Earthship Space

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(Earthship, Taos, New Mexico. From Michael Reynolds, Comfort in Any Climate (Taos: Solar Survival Press, 2000))

Abstract

Earthships are buildings which are constructed almost entirely of recycled materials and are built to be almost totally self sufficient through the recycling of rain water, the recycling of solar energy into electrical energy, passive solar techniques and sometimes the recycling of wind through turbines, also into electrical energy. This thesis draws out and demonstrates the logic that Earthship architecture emerges from and generates amongst its inhabitants. This logic, it is argued, can be characterized as containing elements of the baroque and Neo-baroque. It is a logic of following and interfacing the elements (earth, sun, wind, rain) that folds them into itself. In such a space it is impossible to delineate any strict division between the inside and outside of a house. The inside becomes a node, interval, or point of passage of the outside and domestic life emerges from a complex and dynamic rhythmic arrangement with the outside. Such a space emerges from and generates a new sense of nature as cycles, flows, and interconnections which are fundamentally inseparable from architecture, technology or domestic life. This thesis also argues that to properly understand Earthships it is necessary to draw out the sense of historical and natural catastrophe that has impacted their origin and present incarnations.

Earthships sont des bâtiments qui sont construits presque entièrement avec des matériaux réutilisés et sont construits pour être presque totalement art de l'auto-portrait suffisamment par la réutilisation de l'eau de pluie, la réutilisation de l'énergie solaire dans l'énergie électrique, des techniques solaires passives et parfois la réutilisation du vent par des turbines, également dans l'énergie électrique. Cette thèse extrait et démontre la logique que l'architecture d'Earthship émerge de et se produit parmi ses habitants. Cette logique, on lui discute, peut être caractérisé en tant que contenir des éléments du baroque et Néo--baroque. C'est une logique de suivre et de connecter les éléments (la terre, le soleil, vent, pluie) ces des plis ils dans lui-même. Dans un tel espace il est impossible de tracer n'importe quelle division stricte entre l'intérieur et l'extérieur d'une maison. L'intérieur devient un noeud, intervalle, ou le point de passage de la vie extérieure et domestique émerge d'un arrangement rhythmique complexe et dynamique avec l'extérieur. Un tel espace émerge de et produit d'un nouveau sens de nature comme cycles, écoulements, et interconnexions qui sont fondamentalement inséparables de l'architecture, de la technologie ou de la vie domestique. Cette thèse discute également cela pour comprendre correctement Earthships qu'il est nécessaire d'extraire le sens de la catastrophe historique et normale qui a effectué leurs incarnations d'origine et de présent.

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Introducing:

Earthship Space

Everywhere in the Notre-Dame Basilica in Montreal space is drawn upwards. Entering through the front door the eye is drawn down the isles that run between the rows of benches to the sanctuary, whereupon it is drawn up into the heights, along the vaults and up to the luminescent sky blue that hangs above the sanctuary, just above the sculpture of Jesus crowning Mary in heaven. Everywhere throughout the church, from the pews to the engravings and painted patterns that adorn the ribs of the vaults, the eye is drawn up. There is a sensation there that everything is moving, as if by some imperceptible force.

A basilica means a space of assembly. Not strictly a religious assembly, it can also be an assembly around the law in a court, or it can be a political assembly. The meaning of sanctuary, too, is not limited to religious usage, it too can be political and legal, as in a sanctuary from a state. In either case a sanctuary implies a space of refuge; it is a delimited space, a space that is special in and through its separation, it is a space that is defined through its separation. Sanctuary also carries a meaning of being hidden.

These terms manifest their meaning in the Notre-Dame basilica by creating a special, delimited space around the transcendent. The architecture works by inscribing the transcendent into its materiality by generating the sense that everything is animated by an internal force that drives everything towards the heavens. As a basilica it is a space of gathering around this movement and experiencing it. This force of weightlessness travels through the congregation.

The function of the vault is key in producing this sensation because of its wide base which thins as it curves into a point at the top. A vault is similar to a triangle, though because the sides of a triangle are equilateral no point gains precedence over another, whereas the curve of the vault draws perception towards the point at the top.

In the Basilica the form of the vault proliferates throughout the space. It is the ceiling, but it is also engraved into the ornamentation. Statues are set into columns and the space carved out for them is the vault. The confessionals that line the edges of the church (another delimited, secretive space) are adorned at their tops by the form of the vault. The tabernacle also is framed by the vault. The top sculpture of the sanctuary where Mary is crowned, the top-most point of the church before it turns into the sky blue of the heavens on the ceiling; is also vaulted. This creates not only the sense of vertical movement throughout the church, but also of a uniformity, conformity and harmony amongst all the parts of the church. The transcendent is inscribed everywhere.

Walter Benjamin has described this situation well:

"...an upward-tending ecstasy, such as jubilates from the frescos on the ceiling. So long as ecclesiastical spaces aim to be more than spaces for gathering, so long as they strive to safeguard the idea of the eternal, they will be satisfied with nothing less than an overarching unity, in which the vertical tendency outweighs the horizontal.¹

Chuck and Pat Potter built an Earthship in southern Ontario. The visitors entrance is not from the front or the back, but from the sides. You do not immediately see the depth of the building, you see its width. And you see an explosion of plants: of greens and reds and purples; wildflowers and vegetables and ivy that runs up the wall. They

¹ Walter Benjamin, The Arcades Project (Cambridge: Harvard University Press, 1999), 160.

shoot up and overflow a planter roughly seven feet wide and five feet deep and set along the front of the Earthship, a wall made entirely of glass panels.

The Earthship is divided into three 'U' shapes, three rooms each connected by arches (which have no point at their top) and which have no doors. The rooms divide roughly into kitchen/living room, bedroom, and study area.

In an Earthship we are no longer in a space animated and made light by a transcendent force, nor are we in a space where everything points beyond the world. In an Earthship we are made immanent to the elements: the sun, wind, rain, earth.

The glass panels run the whole distance of the open end of the 'U', or the front of the Earthship. The interior of the house is a white or beige adobe mixture. The floor is inlayed with stones, forming a mosaic. The walls are smooth and they curve at various degrees. They are bulged such that they look like they are undulating at various rates like water. This is because behind the adobe are used automobile tires packed tightly with dirt, the main construction materials of the house. They form the structure and the insulation. This is why the entire front is glass panels, which let in enough sun in the wintertime to heat the walls, and when the sun goes away at night the heat stored in the walls seeps out into the house. In the summertime the sun only enters the house far enough to feed the planters that run the distance of the panels while the house remains the same cool temperature as the earth that fills the tires.

The planters at the front are fed directly by the used water from the kitchen sink. The electricity is supplied by solar panels that rest on the roof. In more radical Earthships, all the water supplied to the house is supplied by rain and collected into cisterns which are then fed to various appliances throughout the house. An Earthship can be built almost entirely from recycled materials—everything from the structure itself to the trim on cupboard doors. They are also built with the capacity to be almost entirely self-sufficient. Their systems, like heating, electricity and water, can all be created by their immediate environment in the form of sun, rain, wind, and earth. They are elemental houses, composed of the elements and powered by the elements.

If the interior of the Basilica is governed by 'an upward tending ecstasy,' the Earthship is filled with a horizontal jubilation. As a Basilica, the Earthship convenes its inhabitants around the flows and movements of the elements which pass through the house. The curves and undulations of the interior generate a sense of movement, not unified nor transcendental, but immanent. The walls bleed into the floor, the roof and the planters, and the ivy crawls along them. The water from the cisterns passes through the showers and toilets and sinks, and into the planters, or out into the yard into still more vegetation. The sun rises, feeds the plants, warms the house and generates electricity. Everywhere one element bleeds into another.

As a space it can not be clearly delimited or separated from its surroundings. The interior becomes a site where the elements flow in and out. The inside is defined by terms like inflection, variation, passage, or node.

The first chapter of this thesis draws out the special logic of *following* and *interfacing* with the elements that gave birth to Earthships and which they generate amongst their inhabitants. This is a logic of recycling in its most radical form, where it is not just garbage which is up to the task of re-use and re-organization, but the elements themselves are seen to work according to a logic of recycling. Architecture, technology and domestic life are each, in their own way, also caught up within this logic. This kind

of building, dwelling and thinking (as Heidegger would say) resonates with certain characteristics and 'folds it into the present' (as Deleuze would say).² By looking at the baroque's fascination with folds and twists we can illuminate the tendencies of the Earthship, which is an architecture that does not proceed according to a desire for a clear separation of inside and out, but asks instead how to connect, and re-connect with the outside, of being both unified and distinct with it, and how to create a domestic life which creates a sense of being responsible for their impersonal forces.

Earthships stand in opposition to the wild proliferation of suburban development which has been occurring across North America since the 1930's and 1940's: massive scale housing developments created by standardized labour and standardized parts that has increasingly create d a relationship between home owner and house defined by consumption and subservience. The suburban house entraps its inhabitants into a whole political economy of energy usage whereby something as simple as having a roof is implicated in deforestation practices, or turning on the lights is implicated in the damming of river basins. The interior design of a typical suburban home generates a sense of disconnection from these very processes. It striates the inside from the very outside it requires for its maintenance. The second chapter of this thesis deals with these concerns as well as the more minor ways in which suburban development through standardization and the building codes and regulations which support it create a subservience amongst their inhabitants to such a degree that any real creative reorganization between the house and inhabitant is destroyed and replaced by one of consumption, of filling it with more 'stuffs,' themselves pre-fabricated and often times

² Martin Heidegger, 'Building, Dwelling, Thinking', in *Martin Heidegger: Basic Writings*, David Farrell Krell, ed. (San Francisco: Harper San Francisco, 1993) and Gilles Deleuze, *The Fold: Liebniz and the Baroque* (Minneapolis: University of Minnesota Press, 1993).

more energy consumptive. Finally, the domestic life of an Earthship is compared with that of a suburban home according to the difference in rhythm it creates; or rather the rhythm that generates domestic life and produces a much different relation between inside and out, between home and inhabitant.

The third and final chapter is concerned with analyzing the importance of historical and natural catastrophe that gives birth to Earthships and which tends to appeal to their owners. They emerge from a sense that the very processes of suburbanization, and the massive amounts of energy they require are at a historical point of disintegration. The domestic architectures of modernity have left the present with massive amounts of refuse, a form of ruin from which Earthships are built (literally, as in using old automobile tires and scrap wood). They are built in the face of catastrophe. This makes them post-apocalyptic dwellings, "sailing on the seas of tomorrow," as Michael Reynolds, the Earthship's principle architect, writes.³

³ Michael Reynolds, Earthship vol 1: How to Build Your Own (Taos: Solar Survival Press, 1990),

Chapter 1: An Earthship Logic

I would like to introduce Earthship space by way of some of their unacknowledged predecessors: Paul Virilio and Claude Parent. In the mid 1960's they had been experimenting with the relationship between buildings, bodies and movement. Traditional architecture, in both its classical and modernist form, according to them, creates a space which is inert. This kind of space creates first of all a distinction between subject and space, and secondly of mastery and control. Because of the preponderance of the vertical and horizontal line (and their marriage in the box form) the body emerges as the origin and center of movement while the room (or house) is seen to *contain* movement. It is motionless save for the bodies that rustle through it, like actors on a stage. Moreover, the head and the eye becomes privaleged as the center of perception as it *looks out* onto space.

