energy harvesting assembly comprised of an array of wind-collecting modules based on the principle of aerostatic flutter. Each of these modules contains a series of horizontally-mounted, flexible stainless steel blades that are fixed at each end and allowed to freely oscillate in the middle. As wind passes over these blades, the resulting oscillations produce alternating current in a collector mounted at the end of each blade.⁶

This double-layered skin is computer controlled in order to maximize the energy harvested from the constantly shifting solar and wind conditions. As the wind increases to the point where it trumps the energy value of the incident solar radiation, the flexible photovoltaic panels peel back in order to expose the wind-collecting modules to the prevailing wind. However, due to the fact that the wind speed and direction is in constant flux, the exterior fabric skin is in a continual state of adjustment, with openings variously appearing and then disappearing on all four facades.⁷

This dynamic opening and closing of the exterior fabric facade provides the *only* exterior views available from within the demonstration house—views which are completely subject to natural variation. As opposed to the logic of the modernist horizontal strip window, which granted to the observer an implicit mastery of the landscape beyond, the views available from within the demonstration house underscore the occupants' *lack of control* relative to

the environment.⁸ The spectacular views available cannot simply be consumed at will by the observer, since the duration and availability of any particular view cannot be predicted. However, the temporality conferred by this natural variability serves to heighten the poignancy of each view, reinforcing the conscious act of viewing and foregrounding the constantly (re)negotiated relationship between the observer and the landscape being observed.⁹

In addition, this constantly changing relationship between occupant and view is mined for its ability to sponsor internal spatial transformations, encouraging the occupants to continually adjust the location of interior activities in response to changes in daylighting and views caused by the constantly mutating exterior envelope. The house is designed to facilitate this through its spatial planning: programmatic elements that primarily serve nighttime uses remain packed away within a thick wall of program during the day, freeing up the floor space that they would otherwise occupy and allowing it to be used for a variety of daytime activities. As a result, during the day the plan of the house remains a relatively undifferentiated rectangular ring, served by free-ranging mobile furniture elements and a matrix of floor outlets that together permit daytime activities to be re-oriented and relocated at will in relation to shifting daylight and views.

These constantly varying effects and situations are designed to cultivate a sense of *uneasiness*, in both senses of the word: *uneasiness* as in a sense of destabilization that heightens the awareness of the precariousness of nature and of humanity's relation to it, and *uneasiness* as in the parallel awareness of the difficulties involved in maintaining the healthy balance that is crucial to this relationship—a balance that requires a radical change of consciousness.

CONCLUSION

While individuals construct society, they are also constrained by it. The particular social constructions surrounding modernity have obscured certain real causal relationships between individuals and the environmental degradation they decry. The technological distancing and abstraction that have been necessary for the success of modern civilization have effectively altered the way that individuals perceive the natural environment and their relation to it, have paved the way for a significant ex-

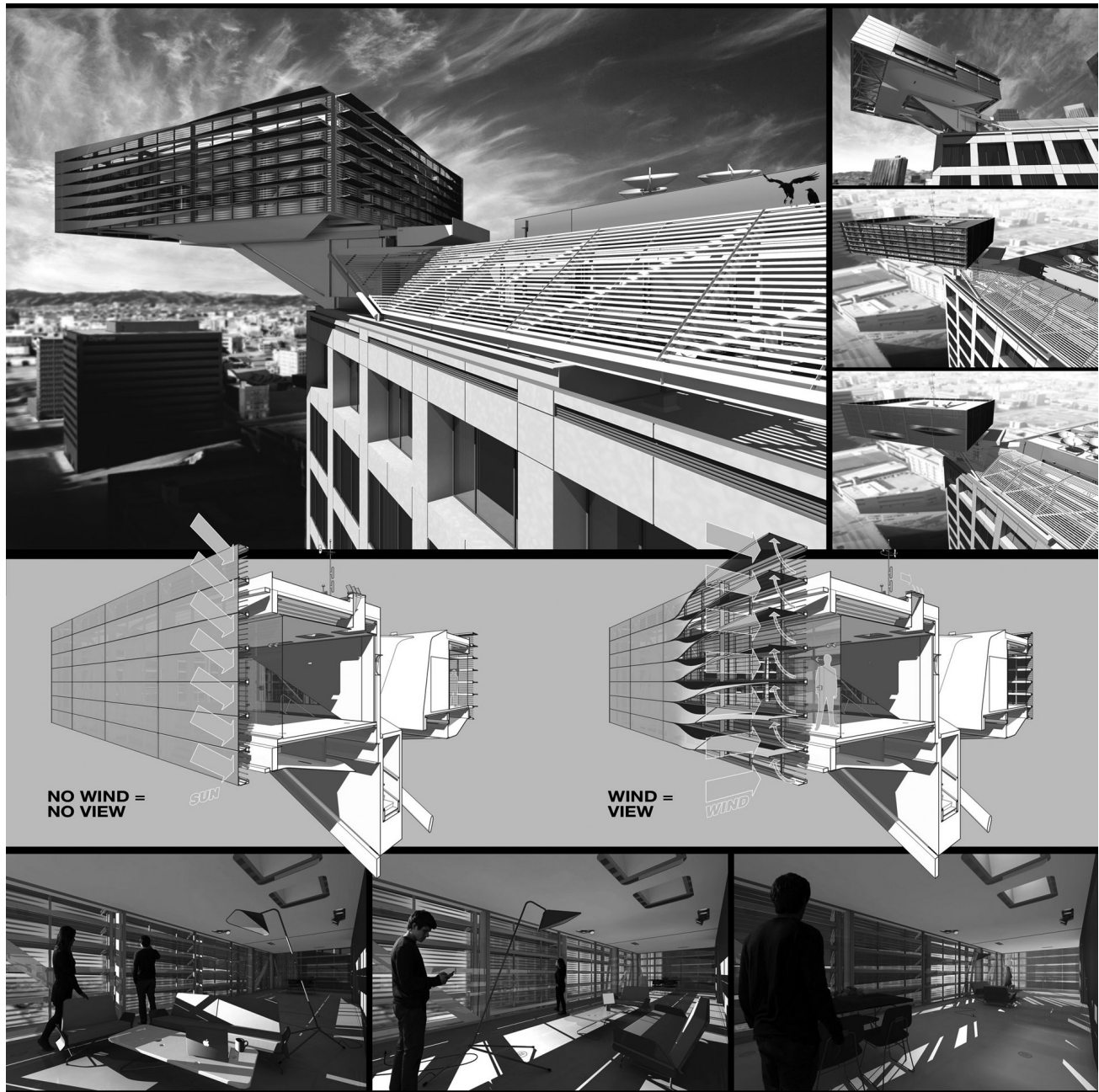


Figure 3. The **Blink House** provides an immersive environment in which the occupants are granted an experience that is outside of the traditional framework of human control and mastery of the environment through the agency of technology. In contrast, the *Blink House* employs technology to create an intentionally destabilized condition in which the occupants are forced to continually re-establish a sense of equilibrium with the environment. A double-layered external skin on all four facades is capable of collecting both solar and wind energy. The exterior layer is a flexible photovoltaic panelized skin that harvests solar energy, but also blocks the view from the interior of the house. Behind this is an array of horizontal blade wind collectors that transform wind-induced aerostatic flutter into electrical energy. When the wind begins to blow the fabric panels are able to open in order to allow the wind collectors to harvest energy from the wind, which also permits a temporary view. As the wind direction and speed fluctuate, so does the pattern of openings—resulting in constantly changing internal orientations, daylighting, and views. Highly mobile furniture allows the occupants to continually re-orient themselves and their activities in response to this constantly fluctuating exterior condition. As a result of the occupants' lack of control in the face of this environmentally-induced variation, the *Blink House* provides an instructive experience outside of the prevailing framework of technological control by which humanity currently relates to the environment, and which has so far also narrowly framed humanity's response to the environmental crisis. (image: Doug Jackson)

ploitation and transformation of the natural world and, more importantly, have framed the ecological crisis as a purely technological problem while also fostering a misguided faith in the ability of technology alone to comprehensively resolve it. Rather than offering a critical alternative, architecture has for the most part simply conformed to this problematically narrow understanding.