Virilio and Parent were attempting to disrupt this relation to space, these binaries of the moving and immobile: the foreground and background; the master and the slave, by introducing movement into architecture. They did so by privileging the oblique angle over the right angle. Such angles would bring movement to both the building and the body and would offset the head and eye ('I') as centers of perception:

The objective of our research was to challenge outright the *anthropometric precepts of the classical era*—the idea of the body as an essentially static entity with an essentially static proprioception—in order to bring the human habitat into a dynamic age of the body in movement. In our work, the *traditional stability* (habitable stasis) of both the rural horizontal order and the urban vertical order

gave way to the METASTABILITY (habitable circulation) of the human body in motion, in tune with the rhythms of life. The space of the body became MOBILE. The limbs of the individual became MOTIVE. And the inhabitant effectively became LOCOMOTIVE, propelled by the (relative) disequilibrium created by the gravity of planet earth, the habitat of our species.

Oblique architecture thus became a generator of activity which used physiological principles to make buildings more habitable. 'It is not the eye which sees', according to the philosopher Maurice Merleau-Ponty, but 'the body as a receptive totality'.¹

Let's take two examples of this oblique architecture: the room designed by Parent for the Venice Biennale in 1970 and Virilio and Parent's drawings of 'future' cities and sketches.² Unfortunately, we are bound to only *look* at the buildings, a poor substitute for our bodies being *in* the buildings. We are left to only imagine the sensations that multiple intersecting oblique angles would create. They seem to shoot away from each other and converge at the same time, creating a sense that the room is getting both bigger and smaller. The lack of horizontal and vertical lines means that there is no plane that acts as a foundation, there is no central point that draws the space together. It converges and diverges all over the place. Nor is there a clear distinction between background and foreground. For the body that traverses through a room of oblique angles the background and foreground are constantly shifting depending on the immediate location and perspective of the body; horizons are continually dissipating along multiple lines. And

¹ Architectural Association, AA Documents 3: The Function of the Oblique: The Architecture of Claude Parent and Paul Virilio, 1963-1969, (London: Architectural Association, 1996), 13. Emphasis in original.

² Ibid., 8, 68, 70, 71. It is interesting to compare Virillio and Parent's oblique cities and Michael

no longer can there be a strict division between the inside and outside of a space, a rather traditional way of delimiting spatial boundaries. There are only curves, corners and undulations.



(Figure 1: From, Architectural Association, AA Documents 3: The Function of the Oblique: The Architecture of Claude Parent and Paul Virilio, 1963-1969, (London: Architectural Association, 1996. Photographer citation not given.) 8.

This is a space that generates the sensation of continual movement. One is forced by the space itself to always be on an angle, and to be always pushed or pulled by its space. Movement is not limited to the horizontal and vertical as it is in classical architecture, requiring only a minimum of activity, but is, as Virilio and Parent's formula goes 'multiplied' (- + | = +, addition; but $/ + \rangle = X$, multiplication). Consciousness becomes dispersed through the body to a far greater degree—to the legs, the arms, the

Reynolds city designs.

torso, as it is thrown out of equilibrium with gravity. Space and the body become 'mobile'.





⁽Figure 3: Ibid., 68.)

Perhaps it is not clear why Virilio and Parent should like to do this, especially if we consider for a moment their context. Living and working in Paris would make one think that there was plenty of movement around: cars coming and going; folks 'qui promennent' at all hours of the day; a metro that whizzes around, moving people to and fro; going up and down stairs, etc... But this movement is all characterized by lateral and vertical directions. For Virilio and Parent it doesn't matter how much movement you have when it is this kind of movement, which keeps the body docile and privileges the head as the center of perception. Remember that in a car, or train or plane, or even a spaceship for that matter, the body remains stationary, even though the apparatus moves. Movement is everywhere but it does not actually engage the body in any fundamental way.

This attempt to create a new interrelation between the body and space and to break down the sovereignty of the body over space is of a similar nature to that of Earthships, though carried out through much different means.³ The Earthship breaks down the distinction by immersing its inhabitants into the elements and by creating a sense of inseparability from the elements. In a way similar to how Virilio and Parent unleashed movement from its origin in the body, Earthships unleash the autonomy of the elements. Moreover, Earthships create an embodied understanding of the elements by intimately embedding the body into their flows. There can no longer be any fundamental divide between the body, domestic space, architecture and the elements; they become completely interwoven. There also emerges a pattern (or a variety of patterns) from this weft; the elements, architecture, and domestic life, vary from each other through cycles, twists and turns, not through fundamental or essential differences in kind. The Earthship, in short, generates a logic of relationality.⁴

³ I could have included many others who share this project, most notably Constant, the Dutch architect, who devoted almost his whole career to a project he called 'New Babylon', a sendentary city built for nomads. It was founded on the principle of movable architecture, buildings which could be designed and re-designed according to the will of its inhabitants. Every structure would have its own motility built into it, such as movable partitions. This new city, he thought, would be governed by play. See, for example, Libero Andreotti and Xavier Costa, eds., *Situacionistas: Arte, Politics, Urbanismo/ Situationists: Art Politics, Urbanism* (Barcelona: Museu d'Art Contemporani de Barcelona, 1996).

⁴ We could also frame the effects of Earthships with Deleuze and say that Earthships provoke an *encounter* with the elements. Traditional houses tend not to provoke encounters with the elements; their function and purpose—the meaning—of the elements is very well set. When we encounter something "something in the world forces us to think. This something is an object not of recognition but of a fundamental *encounter*. What is encountered may be Socrates, a temple, or a demon. It may be grasped in a range of affective tones: wonder, love, hatred, suffering." Thinking here is not just thought in the abstract but is bodily, or affective. An Earthship brings about a different thought and a different experience of the elements. The Earthship is a vehicle of encounter. In it the body and thought become effused in the elements, they are not completely inseperable from them and neither are they totally dependent upon them, but emerge as a dynamic interrelation. The Earthship encounters the elements in such a way as to generate an embodied *ecological* thought. A thought which is attentive to multiple interacting yet distinct entities, to both the unified and the singular. With Bruno Latour we could say that their encounter brings about the establishment of a new collective of humans and non-humans. In an Earthship the divide is no longer between only the human and non-human, it is not two but more. The collective becomes composed of

Fundamentally, a house is made up of a dual movement of separating and connecting. When the walls of a house are built there occurs a separation or a distinction from the site around it. The four walls differentiate the interior from the elements; from the rain, the sun, the cold. But then, at the same time, the house needs heat in the winter (in a northern climate), cool in the summer and water for the dishes and to wash bodies. The house then becomes a problem of how to re-connect, how to re-introduce the outside into the inside. Building a house is something like building a porous membrane, and deciding what its going to let in, what it's going to let out and how its going to go about doing this.

We could put this in a slightly different way. The connections that a house creates after it has differentiated itself are connections with the impersonal. It must ask how to fit the impersonal into itself. For example, we saw that Virilio and Parent tried to break down a sense of distinction and separation between the body and space by introducing the oblique angle. What they did was wrest movement away from the body, or from the perception that movement originates *in* the body, and made it impersonal, where the body is subject to movement. Movement courses *through* the body, it does not make movement. With Earthships it is the impersonal forces of the elements that course through the house.

A Foundation

multiple voices-the elements, the inhabitants, each with their own needs, each with their own autonomy, yet they also interact, flow into each other and become inseperable. The Earthship is a space of *political* ecology. See Gilles Deleuze, *Difference and Repetition*. (New York: Columbia University Press, 1968) especially Chapter 3, 'The Image of Thought'. And, Bruno Latour, *Politics of Nature: How to Bring the Sciences into Democracy* (Cambridge: Harvard University Press, 2004).

For most buildings foundations are the first priority in construction. After clearing an area of trees or knolls or what have you, the foundation is the first imposition of a building into a site. It's hard to miss the relational importance of a foundation, given the way it has entered into language as such a powerful metaphor for so many things. And is it right: does a foundation matter?

Many contemporary buildings, from wood frame houses to sky scrapers dig deep foundations and line them with concrete. The idea is that depth and strength will withstand the contortions and shifting of the earth. The bigger the building the bigger the foundation. Measures like expansion joints and steel re-enforcements are installed either to block the movements of the earth and re-direct them around the building or to absorb them slightly.⁵ Not only are the movements of the earth held at bay, but the movements coursing through a building (the gravity pulling it down to the ground) are sent from the upper structure down through columns and into a few centralized points. This means that weight in a building is not completely evenly distributed.⁶

⁵ Michael Reynolds, Earthship vol, 65.

⁶ If concrete is used to resist the movements of the earth and elements so as to create a stable foundation, it follows, perhaps in a rather obvious way, that concrete too must be stable. It has to be able to with stand movements. But, as Deleuze has written, nothing is more terrifying than the movements of that which seems most stable. Concrete is a swarm of movements. It is traversed by all sorts of pushes and pulls and tensions, that make it, contrary to what we believe, not stable at all. Engineers have responded to its lack of stability by re-enforcing it. Re-bar, for example, is placed in concrete so as to stop a crack or fissure from moving and to impart tensile strength. If you look at bridges, or anything with a concrete slab, it most often deteriorates at its corners because it wants to bow. The weight pulling down on it then cracks it in the middle. This is not a problem with concrete itself but with the forms it is shaped by. It is possible to create far stronger concrete by adapting its forms to the movements and forces that naturally flow through it, such as modular fabric forms that allow the concrete to concretize according to its own 'liquid intelligence'.

I would like to thank Zack Embree for elucidating this point for me, and also for explaining to me concrete's 'liquid intelligence'. It is interesting to note in this context Deleuze and Guattari's genealogy of concrete and their remark that its possibilities were initially quite radical: "Matters like re-enforced concrete have made it possible for the architectural ensemble to free itself from aborescent models employing tree-pillars, branch-beams, foliage-vaults. Not only is concrete a heterogeneous matter whose degree of consistency varies according to the elements in the mix, but iron is intercalated following a rhythm; moreover, its self-supporting surfaces form a complex rhythmic personage whose 'stems' have different sections and variable intervals depending on the intensity and direction of the force to be tapped

This is not so much a practical problem. Many buildings, especially smaller ones, go about their life just fine sitting deep into the earth and holding strong against its contortions. Their foundations might have to be patched once, maybe twice in the owners life time. Rather than a practical problem, it is a problem of relation. It is a problem of an approach to the earth and to its movements.

That foundations have moved into language as a general metaphor should be evidence enough that a deep foundation is expressive of a relation. Think for example of when thinking is said to have a foundation, or the rather tired metaphor of the unconscious as a foundation. Bachelard writes about the cellar: "It is first and foremost the *dark entity* of the house, the one that partakes of subterranean forces. When we dream there, we are in harmony with the irrationality of the depths."⁷

Or think too of the tree, which is analogous to the metaphor of the foundation. The tree moves into a metaphor expressing the relation between thought and world. Deleuze and Guattari, rather famously, and perhaps with some exaggeration, have commented: "It is odd how the tree has dominated Western reality and all of Western thought, from botany to biology and anatomy, but also gnosiology, theology, ontology, all of philosophy...: the root-foundation, *Grund, racine, fondement*."⁸ The rootfoundation; both tree and foundation come together, they lay deep in the ground, they hold out the shifts and sways of the earth. They are the groundwork that holds the weight of the edifice on top. Moreover, the floors on top are increasingly differentiated and

⁽armature instead of structure)." Deleuze and Guattari, *A Thousand Plateaus*, 329. The situation has definitely changed., and innovation into concrete matters has been all but squelched by the political economy of housing. Perhaps the innovations into fabric forms will provide new experimental openings. Micheal Reynolds, Earthship Volume 1: How to Build Your Own. (Taos: Solar Survival Press, 1990) and Earthship Volume 2: Systems and Components. (Taos: Solar Survival Press, 1990). 65

⁷ Gaston Bachelard, *The Poetics of Space* (Boston: Beacon Press, 1964), 18.