Of course, architects certainly have useful technological expertise that can be brought to bear in order to mitigate the degree of harm done to the environment by creating more environmentally-responsible models for the construction of buildings; and, by and large, this is the *only* way that the discipline has elected to engage the ecological crisis to date. However, in terms of the larger problem this alone counts for nothing more than damage control. Architecture has the ability to do far more than that, insofar as it is far more than a technological enterprise.

Beyond simply providing models for environmentally-responsible construction, architects are uniquely capable of creating transformative spaces that allow individuals to experience reality outside of the current framework, and to offer the broad-based “rude awakening” and critical re-evaluation that seems increasingly necessary in order to both reveal these causal relationships and to thereby result in positive change. Of all of the disciplines and expertise being brought to bear on the ecological crisis, architecture is the only one that has the ability to produce a truly immersive and transformative experience that can change the way that individuals think, feel, and act.

As instruments for producing such immersive and productively critical experiences, both the *Elementals* and the *Blink House* represent a small, initial contribution to what should be a robust and concerted parallel effort within the architectural discipline. Neither is intended as a *model* for green or sustainable building, since their value lies not in their ability to be absorbed by the mainstream but rather in their unique ability to stand productively outside of it—providing alternative experiences that have the ability to beneficially affect the course of the mainstream. Accordingly, these two projects act as agents for changing the way that individuals view their relationship to the natural environment and to the larger, abstract entities that alter, exploit, and transform the

environment on their behalf. In so doing they each engage technology, but not in its traditional sense as an invisible and subservient interlocutor and perceptual filter. Rather, they each subvert this conventional relationship, exploiting technology’s position between humanity and the natural world to challenge prevailing assumptions and to foreground that which has become obscured—thereby re-framing humanity’s relationship to the environment as an actively engaged and highly conscious one. Moreover, in the process, these examples demonstrate a more appropriate way for architecture to address the challenges posed by the environmental crisis, one in which the discipline’s expectation to speak to the culture at large is finally redeemed through its unique ability to address broad-reaching and significant issues—issues that are crucial to the rectification of humanity’s seemingly unrelenting environmental degradation, and which are far from answered by architecture’s recent short-sighted, unremarkable, and post-critical performance-driven efforts.

ENDNOTES

1 For Heidegger’s conception of nature as a “standing reserve,” see “The Question Concerning Technology” in Martin Heidegger, *The Question Concerning Technology and Other Essays* (New York: Harper & Row, 1977). The opposite position, which is critical of the idea of the planet as a resource for human consumption and management—an idea which underpins even “green” or “sustainable” efforts—is given by the philosophy of *deep ecology*, which was developed in the early 1970s by the philosopher Arne Naess. To be clear, however, the point of this paper is not to re-tread either Heideggerean or deep ecological discourses or their related scholarship. Rather, it is to demonstrate how a semi-autonomous and productively critical architecture, operating between the poles of the critical/post-critical debate, can offer something of value in the context of the environmental crisis by challenging or transcending the narrow conceptual framework that currently defines humanity’s relationship to the environment. In this case, the deep ecological position simply provides the critical content for the projects presented in this paper. Both the *Elementals* and the *Blink House* can be seen, therefore, as *heterotopic* spaces (per Foucault) that, while distinctly separated from the everyday world, are nevertheless able to capitalize on that distinction in order to provide a positive complement to the world—offering the unique opportunity to question or see beyond existing frameworks, and to arrive at a more beneficial understanding.