⁸ Gilles Deleuze and Felix Guattari, A Thousand Plateaus: Capitalism and Schizophrenia,

individual, such as in the old farm house design: basement, first floor with dinning room, living room, kitchen; up to the second floor with bedrooms. The house is increasingly segmented whereas the foundation remains simple and undifferentiated.

An Earthship has no cellar, no basement, no concrete. It finds a wholly different kind of foundation: the flows of the earth. As the name suggests, the structure is buoyant. The Earthship approaches the problem of the earth's movements not by trying to block them out, or rigidly resist them, but by moving with them. An Earthship is flexible, and far more stable than conventional houses.⁹

An ancient form of building is to take the earth and pile it on top of itself, and pile it and pile it, and tamp it down until it is solid. It is as ancient as rock, for this is how rock is made, it is how the earth generates its surface. And people have been re-creating the earth's surface to live in for thousands of years. The uniqueness of an Earthship is that it pounds its earth into old automobile tires. Tires are placed flat on the ground and filled with dirt, then rammed tight. More tires are stacked on top, in a staggered fashion like bricks, then rammed with more dirt, etc... until you have a wall. There is only one principle structural wall that runs the whole perimeter of the building in a 'U' shape. This forms what will be the back wall while the front of the building is all windows. The back end of the 'U' wall is often filled over with dirt such that the Earthship blends into the Earth, and people will commonly grow grass all along the roof. The Earthship becomes almost indistinguishable from its surroundings, aside from the front windows that occasionally reflect the light of the sun. Otherwise, it's a house that could be mistaken for just another knoll in the earth.

⁽Minneapolis: The University of Minnesota Press, 1987), 18. ⁹ Reynolds, *Earthship* vol 1, 65.

stratum

This first move of adding another **three** to the earth makes it possible to take on another quality of the earth: its ability to heat and cool itself. This technique is called 'solar mass', and Mike Reynolds, the principle designer of Earthships writes that:

When a substance is heated, it will expand; when it is cooled, it will contract. Earth, concrete, wood, and all building materials are affected by weather in this way. This is called *thermal movement*, and can cause a brittle material like concrete or masonry to crack. Masonry buildings may also be pushed by the swelling of frozen earth or water around their foundation walls. An Earthship is more 'of the Earth', and it will accept and experience similar thermal movement to that of the Earth rather than resisting it. It is very expensive to make foundations that resist the Earth. An Earthship must interface with the Earth, rather than resist it.¹⁰

The Earthship interfaces with thermal movement by maximizing solar gain, a form of heating and cooling that is sometimes called 'passive solar'. Passive solar buildings were being experimented with especially in the 1970's as a way of jumping off the grid, though it has not really received such a full application as it has with Earthships. In Earthships, as we will see as we progress, **b** combines with the over all system of the house, where all the elements are working dynamically together to produce the 'independent vessel' Mike Reynolds calls Earthships.

Traditional forms of insulation (like the pink stuff you might find in the wall,) again emerge from a similar logic of relation as does a concrete foundation, a logic of blocking out and separating. The idea (in cold climates at least) is to keep the cold air outside and the hot in. Quite a simple, straight forward logic—common sense, perhaps.

In recent years we have recognized the fact that insulation can help keep temperature in a shelter. It simply blocks the passage of temperature from inside to out and vice versa. Good insulation has millions of tiny air spaces. The presence of air spaces tends to slow up the movement of temperature by causing it to pass from air space to air space as opposed to moving easily through unobstructed dense mass. Insulation acts as a blockade for temperature—not allowing it to enter or pass through.¹¹

Insulation does not generate its own temperature; it only holds in existing temperatures. The effect of this is that a house is plugged into a vast network of connections to heat and cool itself, such as hydro-electric companies, or natural gas. This puts the house in a highly dependent situation. This is a form of re-connection to the outside that conventional houses undergo once they have disconnected from their immediate environment. The flows and movements of electricity are patched into the house, along with a whole political economy of which the home owner has little choice over. If you don't pay your electricity bills your heat is cut off in the middle of the winter. The rather simple activity of heating your home connects you up with a whole network of events you might not otherwise be invested in, such as the damming of rivers and the flooding of river basins. Such a simple an act as remaining warm in the winter time is not simple at all. Later we will treat more exclusively the political economy of housing and the political connections one is implicated in by the very fact of having a house.

Solar mass, though, functions quite differently:

¹⁰ Ibid,. 45

¹¹ Michael Reynolds, Comfort in Any Climate (Taos: Solar Survival Press, 2000), 8.

Dense mass, also called thermal mass, absorbs and stores temperature much like a battery stores electricity. Examples of dense mass are stone, water, compacted earth, and concrete. There is a major difference between mass and insulation. Dense means the absence of voids or air spaces. The more dense the mass, the more temperature it holds. This density acts as a conduit for temperature allowing it to travel into the mass and be contained there.¹²

This works simply and brilliantly. Pounding the earth into tires, effectively creating another crust, not only produces the principle wall of the house but also provides enough density for the house to heat and cool itself. "The super insulated thermal mass home... The mass in the building is linked to the tremendous mass of the earth. The heat from the sun is admitted through southern windows and stored in the mass".¹³ I should add that the face of an Earthship (the open end of the 'U') is situated (when in the Northern hemisphere) toward the south so that in the winter time when the sun is lower in the sky its rays reach deep into the house. This heats it during the day time while at night when the sun leaves the sky the walls release the heat they have stored throughout the day, keeping a stable temperature. In the summer when the sun is higher in the sky its rays only enter roughly five or six feet into the house, just enough to reach the plants that run the distance of the front window while the majority of the house remains the same temperature as the cool earth. And, should it be too hot in the summer one need only lower the blinds. Chuck and Pat Potter who own an Earthship in Southern Ontario, where the temperature dips well below freezing in the winter, told me that during the whole winter there were only a few days when they had to turn on a generator.

¹³ Ibid., 13.

¹²I bid., 10. Emphasis in original.

Otherwise, it was the sun and the solar mass that kept it warm.¹⁴

Not only does the house self regulate its temperature but it is also possible to grow plants all year round because the glass that runs along the front is tilted to such an angle that it always hits, at the very minimum, the planters at that run along the front window. The Potters, for instance, have an avocado tree growing in their house!¹⁵ During the summer time, and also because of the angle of the glass, a micro climate is created outside by the sun bouncing off the front windows and warming the earth below, creating exceptionally good growing conditions along a two or three foot perimeter running the length of the window.¹⁶ This is like a chain of mutually supporting innovations.¹⁷ Every move is productive. This is the meaning of the term introduced a little earlier by Reynolds: interfacing.

Interfacing also has another meaning. It includes the body. It is important for Reynolds that Earthship owners play a part in building their homes.¹⁸ From my own researches it seems like this is often the case. It is possible to hire a trained crew of builders to come and help build the house all on their own but people often help out and learn about the house through the construction process. Especially the tire wall, which is the most laborious task of the whole building, requiring many bodies to throw their weight into the tire. "You don't pound tires with your head, you pound with your body

¹⁴ Chuck Potter and Pat Potter, interview by Adam Bobbette, April 05, 2005.

¹⁵ The leaves of which "make a lovely tea, by the way", as Pat Potter informed me. Chuck Potter and Pat Potter, interview by Adam Bobbette, April 05, 2005.

¹⁵ Chuck Potter and Pat Potter, interview by Adam Bobbette, April 05, 2005.

¹⁶ This phrase is taken from: Manuel De Landa, A Thousand Years of Nonlinear History, (NewYork: Zone Books, 1997) 77.

¹⁷ Michael Reynolds, Earthship vol 1, 1-10.

¹⁸ Michael Reynolds, Comfort in Any Climate, 48.

and your body learns the intensity of thermal mass"¹⁹

Interfacing, we could say with Manuel De Landa, creates a sensual knowledge of the Earth. Sensualising the earth means getting into it—you pound with your body—and following it, allowing it to speak. It means giving some autonomy to the earth and apprenticing it, even while you work it to transform it. As De Landa writes, interfacing means:

...allow[ing] the materials to have their own say in the final form produced. All of this involve[s] following a given material's local accidents and imperfections, rather than imposing a rigid, pre-planned form on it. According to the metallurgist Cyril Stanely Smith, this know-how had been developed well before the Greeks began to apply formal reasoning to these problems, and it was therefore mostly of a sensual nature. . . (As *sensual* knowledge, this know-how would constitute yet another stratometer, one built into our own bodies.)²⁰

A stratometer is a sort of feeler for the various strata of material and energy flows that make up the world. In this case it feels out the capacities of the earth, of its tendencies to break down dirt and solidify to such an extent that it makes habitation possible but also that it holds temperature at a steady rate.

Henri Focillon, in the essay 'In Praise of Hands', describes another way of understanding the implication of the body in interfacing and the sensual knowledge it gives rise to:

Knowledge of the world demands a kind of tactile flair. Sight slips over the surface of the universe. The hand knows that an object has physical bulk, that it is

¹⁹ Ibid.,48

smooth or rough, that it is not soldered to heaven or earth from which it appears to be inseparable. The hand's action defines the cavity of space and the fullness of the objects that occupy it. Surface, volume, density and weight are not optical phenomena. Man first learned about them between his fingers and in the hollow of his palm. He does not measure space with his eyes, but with his hands and feet. The sense of touch fills nature with mysterious forces. Without it, nature is like the pleasant landscapes of the magic lantern, slight, flat and chimerical.²¹

To reach a relationship of interfacing we could say it requires the sensual knowledge De Landa and Focillion describe. And we find in Deleuze and Guattari an expression of the kind of logic that interfacing tends to require, a logic of *following*:

...following is something different from the ideal of reproduction. Not better, just different. One is obliged to follow when one is in search of the 'singularities' of a matter, or rather of a material, and not out to discover a form; when one escapes a force of gravity to enter a field of celerity... And the meaning of the earth completely changes...²²

An Earthship does precisely this, it follows the earth, it allows it to speak. And its voice travels through the body. One learns the properties of the earth in a very intimate fashion in an Earthship. The logic of relation that earlier I pointed to as giving rise to foundations (and the edifice in general) is in an Earthship a logic of interfacing, of following and of sensual knowledge. But the structure of an Earthship, its form and its function, is only the introduction to this logic. We will see that it is suffused throughout

²¹ Henri Focillon, the Life of Forms in Art (New York: Zone Books, 1992), 162. Originally published in 1934.

²² Gilles Deleuze and Felix Guattari, A Thousand, 372.

the house. And for that we need some grey water.

Grey Water

There are a variety of grey water systems, and they are not unique to Earthships. Nancy Jack and John Todd have designed their own form, as well as numerous other architects and designers.²³ It is not clear if Reynolds designed his own, but we could assume that he was influenced by other designers, as grey water was 'in the air' during the 1970's. It is when the grey water system is added to all the other elements in the Earthship that it gains a particularly perceptive expression.

Let's follow some water. It begins to rain on an Earthship. The water will first be drawn along the roof because of its shape and/or sometimes by an open drainage pipe, and collected into a cistern. From there it is fed through the house: into the shower, sinks and toilets. Once it passes through these *intervals*, the water is split into types according to the new elements that have been added to it: grey and black water. Black water is toilet water; not immediately re-useable, it is sent to another cistern outside of the house dug into the ground. It is something like a septic system, though different for septic tanks mix all waters together, making all water unusable,

Consequently we have massive sewage systems for even the smallest of towns. Individual homes have so much sewage that codes require at least an acre of land for them to have their own septic system. This still requires soil percolation tests and EPA supervision to try to keep pollution of ground water to a minimum. In view of these facts, if you must have black water, **the first step toward dealing**

²³ John Todd and Nancy Jack Todd, From Eco-Cities to Living Machines: Principles of Ecological Design. (Berkely: Atlantic Books, 1993) Introduction.

with it is to separate it from grey water. . . As the number of people continue to grow we must continue to reduce the "per capita black water volume.²⁴

Reynolds suggests building the septic tank out of old aluminum cans stacked on top of each other like bricks, held together with a cement mixture and lined with plaster. Here the black water collects and begins a process of breaking down through an anaerobic process with bacteria.²⁵ Once the sludge has reached a certain height it exits the tank into a drain field and returns to the soil. At the point it meets up with the earth again its elements have been changed and shuffled around enough to be healthy for the soil. I should add too that Drano and industrial chemicals of the like can't be poured down such a toilet (or any toilet) for they destroy all the bacteria that get in on the process of making shit an agent in proliferating vegetation.²⁶

The rain water that is run to the sinks in the kitchen (or any wash basin in the main rooms) is often passed directly from the sink, after it has washed over hands and dirty dishes or what have you, into the planters that run along the front windows. This is the grey water; reusable, nutrient rich water. "We throw away nutrients for our plants in underground sewage systems. We do this in such a way that pollutes underground water tables. Then we buy manufactured 'nutrients' for our plants which aren't as good as what we threw away. This is modern day waste water technology."²⁷

Straight from the sink to the plants, with no treatment. Reynolds describes what happened when he first did this:

In one of my early experimental Earthships I drained my kitchen sink into its own

 ²⁴ Michael Reynolds, *Earthship vol 2*, 52. Emphasis in original.
²⁵ Ibid., 58.

²⁶ Ibid., 58

individual *inside* planter. I put a little ten inch tall \$2.98 split leaf philodendron in the planter. Within a couple of years the plant became a fifteen foot tall tree with an 8" diameter trunk with seed pods and other weird things I have never seen on a philodendron before. This plant is so healthy and strong from the 'food' produced by the kitchen sink that no bug or disease could touch it. It is a *being*.²⁸

Noodles, vegetables, bread crumbs: all sent to the plants. As I said before, the Potters have an avocado tree growing in their living room; fed by the water from their sink. Should the plants be hungry, do the dishes.

Reynolds conceptualizes grey water systems:

We are beginning to see on this planet that everything we 'discard' has a value. Waste is not even a relevant issue with plants and animals. Everything is reused, transformed, or gives birth to something else as it dies. This is the frame of mind we must adopt as we decide what we do with our water after we have used it once.²⁹

The Earthship is suffused in an open circularity: "reused, transformed or gives birth to something else."

Trees drop their leaves to the ground. The leaves rot at the base of the tree, thus enriching the soil from which the tree gets its nourishment. The tree (by strategic placement of its by-product – leaves) is constantly contributing to its existence. Likewise, we as humans (by strategic placement and use of our own by-products) can constantly be contributing to, rather than taking from our

²⁷ Ibid., 53.

²⁸ Ibid., 53. Emphasis in original.

²⁹ lbid., 52. Emphasis in original.

existence.30

This logic of open circularity catches up all sorts of things in its path. It breaks down distinctions. No longer is there a distinction between trash and 'good' resources; no longer is there a distinction between nature, architecture and technology. Everything partakes of everything else in this immense process of transformation and recombination.

This logic gives a different sense to green building, or environmental building. It pushes it in a direction it doesn't often go. Like much green building it turns to nature for inspiration and help, but this nature is the waste dump. This is the new environment. It becomes senseless to think about building in some pristine (read primordial) nature. Earthships express a unique openness and clear-headedness about the reality of waste. Reynolds calls an Earthship an "assemblage of By-products":

An Earthship of the future should make use of indigenous materials, those occurring naturally in an area. For centuries, housing has been built from found materials, such as rock, earth, reeds, and logs. Now, there are mountains of by-products of our civilization that are already made and delivered to all areas. *These are the natural resources of the twenty-first century*.³¹

The Earth is also the litter scattered over it, this is another one of its strata, or another of its elements. This insight is one of the most important and radical innovations of an Earthship. It is also expressive of the ethics it creates: how to build with the Earth—or how to follow the earth, in its fullness, including the refuse, how to re-evaluate it as filled with potential to build new things, new things which augment the flows of the

³⁰ Michael Reynolds, A Coming of Wizards: A Manual of Human Potential (Taos: High Mesa Press, 1989), 110. Emphasis in original.

earth and elements, which produce new combinations that allow for more life. The revaluation of trash constitutes a new form of skilled labour, a new artisan. Or, rather it appears new, but it connects up and makes new the forgotten traditions of the homeless, the poor, the nomads. They have tested how satellite dishes have worked as roofs.³² or corrugated factory steel as walls.³³

Such a perspective also changes the position that says we are in a period of depleting resources to one which sees a period of resource accumulation. The resources that *are* depleting, such as oil and natural gas, have been responsible for the production of virtually unthinkable numbers of other resources. Think of plastics, machinery, automobiles, etc.... These are resources that just haven't been considered as resources yet. Seeing them as resources will require a logic of encountering them and following them, apprenticing trash.

Reynolds writes:

The type of thinking that allows the aluminum can to 'be' a brick is a step in the right direction. This type of thinking lends us the flexibility to uninhibitedly respond to the nature of the moment. . . And at the moment we have more of what we term 'garbage' than any other natural resource.³⁴

Reynolds also writes that:

Look at an alluminum beverage can. For years this item has been

³¹ Michael Reynolds, *Earthship vol 1*, 18

³² The example of the satellite dish comes from experiencing this very architecture off a highway in British Columbia.

³³ The artisans of trash appear all over the earth. Blackbirds for instance are well known to build their nests of a whole variety of bits and pieces culled from muddy fields and peoples back yard garbage cans. They weave all of these resources together to such a degree that no element has special priority over another. And futhermore, how do could we distinguish between the 'natural' and the 'artificial' in such a dwelling? ³⁴ Michael Reynolds, A Coming of Wizards, 109.

distributed all over the globe as a container for beverages consumed by human beings. The beverage can is so well distributed over the planet that it is at least as common and plentiful as wood. It has been looked upon as waste or garbegetheregore wothless. For a long time beverage cans were thrown anywhere and everywhere. Then they became a problem to the environment. Reluctantly and soley as a result of pressure from various environmental movements, the manufacturers of beverage cans began to recycle the alluminum to make more beverage cans. Now, we have something that is as plentiful as wood 2x4's and actually available in more places than 2x4's. Beverage cans appear 'natually' on the planet and are found in more places than any of the above mantioned 'standard' building materials.³⁵

A dump of discarded automobile tires becomes a structure bearing and insulating wall *and* a surface to grow on. It enters into a new composition of relations and gains new properties, new meanings, new possibilities. The meaning of recycling completely changes from the removed suburban style where you dump your box on the side of the road to be sent off to a plant and then returned to you in the form of another package. Nor is it the compulsion to buy a product because of the recycling label pasted on its package, or some sense of civic duty. It extends recycling to the very space you inhabit, it constitutes that space. But it doesn't rest only here, the Earthship opens a perspective on the earth and 'nature' as recycling, as a process of variation and recombination-of open circularity.

I should add too another difference between Earthships and other forms of green

³⁵ Micheal Reynolds, A Coming of Wizards, 106.

building. Green building will sometimes advocate a 'lighter' step approach to nature and an ethic of backing off. This is not at all the case for Earthships which jump head first into the world around them. They are not anti-technological, but technological through and through with their solar panels and wind mills and their intricate network of batteries and converters, with their grey water systems that utilize plastics and contemporary plumbing.

In the early 1930's Henri Focillon developed a theory of the ornament in art and architectural history. He distinguishes two functions for ornament. One of the functions is an especially apt description of the systems of an Earthship, including grey water, the tire walls, the planters, as well as the solar panels and wind turbines. Ornament, he says, brings form to a void in space whereupon it creates a relation with the void in one of two ways: respect or cancellation. Earthships fall into the latter. He is worth quoting at length for his economy of expression and insight:

This respect for, or cancellation of, the void creates two orders of shapes. For the first, it would seem that space liberally allowed around forms keeps them intact and guarantees their permanence. For the second, forms tend to wed their respective curves, to meet, to fuse or, at least, from the logical regularity of correspondences and contacts, to pass into an undulating continuity where the relationship of parts ceases to be evident, where both beginning and end are carefully hidden. In other words, what I may call 'the system of the series'— a system composed of discontinuous elements sharply outlined, strongly rhythmical and defining a stable and symmetrical space that protects them against unforeseen accidents of metamorphosis—eventually becomes 'the system of the labyrinth,'

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which, by means of mobile syntheses, stretches itself out in a realm of glittering movement and color. As the eye moves across the labyrinth in confusion, misled by a linear caprice that is perpetually sliding away to a secret objective of its own, a new dimension suddenly emerges, which is a dimension neither of motion nor of depth, but which still gives us the illusion of being so. In the Celtic gospels, the ornament, which is constantly overlaying itself and melting into itself, even though it is fixed fast within compartments of letters and panels, appears to be shifting among different planes at different speeds. . . My statement of the situation might appear entirely too abstract and systematic, were it not henceforth evident that this strange realm of ornament—the chosen home of metamorphoses—has given birth to an entire flora and fauna of hybrids that are subject to the laws of a world distinctly not our own. The qualities of permanence and energy implicit in this realm are extraordinary; although it welcomes both men and animals into its system, it yields nothing to them—it incorporates them."³⁶



(Henri Focillon, TheLife of Forms, 69.)

The logic of interfacing and following that an Earthship expresses—in its construction, in its form, in its interior, in the bodies of its inhabitants—creates precisely

³⁶ Henri Focillon, The Life of Forms, 67.
this, an ornament. Water enters into the house from a rain cloud; it runs through your sink after you have had dinner and then feeds the plants which grow herbs and vegetables which you eat for dinner; you flush the toilet and fertilize the lawn where there are more vegetables growing, or perhaps just trees that provide a shady place to read. What action is the cause of what? There is no simple causal chain of cause effect. The origin and the effect is lost. This is what is meant by open-circularity and what Focillon means by ornament.

Everywhere throughout the house things are flowing into and out of each other. Nothing is fundamentally distinguishable. The house is barely distinguishable from the earth around it. The curls of the cisterns at each end resemble turbulence in a stream. The major design form in the interior of an Earthship is the curve; the walls aren't straight and the corners bend. The cabinets blend into the walls, they do not jut out in boxes. Doors in many Earthships are rounded at the top rather then square, and often crowned with old pop and beer bottles to let coloured light pass through rooms.

Truly the Earthship creates hybrid forms, monstrous connections, where no form can lay claim to a fundamental ontological difference, or a difference in kind, everything is fluxing together. What becomes of the house is a node. To say Earthship is to say passage.



(Figure 5: Reynolds' rather impressionist rendering of the flows and movements in an Earthship. From Michael Reynolds, Comfort in Any Climate, 61.)

The Neo-Baroque

Both Gilles Deleuze and Henri Focillon argue that the baroque is not limited to a period but to functions that travel through a variety of spaces and times. As Focillon writes:

The baroque state likewise reveals identical traits existing as constants within the most diverse environments and periods of time. Baroque was not reserved exclusively for the Europe of the last three centuries any more than classicism was the unique privilege of Mediterranean culture. In the life of forms, baroque is indeed but a moment, but it is certainly the freest and the most emancipated one. Baroque forms have either abandoned or denatured that principle of intimate propriety, an essential aspect which is careful respect for the limits of the frame, especially in architecture. They live with passionate intensity a life that is entirely

their own; they proliferate like some vegetable monstrosity.³⁷

Gilles Deleuze is in agreement that the baroque breaks down the meaning of the frame, though where Focillion discusses form as playing this role Deleuze talks of materiality and the fold. In the baroque the fold becomes the major constitutive aesthetic feature. It is flexible, malleable, compactable and essentially infinite in its possible shapes. Not only does the baroque utilize folds in its art and architecture but, as Deleuze argues is the case with Liebniz, the fold comes to characterize matter. The fold proliferates—or rather *folds* proliferate, to all levels of the world. "The [smallest] unit of matter…is the fold" and "the baroque fold unfurls all the way to infinity."³⁸ Liebniz for instance begins differential calculus, the mathematics of the curve and the fold, rather than the straight line and the point.