2 The word *environment* comes from the Old French *environer*, meaning “to surround, enclose” and has always carried with it the idea of a categorical distinction between the speaker and the speaker’s physical context. The term *ecology* carries this distinction further by presuming to quantify and analyze the natural world, pairing the Greek root *logos* (“word,

reason”) with *oikos* (“house”)—meaning the study of that within which we live. The fact that this problematic distinction between humans and the natural world is so embedded in the language used to discuss the planet-wide degradation caused by human activity is, itself, telling. Nevertheless, it becomes difficult to discuss these issues without resorting to such terms. Therefore, in order to avoid cumbersome language, both the terms *environment* and *ecology* are used throughout this paper, with this caveat in mind.

3 The San Geronio Pass Wind Farm is one of the 3 major wind farms in California. According to data published by the American Wind Energy Association, as of September 2009 the facility was comprised of 3155 units producing over 600 MW of energy. See <http://www.awea.org/projects/projects.aspx?s=California>.

4 Views include the pending Antelope Solar Farm, a 2000-acre solar energy facility that is being developed by Renewable Resources Group, Inc., consisting of up to 2,900 rotationally-tracking photovoltaic panels capable of generating up to 650 MW of annual electric power. For project details please see http://www.co.kern.ca.us/planning/pdfs/notices/antelope_valley_solar_nop.pdf. In addition, the site offers views of the pending Antelope Valley Solar Ranch One, a 230 MW photovoltaic facility being developed by First Solar, as well as the Gaskell Sun Tower, a 245 MW solar tower project being developed in two phases by eSolar. See <http://www.seia.org/galleries/pdf/Major%20Solar%20Projects.pdf>.

5 The panels of the *Blink House* use amorphous silicon solar cells, which can produce electricity in low-light and cloudy conditions, and which are equally effective regardless of their orientation to the sun.

6 The theory behind this novel form of wind energy collection is that aerostatic flutter provides a more efficient way for residentially-scaled devices to harvest energy from the wind, since turbines are only efficient at large volumes and high wind speeds. The modules shown in this proposal are similar to the Windcell™ Panels being developed by Humdinger Wind Energy. For more information please see <http://www.humdingerwind.com>.

7 Although the wind in downtown Los Angeles predominately comes from the west (Pacific Ocean) during spring, summer, and early autumn and from the northeast for the remainder of the year, these dominant wind patterns are randomized on a daily basis by phenomena such as nighttime off-shore breezes, urban heat island effects, urban thermal plume effects, and vortices due to turbulence from adjacent buildings.

8 While both Le Corbusier, champion of the horizontal strip window, and August Perret, who argued for the traditional vertical window, supported their respective positions by an appeal to the ostensible connection to nature afforded by each type, the distinction is that the horizontal window reinforces a gap or distance between the observer and the landscape through its exclusion of the exterior foreground, which renders it abstract, distant, and therefore subject to a kind of visual consumption. This differs from the vertical window argued for by Perret, which emphasizes immediacy and connection by virtue of its ability to permit a view of the foreground. Both frame nature as a picture, but the horizontal strip window is a more severe manipulation of nature, collapsing the very

distant landscape onto the interior space. For a thorough discussion of these issues see Bruno Reichlin, “Une Petit Maison on Lake Leman: The Perret–Le Corbusier Controversy,” in *Lotus International*, vol. 60 (1988), 59–83.

9 There is an obvious dialogue here between the *Blink House* and the *Pinwheel House*, designed by Peter Blake in 1954. In the latter, the entirety of all four facades can be opened as desired, affording the occupants maximum control over their relationship to the surrounding views. In this sense the *Pinwheel House* can be seen as the ultimate modernist viewing machine—the epitome of architecture as a technological agent for human control over nature—and the *Blink House* as its antithesis, in which human will is obstructed by natural variability, thereby requiring constant negotiation. For images of Blake’s *Pinwheel House* see Peter Blake, *No Place Like Utopia: Modern Architecture and the Company We Kept* (New York: Alfred A. Knopf, 1993) 116–118.