The baroque begins to understand matter as explosive. This is also where Deleuze and Focillion agree. Its explosiveness breaks down boundaries, it surpasses its frames.

Dividing endlessly, the parts of matter form little vortices in a maelstrom, and in these are found even more vortices, even smaller, and even more are spinning in the concave intervals of the whirls that touch one another. Matter thus offers an infinitely porous, spongy, or cavernous texture without emptiness, caverns endlessly contained in other caverns: no matter how small, each body contains a world pierced with irregular passages, surrounded and penetrated by an increasingly vaporous fluid, the totality of the universe resembling a 'pond of

³⁷ Henri Focillon, Life of Forms, 58.

³⁸ Gilles Deleuze, *The Fold: Liebniz and the Baroque* (Minneapolis: The University of Minnesota Press, 1993) 3-4.

matter in which there exist different flows and waves.'39

Peter Eisenman describes well some of the consequences of this conception:

... the notion of the object is changed: it is no longer defined by an essential form. This new object [Deleuze] calls an 'object—event', an 'objectile'—a modern conception of a technological object. This new object, for Deleuze, is no longer concerned with framing space but, rather, with a temporal modulation that implies a continual variation of matter, unfolding through the agency of the fold (an idea first defined in the baroque). He differentiates between the Gothic, which privileges the elements of construction, frame and enclosure, and the Baroque, which emphasizes a matter overflowing its boundaries, and before which the frame eventually disappears.⁴⁰

The Earthship folds the baroque into the present. On one level the Earthship shares an aesthetics of the fold with the baroque. It looks like a fold of the earth around it, it bends the rain through it. The inside of the house is curved, the plants swirl up to the roof in their rounded potters. The folds and bends of the grey water, the solar panels, the recycling. But the aesthetic of the fold is expressive above all of a logic of relation.

A fold touches everything around it: it carries no sharp distinction. The fold is in contrast to a segmented and striated line which gives the impression of being separate, solid and unified. This brings about a shift in the meaning of the inside and outside, not only of a house but also of its inhabitants. The inside is only an intermediary, a passing through, a momentary transformation in the flows of the elements. The inhabitant

³⁹ Ibid., 5.

⁴⁰ Peter Eisenman, 'Unfolding Events', in *Incorporations*, ed. Jonathan Crary and Sanford Kwinter (New York: Zone, 1992) 425.

becomes one among many inhabitants. The space does not exist solely *for* the humans that live there. Living in an Earthship very much creates the sense you are only one combination of relations amongst all the others going on. The Potters told me a story of going away on vacation for a number of weeks to come back to a house where all the plants were still living (had grown even), the temperature was regulated, the cisterns were full, the sewage still filtering into the yard. The house sustains itself, it continues to direct and re-direct the flows of matter and energy without human intervention. To be domestic is to partake of these movements. This creates also a sense of humility towards your own house, as I noticed in the Potter's, who, after 12 years in an Earthship, were still in amazement at their own house.⁴¹

The inside becoming a fold of the outside is what distinguishes, according to Deleuze, the baroque from its 'neo' or modern, instantiations. As Michael Goddard has written, the neo-baroque is not a refutation of the baroque but "its re-working in relation to modernity and its breakdown of the unity of the relation between the subject and the world."⁴² It is a "nomadic conception of subjectivity as the transitory folding of the chaotic outside. . ."⁴³ Deleuze expresses this breakdown of the inside and out with reference to contemporary atonal music:

To the degree that the world is now made up of divergent series (the chaosmos)...the monad is now unable to contain the entire world as if in a closed circle that can be modified by projection. It now opens on a trajectory or a spiral in expansion that moves further and further away from a center...The question always entails living in the world, but Stockhausen's musical habitat or

⁴¹ Chuck Potter and Pat Potter, interview by Adam Bobbette, April 05, 2005.

⁴² Michael Goddard, 'The Fold, Cinema and Neo-Baroque Modernity', *Traces*: 3. 223.

Dubuffet's plastic habitat do not allow the differences of inside and outside, or public and private, to survive. They identify variation and trajectory, and overtake monadology with a 'nomadology.' Music has stayed at home; what has changed now is the organization of the home and its nature...what always matters is folding, unfolding, refolding.⁴⁴

We left off from Virilio and Parent at the opening of this paper and their project of creating "habitable circulation."⁴⁵ They outlined many of their objectives in the journal *Architecture Principe*, of which Virilio wrote: "...The illustrations in the *Architecture Principe* magazine were obviously not of architectural or even urbanistic projects, but were simply statements of PRINCIPLE—concepts intended to outline the theory..."⁴⁶ It would take an Earthship to flesh out the principles in a building and to create a fully habitable circulation, and perhaps to a far more radical and comprehensive degree than Virilio or Parent imagined. By becoming Neo-baroque the Earthship immanentizes its inhabitants with the movements of the elements.

The most profound effect of this is that it creates a space where the inhabitants feel that they are part of processes and movements that are beyond themselves, that are impersonal, which traverse through themselves and the house. You eat the food from the garden for instance that has been fed by rain, which you then transform and deposit in the soil for further regeneration. Your role in the house is as a passage and transformer, and domestic life becomes a site of recombinations and reassembly. This generates an immediate, embodied, sense of responsibility for these very processes. It is not about

⁴³ Ibid., 223.

⁴⁴ Gilles Deleuze, *The Fold*, 137.

⁴⁵ Parent and Virilio, Function of the Oblique, 13.

⁴⁶ Ibid., 13. Emphasis in original

becoming one with the elements, as in the same, but about entering into them, hybridizing with them, being swept away by them.

I should add too another statement by Virilio and Parent that seems now, in the light of Earthships, to be a premonition: "In the work of the group, 'the making of the architectural OBJECT' was superseded by the 'making of the JOURNEY'."⁴⁷

⁴⁷ Parent and Virilio, *Function of the Oblique*, 13. Emphasis in original.

Chapter 2: The Suburban Box and the Lines that Cleave

In *A Thousand Years of Nonlinear History* and the essay 'Nonorganic Life,' Manuel De Landa takes up the task of seriously learning from the Earth. He sees in it an intermixing of a variety of structures which for the sake of analytic clarity can be broken down into three categories: the stratified, the supple and the self-organizing. These categories run along a scale from the most hardened (the former), to the most chaotic (the latter). To these categories he also attributes properties and values. The most stratified tends to be the most resistant to transformation, while the supple is less so, and then there is the chaotic, which is the most dynamic of the three, the state with the highest tendency toward transformation, and it is often defined by self-organizing properties that emerge from *within* rather than following rules and regulations imposed from without. These three states never exist in a purely separate form, they are always mixed, if not internally then around the edges. A supple structure, for example, might emerge along side a more rigid one and properties might pass from one to the other. This, De Landa concedes, is because these structures do not only exist at a geological, biological or chemical levels alone but traverse all of reality. These structures constitute reality.¹

This tripartite division of structures is a variation on the analyses of Deleuze and Guattari, especially those of *A Thousand Plateaus*, where they distinguish between solid structures (usually those of hardened institutions like schools, the military, family, office, marriage) and more supple ones (like temporary alliances and loosely knit groups like reading groups, knitting bees, clubs, even love affairs) while the third they call the 'lines

¹ See, Manuel De Landa, "Nonorganic Life", and *A Thousand Years of Nonlinear History* (New York: Zone Books, 1997).

of flight.² De Landa describes such lines as "...the bifurcations that could allow us to change our destinies as defined by those two types of structures."³ Or, in the words of Deleuze, "to flee is to produce the real, to create life, to find a weapon."⁴ The line of flight emerges between the two other types of structure and unsettles them, destructures them and opens up possibilities for new types of organization.

De Landa describes what Deleuze and Guattari are up to, while at the same time nodding to his own work:

In every area of human reality (art, politics, love), they [Deleuze and Guattari] attempt to 'measure' the degrees of stratification of the flows of matter and energy at work in these domains. For example, after showing how music originates from the expressive powers of matter itself (in particular, the selforganizing processes of animal territories that give rise to bird songs), they argue that music has a greater capacity to 'destratify' than does painting. It is as though the modulated flows of air that we experience as music have a greater capacity to set our emotions and thoughts into flux than do the more viscous, spatial flows of form and color found in painting.⁵

Suburban development is organized by what are generally very highly stratified structures. Such structures give rise to highly segmented and striated spaces. In a suburb there are distinctions and separations all over the place which run from the labor that goes into building them, to the architectures themselves and into the life that takes place inside.

² Manuel De Landa, 'Non organic Life', 155. and Gilles Deleuze and Felix Guattari, A Thousand Plateaus, 'plateau 9'. ³ De Landa, "Non organic Life", 155.

⁴ Gilles Deleuze, Claire Parnet, *Dialogues II* (New York: Columbia University Press, 2002), 49.

⁵ De Landa, "Non organic Life", 155.

There is an important distinction to remember for understanding how striation and stratification work. Deleuze, Guattari and De Landa all give a certain privilege, or a primacy, to flows and fluxes. For them, it is as if everything is moving, even if at different rates. Structures that are highly stratified or very rigid either emerge from flows or are implanted onto flows. For all, rigid structures can emerge out of self-organizing processes, or a line of flight can become solidified and loose its creativity. One type of structure never has an inbuilt guarantee as to which way its going to go. At any point a given structure can flip over into another type. None the less, the distinction that must be made for our immediate purpose is that a structure emerges from a flow or is imposed on it. In the case of rigid structures, they separate, divide, calculate, create distinct entities, etc...

This process of stratification Deleuze and Guattari term striation or segmentation. Such processes are highly spatial and attempt to account for the emergence of a given space. In *A Thousand Plateaus*, Deleuze and Guattari contrast striated space with the smooth, though they always define the two together.

The smooth and the striated are distinguished first of all by an inverse relation between the point and the line (in the case of the striated, the line is between two points, while in the smooth, the point is between two lines); and second, by the nature of the line (smooth-directional, open intervals; dimensional-striated, closed intervals). Finally, there is a third difference, concerning the surface or space. In striated space, one closes off a surface and 'allocates' it according to determinate intervals, assigned breaks; in the smooth, one 'distributes' oneself in an open space, according to frequencies and in the course of one's crossings...⁶

The smooth and the striated always emerge together, never one in simple exclusion or distinction from the other.

I would like to bring this conception of the dynamic interrelations between these different types of structures and their emergence in space to bear on both suburbia and Earthships. In the previous chapter we saw how the Earthship privileges the curve, bend and fold in its structure. This privilege emerges from and expresses a logic of relation that here we could term smooth, where we once used Neo-baroque. The suburbs, on the contrary, will be understood as a striated space. I would like to draw out the effects of both of these types of space, though it should be stressed that neither space is either smooth or striated, but emerges from a dynamic interrelation between the two.

The suburbs have an interesting etymology:

Subdivision: the process, instance or state of being divided again following upon an earlier division/ A portion that is the result of subdividing/ A tract of land for building resulting from subdividing land/ a housing development built on such a tract.

Division: the act of dividing or state of being divided/ The act of sharing out, distributing/ Something that divides or keeps apart, such as a boundary/ A difference of opinion, especially one that causes separation/ A mathematical operation, the inverse of multiplication.⁷

⁶ Deleuze and Guattari, A Thousand Plateus, 481.

⁷ J. Harrison, "Multiplication and Subdivision: a Paradox of Danger and Safety" in *Architecture of Fear*, ed. Nan Ellin (New York: Princeton Architectural Press, 1997) no page numbers.

Assembling the Lines that Cleave

We don't often think of the suburban house as a massive scale architectural project in the way we do of the pyramids, grand cathedrals, or the Great Wall. How often do we consider that some day Etobikoe or Scarborough, will be in a history book as a major architectural form? But the fact is that the resources, the labour power, the technologies, and the magnitude of the qualitative transformation of space is of such a scale that it deserves treatment like it were a great wall.

phenomenan

Building just one suburb is virtually a global phenomena. For instance there are materials: from wood to concrete to brick, to copper wiring to shingles to tiles. Wood takes trees; concrete takes limestone, dirt and rocks of various kinds. Copper wiring takes, obviously, copper; but also plastics, which mean petroleum. The same for shingles, more petroleum and rocks. Tiles: rocks.⁸ There is also the manufacturing processes which all these materials pass through and get arranged and re-arranged by. There are mines, forests, and quarries, road ways, automobiles and factories (themselves composed of massive networks), and there are distributors who are intermediaries between the materials and the builders. On top of these there are all sorts of other mediating points (or nodes) in the network: contractors of various sorts, planners, municipal governments, surveyors, engineers, architects, hydro-companies. And there are laws, bylaws, regulations and codes which act as mediators along the flows. . . Whole vast networks that coalesce their functions and movements into a suburban house, but which also surpass them, making more houses, employing more people, damming rivers, fabricating more things.

⁸ Suprisingly most building materials are still mostly just dirt, and variations of dirt. 1 owe this reminder to Jay Gillingham.

Since the 1950's suburban development has been the principle form of housing development in North America.⁹ Over 60% of housing stock as of 2002 has been built since 1950. Between the years of 1950 and 1970, 83% of the United States' growth took place in suburbia.¹⁰

The suburbs emerged from the application of industrial models of production to housing. As early as 1904 through the mid-thirties, small building firms as well as nation wide American mail-order companies Sears, Roebuck and Montgomery Ward sold 'ready-built' houses by catalogue.¹¹ "They advertised the efficiency and economy of houses that were precut by machine in the factory, 'more accurately than hand labor ever could,' rather than built on site to individual specifications."¹²

There emerges from this period a glorification of housing's industrial origins. Builders began to be very open about the industrial nature of their houses. They were also experimenting with non-traditional and highly manufactured materials like asbestos and aluminum while also becoming increasingly minimalist in their design. All sorts of experiments were being conducted to reach the most efficient form of housing possible and the design itself came to be an expression of this logic, though amidst this period of experimentation it is interesting to note that the form of the free standing, wood frame, single family residence was never tampered with—it remained the end product.¹³ The box.

⁹Andres Duany, Jeff Speck and Elizabeth Plater-Zyberk, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream. (New York: North Point Press, 2000), and Avi Friedman, Planning the New Suburbia: Flexibility by Design, (Vancouver: UBC Press, 2002).

¹⁰ Friedman, Flexibility by Design, 35.

¹¹ Cartherine Jurca, White Diaspora: The suburb and the Twentieth-Century American Novel (Princeton: Princeton University Press, 2001), 79.

¹² Jurca, White Diaspora, 79.

¹³Jurca, White Diaspora, 79.

The image of the machine came to govern the house and domestic life. It was machines that built houses and the house itself became a machine. The French architect Le Corbusier was the first to describe the house as 'a machine for living in' and it was subsequently incorporated into North American popular discourses to describe suburban development and design. Catherine Jurca describes the purpose: "...eliminate all preconceptions about what buildings should look like in the practical and economical alliance of function and form, utility and aesthetics, through the design and manufacturing possibilities inherent in the machine."¹⁴

With De Landa we can make a link between this kind of productivity and what he calls the American system, which has its origins in the transformations of military labour.

The American system was originally devised to create weapons with perfectly interchangeable parts. When artisans manufactured the different parts of a weapon by hand, the resulting heterogeneity made it impossible to supply fronts with spare parts. The new system first created a model of a particular weapon, and then the model served as a *standard* to be exactly replicated. But enforcing this standard, to ensure the homogeneity of the products, required a transfer—from the military to the factory—of the disciplinary and surveillance methods that had been used to maintain order in the barracks and camps for over two centuries. In short, the American system transformed manufacturing from an open process based on flexible skills into a closed process based on fixed routines (enforceable through discipline and constant inspection)...¹⁵

¹⁴ Jurca, White Diaspora, 80.

¹⁵ De Landa, A Thousand Years of Nonlinear History, 84. Emphasis in Original

The construction of dwellings and its aesthetics comes to mirror the general organization of labour as inside space, domestic space, becomes a product of the machine.

This model of standardization remains to this day in suburban development. I am of course not the first to point this out, it is the general sentiment expressed over suburbia.¹⁶ We might remember too Pete Seger's song from the 1960's, "little boxes, little boxes, all the little ticky tacky boxes..."

De Landa notes that standardization is achieved through the enforcement of routinization. Routinization segments tasks and skills and it sepirates and divides labour and the product. Such routinization brings about a deskilling of labour. Deleuze and Guattari write that:

It can be said not only that there is no longer a need for skilled or qualified labor, but also that there is a need for unskilled or unqualified labor, for a dequalification of labor. The State does not give power to the intellectuals or conceptual innovators; on the contrary, it makes them a strictly dependent organ with an autonomy that is only imagined...¹⁷

This total simplification of labour is one of the fundamental striations that bring about suburban development. Houses are put together in a piecemeal fashion, one bit at a time. It is akin to the military model where squads come in on the scene with a preformed task and then leave when its done.. The cleave that runs between these

¹⁶ See Jurca, White Diaspora, 2001. Andres Duany, Jeff Speck and Elizabeth Plater-Zyberk, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream, 2000. J.W.R. Whitehand and C.M.H., Carr, Twentieth-Century Suburbs: A Morphological Approach, (London: Routledge 2001). Peter King, Private Dwelling: Contemplating the Use of Housing, (New York: Routledge, 2004) The End of Suburbia. The End of Suburbia: Oil Depletion and the Collapse of the American Dream, (Film) Gregory Greene, dir. (Electric Wallpaper: Canada, 2004).

¹⁷ Deleuze and Guattari, A Thousand Plateaus, 368.

segments makes it almost impossible for there to be any resonance between these squads. Think for instance of a brick layer who decides to play around with laying bricks in a unique way, which will thrn throw everything else that comes after it off-course.¹⁸ The Viennese architect, Hundertwasser, has brought up another point about the brick layer: "The brick layer has no relationship to the building. If, for example, he wants to vary, if only slightly, the construction of a wall according to his own moral and aesthetic concepts—if he has any—he looses his job. And besides, he doesn't care, since he will not be living in the structure."¹⁹

Endemic to this situation is another line that cleaves; a segment between architect/designer and home owner. Where architects/designers are seen as the only ones with the skill and authority to manipulate their living space. Not only is there a general sentiment that 'they're the experts' but also the whole set of codes and legalities that prohibit people from experimenting with their built environment. A striation appears between people and where they live, they become inhabitants who accept models created by architects and designers who in turn work with developers.

In 1959 Hundertwasser wrote, with characteristic flair;

We are outrageously robbed of our humanity by defiling dictates and criminally forced not to make any changes or additions to facades, the layout or interiors, either in colour, structure, or masonry. Even tenant-owned dwellings are subject to censorship (see building-inspection regulations and lease statutes). The

¹⁸ Kenneth Frampton writes that "modern building is now so universally conditioned by optimized technology that the possibility of creating significant urban form has become extremely limited." Kenneth Frampton, "Towards a Critical Regionalism: Six Points for an Architecture of Resistance" in *Post-Modernism: A Reader*, ed. Thomas Docherty (New York: Harvester Wheatsheaf, 1993), 269.

¹⁹ "Mould Manifesto Against Rationalism in Architecture". In Hundertwasser. Web Site [cited 15 April 2005]. Available at www.kunsthauswien.com/english/philosophie.html.

characteristic thing about prisons, cages or pens is the prefabricated 'a-priori' structure...²⁰

One may object by raising the popularity of renovations in the suburbs (for people who can afford it): building basement apartments, installing custom-made bars in the basement, etc... There is also the industry of selling whole new units of bathrooms, kitchens, recreation areas, often sold in mega big box construction/building/ 'home owner' stores like Home Depot, Ikea, or Rona. This adds new elements, new 'situations' perhaps into the mix of the home, but changes nothing beyond objects (and the symbolic value of having a nice dishwasher over a double sink). Nothing fundamental in the house is changed. It does not transform to any serious degree the flows that make up a house. It transforms only the spaces within the striations, not the striations themselves.²¹ These are not lines of flight. These interventions into the home, adding new features like hot tubs and fancier fridges, etc... are also signs of consumption and wealth. Catherine Jurca has demonstrated that the suburbs have been about the so-called 'democracy of consumption' since their inception in the 1930s and 1940s. Having a single family home became a sign of status and the interior became a space to display commodities. Living in a suburban home demonstrates their owners ability and power to consume.²²

What is interesting about the materiality of a suburban house is that consumption is inscribed into the very materiality of the house itself. In Ontario, for instance, mortgages last roughly twenty years. This same time-span is the rough life-span of the

²⁰ Hundertwasser, "Mould Manifesto against Rationalism in Architecture", no page numbers.

²¹ It would be interesting to spend more time on what these 'minor differences' are. Think for instance of hot tubs, which carry a load of symbolic value, but also introduce into the private sphere what was a public activity: hot baths, creating yet another cleave between the inside and out. Or, think too of home offices, which break down the striation of work and home and extend corporate life into home life and vice versa.

²² See Jurca, White Diaspora.

materials used to build these houses. This means that once a mortgage is paid your house begins to fall apart, which sends you back to the bank asking for more loans to pay for the repairs.²³ A lucrative system where the capacity of a house to break down is turned into profit for the banks.

The function of debt in suburbia creates interesting resonances with Nietzsche, who wrote: "How can one create a memory for the human animal? How can one impress something upon this partly obtuse, partly flighty mind, attuned only to the passing moment, in such a way that it will stay there?"²⁴ Debt, found Nietzsche, was this instrument. Not only does it impose a memory but, correspondingly, a future. Debt opens up a path way, a trajectory, by saying you *must* follow it. It fills the present with portents of all the future payments to come. Debt is one of the fundamental constituents of contemporary suburban housing.

Debt imposes a memory through the future it instills. One must always live up to the future to come. In the case of housing it is a future of payments; of mortgage payments at the end of the month, or w-monthly. A circular rhythm develops; one works and accumulates capital then (depending on the individuals situation of course) portions of that capital are put to all the debts that come around at their allotted time of the month..²⁵

In the context of mass produced housing the case of Earthships is interesting. They definitely share a sense of standardized form and Mike Reynolds shares the dream of creating a new type of home that would be suitable for everyone. At times Reynolds also shares the aesthetic of functionality. A fundamental difference between an Earthship

²³ Chuck Potter and Pat Potter, interview by Adam Bobbette, April 05, 2005.

²⁴ Friedrich Nietzsche, 'Genealogy of Morals', in *Basic Writings of Nietzsche*. 496.

²⁵ We should remember the meaning of mortgage: death gage or gage of death.

and a suburban home though is that it has tapped into different resources: the elements. But Reynolds maintains, in a similar way to the suburbs of the 1950s, that the house is essentially a machine for living in and that people's aesthetic allegiances to old forms, or what have you, need to be overcome so as to usher in the space for these new machines. There is an even more fundamental difference than the resources and materials between Earthships and suburban houses that has to do with the apocalyptic sensibility that we will deal with more fully in the third chapter. But this idea of a 'housing type for the masses', of a standardized Earthship, is expressive of the potentially oppressive line that runs through Reynolds writing, and which we see as characteristic of especially modernist architects who believe they have found the 'proper' urban or rural form that will solve all problems of social organization.

If we take the Potters as an example we can see the positive effects of Earthships and how they create a different sort of economic dependence on the house. They have been living in an Earthship for roughly 12 years. They paid for the land without the help of a bank because no bank would approve an Earthship for a mortgage. There will always be a difference in the cost of land depending on if it has been serviced for hydro or water, or a well. If land has no services it will be cheapest. Choosing whether they want services or not is up to the owner, for the Earthship has the potential to be fully self serviced with no need for any of the conventional systems that power other houses. The Potters have a well, so not all of their water comes from cisterns (though it all runs into gray and black water, not a septic tank). Their house sits atop a hill in Southern Ontario, surrounded by forest. The land was the principle cost of the whole adventure.

For the tires they were actually paid to take them away-\$1 each. They received their principle building material for free plus money to further invest in the house. It is common, at least in Ontario, to be paid to take tires away. In total the Potters spent \$40,000 on their house and property for 2300 square feet of home. This also includes the solar system. And this, as they told me, is not at all the cheapest Earthship one could build. A smaller house that was more attentive to using more recycled materials²⁶ could be built for as little as \$10,000, \$5,000, or even less if the owner squats a piece of landor 'disappears.' Moreover, these costs are the final costs of the house. You don't pay utilities, nor mortgages (if you don't want to). And, as an engineer friend told the Potters when he was checking it out-their house will out last them by two or three generations.²⁷ "Breakfast, lunch, dinner and taxes", are their only expenses.²⁸ What the taxes are they are paying I don't know, but I do know that it is quite possible to get around paying any taxes if one is willing to opt for more remote living-especially in Canada. I also know that through a happy coincidence (so much of Earthships are this; this is another meaning of mutually supportive innovations in the first chapter) the Potters have got around paying property tax. This is because the property tax rates are based on the net loss of arable land.²⁹ But because it is possible to grow anywhere on the surface of the house the net loss is only the thickness of the glass panel at the front, 2 inches.

The Potters spent most of their lives as environmental activists, reporting on corporations that willfully turned a blind eye on their own toxic practices. This is not

²⁶ Such as recycled wood for the roof and interior

²⁷ With no maintenance, that is. Conceivably it would last longer with maintenance and upkeep.

²⁸ Chuck Potter and Pat Potter, interview by Adam Bobbette, April 05, 2005.

²⁹ This is not the case everywhere.

such a monetarily lucrative field, so an Earthship allowed them the means to retire. Moreover, it was a space that they felt embodied the world they wanted to be in.

Their property came with an old wood frame cabin which they left standing only a few meters away from the Earthship. It acts as a contrast and reminder. On top of receiving curious visitors and genuinely interested people Chuck Potter uses the cabin to display and sell his nature photography. He sells roughly \$1000 dollars a month, which accounts for just about their total income and living expenses.

"Self supporting, independent vessel to sail on the seas of tomorrow."³⁰

The standardization of space

Our analysis of suburbia has not yet ventured inside the house. We have seen so far that the 'little boxes' are formed by a rigid segmentarity that striates the labour that goes into the house as well as the space of the house it self. But I would like to take a closer look at the striated space of the house itself.

Imagine a suburban house; large, perhaps in the bend of a crescent, the brick a few shades different from the neighbors, a two car garage. You are coming home from work; you pull in the driveway; the garage doors lift and close behind you. You open your car door and walk to the door inside the garage that leads inside. You've passed through two doors already and now you have to pull out a key or type a code to enter through the third door and into the house, where of course you will find more doors. But at least you are in the house. It's a quiet house, no one is home, so you turn the lights on. It's been a hot day, so you turn up the air conditioner. You draw the curtains in the

³⁰ Michael Reynolds, *Earthship Vol 2*, introduction.

kitchen to let some light in and to see the back yard. Next, you open the door of the fridge to look for what you might want for dinner.

There are passageways everywhere. Doors to everything. And on the inside of each **boot** a particular environment. The garage often has a dark, cool, environment, usually filled with cars, excess stuff or recreational equipment. Past the front door the house has a cooled or warmed environment (depending on the season) and the fridge a wintry environment. On top of this, each room will have its own particular environment; bedroom, study or recreational environment as it is tailored to each inhabitant. Each of these rooms often have their own respective door that might also come with a lock and key. Also, there are cupboards and drawers that conceal their own goods. Generally speaking, the inside of a suburban house is as segmentary as outside and the labour that went into it. Segments overlap other segments which further overlap others: the kitchenthe cutlery drawer-the cutlery tray. Or, bedroom-closet-hangers-pockets.

What are the effects of this? A segment cuts, slices and frames. It also contains. For objects, it creates the sense that things have their place. The fork is framed by the cutlery holder, and the drawer, when it is taken out and used its use is further framed by the dinning room. From box to box. Each object has its place, and may also pass through the segments, though it is the inhabitant who gives it the power to pass.

The segments of the house do not just simply impose themselves on and structure the lives of its inhabitants. The life inside also takes up the processes of segmenting, cutting and framing. Think for example of parents who notch the height of their children in a door frame.³¹ This very physical engraving, the activity of scratching away the fibers

³¹ This example comes to mind from seeing a bank commercial where a family is moving but the mother doesn't want to move because of the memories represented by a frame in a doorway that is notched with

of paint and wood and marking the date and name cuts up the movement of time into chunks. We could say the flow of time becomes coded. This motion also includes, in a very material way, the house into the transformations of time and growth. Whenever someone passes by these markings and considers the time that has passed, the house becomes a monument to this very passing of time, it carries within itself (contains) the markings of the passage of time. It is both stable and subject to change. The house is container of memory and a material instantiation of memory. This container though is not immobile, it is rather that it is slower to transform, it holds its engravings for longer, it becomes a marker of a difference of times by which we can place our present; 'look at how much you have grown since then'. This act of engraving a segment is a way to locate movement and time. It subordinates what passes between segments to the segments themselves. The in-between of segments is made sense of by referring it to the segments it passes through.

Segments are all over the house. To the inhabitants of the box it seems as though what passes between segments *are what we make pass*. We walk through the rooms and the rooms stay stationary. The background and foreground are separated like an actor on the stage; the locus of movement is in the subject while the environment (the house) remains stationary; it contains movement, or bears witness. The act of engraving the wall brings the house to signify the movement that occurs within it, while it also tries to catch the house up in this movement. For the most part we don't include the house in our movements, mainly the house includes us, in our movements. We are the ones who take the fork from the drawer. We are the ones who turn the air conditioner on. We are the

the children's' different heights over the years. The husband responds by transporting the piece of wood to the new house.

ones who walk in and out of the front door. The box contains and frames our movements, while it remains stationary. The light lay there waiting for us to turn it on, same goes with the air conditioner, the fridge, etc... All of the elements that power a house, that give it its micro climates, are subject to this segmentarity. We do not know where electricity comes from, where our water comes from, where our heat comes from.

For Mike Reynolds this forms the key ignorance of contemporary housing. The striations that govern contemporary building, dwelling and thinking has cut itself off from the very systems that it requires for existence. This severing has had a secondary effect of making housing blindly reliant upon these systems.

The flows and movements of matter and energy that make the house possible are striated to such a degree that they no longer appear as flows and movements with an agency and autonomy of their own, nor of being connected with other systems.

A key component of the Mike Reynolds' critical project is the exposure of the very systems that contemporary building has made possible and which in return it has become reliant upon. These systems are equally true of suburbs as well as cities, but my focus here is suburbs. Breaking away from these systems and replacing them with others constitutes one of the innovations of Earthships.

According to Reynolds, contemporary building techniques entrap the individual within a system that comes to determine and limit the possibilities of dwelling and thinking. These systems are the weight of current housing. They entrap the house, pull it down, force its dependence on centralized systems; they are its gravity. They are, as Reynolds calls them, "dependent traps."³² The Earthship is about lightness, becoming a little weightless. By severing the ties to centralized systems like the hydro-electric grid,

³² Michael Reynolds, Earthship vol 1-3.

natural gas, sewage systems and their treatment centers, atomic power, etc... it is able to ride the movements of the earth and elements.

Reynolds writes:

Do not think of the dwelling as separate from its systems. Think of our bodies. They are the *product* of their various systems – so should the Earthship be a product of its various systems... Regular housing, no matter how elaborate, is usually a box with a variety of energy consuming systems attached to it.³³

Contemporary boxes tend to act like sieves for electricity production and distribution systems, water, oil, gas, sewage, food and monetary systems. These are the basic flows that run through houses, which are configured according to large systems that generate these flows, such as power stations, oil fields, water dams and capital.

The wood-frame house is not much better than a leaky box. It might last longer, but not by much. Its walls are far more porous than we tend to imagine; in the winter time heat escapes at an incredible rate while in the summer it retains the heat, making it generally uncomfortable all year round and virtually unlivable in cold climates in the winter. Without, that is, heating and cooling systems which require a vast infrastructure like electricity grids and the damming of the rivers that propel them.

Musical Insides

This house, as I see it, is a sort of airy structure that moves about on the breath of time. It really is open to the wind of another time. It seems as though it could greet us every day of our lives in order to give us confidence in life.³⁴

³³ Michael Reynolds, *Earthship Vol 1*, .5.

³⁴ Bachelard is not writing about Earthships. Bachelard, *Poetics of Space* 54. Emphasis in original.

Out at sea a ship rocks to and fro and undulates with the movement of the ocean. It enters into its rhythm. At home a light is turned on and people gather around the table for dinner, it is roughly the same time as the day before and the day before that. Dinner time is a rhythm. And bed time is a rhythm just as home time and work time. Rhythms form around people coming together and apart. Rhythms emerge in interstices, it is the coming together and coming apart that forms the rhythm, or going to work and leaving. The church bell rings in the morning and draws people out of their houses for worship. The church bell marks a point of passage, a change—a rhythm.

It has been cloudy for days. In a suburban home, or an urban apartment this may have little effect on domestic life. The lights are used just as often, if not more than when it's sunny. The same goes for the television, the computer, the appliances. This is a much different scenario in an Earthship. A few days of clouds calls you to alter your domestic life. Electricity usage must be cut down because the batteries that hold the electricity generated by the sun have only a limited carrying capacity.

An Earthship makes its own special demands on its inhabitants. Its call is different from conventional houses where their environments are 'at hand' (to use a phrase of Heidegger's). They are there in waiting, ready to be used, or (again to use Heidegger) they are a standing reserve. They become components in rhythms rather than the generator of rhythms themselves. In a way we could say they are subordinate to rhythms. For instance, the light in the living room is turned on to illuminate the room for dinner time. The rhythm is dinner time, not the light. In such cases the systems of the house are subordinate to the environments they create. Thus far we have not ventured so much inside an Earthship. We have looked at its systems and its structure and seen how it emerges from a Neo-Baroque logic of relationality. Everything is moving about, flowing in and out, there is no strict division between inside and out. The Earthship is a point of passage. But what does this mean for interior life, or what we might call domestic life? What is Neo-baroque domestic life like?

There emerges a dynamic interplay between the domestic life of the individual and the house. The relations between them are point and counter point, unity and difference. Why such terms? If the Earthship is principally a house of folds and twists, and if it is no longer possible to assign fundamental divides between inside and outside, foreground/background, house/environment, there needs to emerge a vocabulary to describe the character of domestic life, of the relations that constitute it. These are the terms that will allow us to understand it.

Domestic life in an Earthship is composed of dynamic rhythms. The Earthship interior is not a space of pounding industrial techno, nor of the repetitions of a marching band. There we have the rhythm of the factory. It is more like a sway to and fro, a waltz perhaps, though in this dance there is no leader. The leader changes places. Who are the dancers: the sun, the wind, the rain, the coming and going of winter and summer, the systems recycle them and pass them through the house. And there are also the inhabitants who lead their own individual lives, their jobs, their histories, etc... their singularities. The elements and the inhabitants come to dance to great cosmic rhythms.

Take for example this description of interior life in an Earthship:

When it rains for days on end and we become conscious about conserving power, I appreciate the simple joy of reading, playing monopoly or doing a puzzle under a single light with my mate in the evening.³⁵ While we rejoice in the bounty of the rain which will provide our water, we simply switch over to less power-consumptive activities. When the sun shines again, we reverse the behavior: we use the power to run the washing machine which uses restored water resource. When we enter a long period of drought, water conservation takes priority. Thought processes change from 'the plants need watering...go fill the watering can from the sink', to 'the plants need watering...wash some dishes or do a load of wash and make them some greywater'.³⁶

The rhythms that organize the space of an Earthship are focused around the elements which traverse and power it. The sun, wind, rain; the seasons, night and day. Unlike conventional houses where such things are immediate and at hand in a switch. Taking this away obviously opens a different perspective on the place of 'home life,' or 'domestic space.' Domestic space is not at all a separate interior space, where there are solid striations between it and outside. The Earthship interior becomes a cosmological territory, very explicitly and immediately. And it is rhythm that creates the space for this cosmos to appear. It is not that the cosmos is there and then submitted to a rhythm. "We were originally born out of its systems and rhythms..."³⁷ As Reynolds says.

He also writes:

³⁵ Monopoly? In an Earthship? is this ironic. Why would an Earthship owner have a taste for monopoly? It is a foreshadowing of the conclusion.

³⁶ www.sanjuancountry.com/personalpage/oneyear.html

³⁷ Michael Reynolds, *Earthship vol 2*, Introduction xi.

When the sun is out, you use as much electricity as you want. When it is cloudy you watch what you do—or else you fight wars over oil and live with nuclear waste. That is all there is to it. You watch the weather and your gauges and decide what you want to do and when you want to do it. The sun is your friend, a dependable friend. You know its nature—it is sometimes behind a cloud. You can depend on this also. It's almost like a relationship with another person. This person has moods. The sun has 'moods' but unlike another person, it has no ego. . . Our lives must *gravitate* around the sun, much the same as the planets *gravitate* around the sun. We allow our lives to gravitate around much shallower things like TV shows, religions, social clubs, football games, politics, etc...Why not let something as true, unbiased, reliable and giving as the sun call a few of the shots?³⁸

Having to cut down on power consumption when it is cloudy, sitting around a single light during the evening, or not showering everyday, reorganizes the rhythms of domestic life. The rhythms begin to emerge from the elements. This rhythm is dynamic, it emerges from the complex interplay of difference and repetition. And it creates a sense of responsibility and connection to the very flows and energy which traverse the house.

If the house is a fold of the outside, the way to properly understand the interior life of an Earthship is by the rhythms it produces, from within their play of difference and repetition. The inside becomes musical.

³⁸ Michael Reynolds, *Earthship vol 2*, 21. Emphasis in Original

Chapter 3: Beginning with Ends

"...the house does not shelter us from cosmic forces; at most it filters and selects them"¹ "Prosperous suburbia was one of the end-states of history. Once achieved, only plague, flood or nuclear war could threaten its grip."²

Earthships provide an alternative model of development to suburbs. They create a domestic space governed by the rhythms of the elements and they bring domestic life into such close proximity to them that it becomes difficult to separate the most intimate of insides from them. There is a sense of 'connectedness,' as so many people say. To use a different language, the Earthship creates a smooth space of flows.

In such a space the image of the technological as a machine, as simple and streamlined, with a harmonious relation between its parts, and between the parts and the over-all functioning of the whole, the very image that governed suburban development, is transformed into an *organic* machine, inseparable from nature. The machine becomes natural, and nature becomes a machine. They hybridize.

A significant difference between this new kind of machinics is that it is governed by a complex repetition, that is, a repetition of variation rather than the reproduction of the same. Nancy Jack Todd and John Todd have given such a technology the perfect name: a living machine.³ Earthship owners too have remarked on how their houses are "organisms," or "living beings," living in one is then about inserting yourself into its processes and becoming part of a larger organism.⁴

¹ Gilles Deleuze and Felix Guattari, *What is Philosophy* (New York: Columbia University Press, 1994), 182.

² JG Ballard, *Millennium People*, (London: Flamingo, 2003), 91.

³ Nancy Jack Todd, and John Todd, From Eco-Cities to Living Machines, 25.

⁴ Karen LeCour, *Three Years Living Consciously*. Website. [cited 15 March 2005]. Available from www.sanjuancounty.com/personalpage/oneyear.html.

We have not really looked into the beginnings of Earthships though. Mostly we have looked at present incarnations and articulations of their meanings and possibilities. When we do go back to their beginnings we again come across more resonances with the Baroque. Though in their beginnings we see Earthships resonating with the more morbid fascinations of the baroque; with the escaton, catastrophe, and also magic and hallucination. This time, using Walter Benjamin's treatment of Baroque theatre, we can draw out the meaning of Earthship beginnings.

In a text that is rather late for the Earthship books, published in 2000 (rather than A Coming of Wizards and Earthship volumes 1-3 all published between 1989 and 1993) Michael Reynolds writes in the opening page:

Thirty years of exploration into biology and human nature have brought me to the realization that humanity has, itself, forged the sword that is potentially responsible for piercing its own heart... We have corralled ourselves with laws and codes that, while written to protect us, are also keeping us from evolving at the pace necessary to keep up with global change and population explosion... The future will bring humanity extreme hardship unless we can bypass certain laws and codes in designated areas in order to experiment with new and more logical ways of living in our physical environment.⁵

The following paragraph reveals a key insight into the influences on Earthships:

In the 1940's, New Mexico designated several thousand acres of land for testing weapons of nuclear destruction. There, scientists dropped an atomic bomb. Many codes and environmental standards were put aside for this endeavor in the name of defense from our enemies. Can't we now take this same bold step

⁵ Reynolds, Comfort in Any Climate, no page numbers.

to designate both acreage and legislation in every state to explore methods of sustainable life on this planet? The evolution of sustainable living methods must be allowed a 'test site', free from crippling restraints of laws, codes, and basic human encumbrances, in the name of defense...from our failing methods of living.⁶

This is from the opening page of *Comfort in Any Climate*. The rest of this small book serves as an introduction to Earthships, how they work, what their general principles and concepts are; there are pictures and architectural drawings. As with all the books, there is a mix of philosophical and mythical reflections alongside Do It Yourself building instructions.

But what is also repeated in this introduction are themes of an encroaching catastrophe that faces humanity (it is important to remember that 'humanity' always refers to North Americans when used by Reynolds. North Americans always stand in for the whole world). And the mention here of the Atomic bomb is vitally important. This passage is the only direct reference to atomic warfare but it forms the theme and backdrop of so much of the other writing and the origins of Earthships. In much of the other writing though it is the catastrophe of nature which plays a key roll.

I would first like to point to the special relation that exists between suburbia and Atomic weapons. The quote taken from J.G. Ballard that opens this chapter points out that only a major catastrophe could spell the end of suburbia, but we should also keep in mind that catastrophe is also written all over their beginnings. In the mid 1940s the military approved spending \$4.4 million on the construction of 300 new homes in the town of Los Alamos. The houses looked very much like the suburban houses being built

⁶ lbid., no page numbers.

across the country. single family units with garages, enclosed lawns and modern appliances. This development was the first of its kind in Los Alamos, previously a small community. These new homes were built to house the workers of the Los Alamos laboratories—the birth place of the Atomic bomb.

This new town was built after the explosions at Hiroshima and Nagasaki. Prior to this the laboratory workers (military personnel, scientists, laborours, and their families) had lived in quickly built, rather shabby homes constructed to last not much longer than the war. After the bombs were dropped the suburb was built. Jon Hunner, in his essay 'Reinventing Los Alamos: Code Switching and Suburbia at America's Atomic City,' argues that the new suburb at Los Alamos functioned in three ways: to meet the needs of the housing shortage; to invent a new image of Los Alamos for the public; and finally to enact what he terms a 'code switch,' a change of terms, or conditions, in order to rearticulate the meaning of a situation; "Residents on the Hill faced the challenges of the Atomic Age by code switching from a culture of shortages, military housing, and war to one of abundance, ranch houses, and suburban life."⁷

The destruction of the atomic bomb stands in contrast with the new suburban homes, which manufacture a sense of prosperity and stability. Hunner mentions too that Los Alamos became a site that government officials pointed to as an example of post-war prosperity. It was also one of the first communities to experiment with nuclear power. Officials pointed then also to Los Alamos to assuage the public's fear over nuclear energy. But what is the meaning of this great juxtaposition between the creation of a

⁷ John Hunner, "Reinventing Los Alamos: Code Switching and Suburbia at America's Atomic City," in *Atomic Culture: How we Learned to Stop Worrying and Love the Bomb*, ed Scott C. Zeman and Michael A. Amundson. (Boulder: University of Colorado Press, 2004), 35.

weapon with a destructive capacity never before seen, and the creation of the smooth, efficient and neat suburb?

I should add too that many of the scientists, officials and labourer who worked on the first Atomic bomb project moved back to Los Alamos after their retirement.⁸ How is this possible? What did that place represent to them? Perhaps for many it carried little sense of catastrophe or destruction. Ferenc Morton Szasz argues in the rather jingoistic book *The Day the Sun Rose Twice: The Story of the Trinity Site Nuclear Explosion July 16, 1945,* that Los Alamos was the most exciting time in many of these people's lives and they wanted to return to the place which left them with such good memories.⁹ What kind of re-writing, cutting out and editing is required to have no relation to the catastrophe which was born there?

Michael Reynolds moved to the region around Taos, New Mexico in 1969 after graduating from architecture school. Amidst the mesas, he writes, "something happened . . . I felt so at home that I think I must have stumbled onto my own energy . . . I found that particular state of mind which allows the oneness or wholeness of the universe to prevail over human dogma. I believe this state of mind is a key to the limitless energy of the universe."¹⁰ While there he built a pyramid, which he lived in for a number of years, and experimented with various architectural projects. In the pyramid he underwent a variety of mystical experiences which are documented in the book *A Coming of Wizards*, and which also gave birth to the concept of 'direct living', which in turn finds its

⁸ Ferenc Morton Szasz, The Day the Sun Rose Twice: The Story of the Trinity Site Nuclear Explosion July 16, 1945. (Albuquerque: University of New Mexico Press, 1984), 54.

lbid., 57.

¹⁰ Reynolds, A Coming of Wizards, Introduction.

'physical manifestation' in Earthships. We will come back to these experiences and concepts later though. We first need to enquire further into Atomic bombs.

It is important to remember that not far down the road from Taos is Los Alamos. And not too far either is the Trinity Site, the testing ground of these first weapons 25 years before Reynolds' arrival. It is hard to imagine that Reynolds was not aware of Los Alamos, or Trinity. In fact, though it is rarely mentioned, I think that Atomic warfare was a decisive influence on Reynolds and the birth of Earthships. It is most clear in his discussions of energy.

Reynolds' preoccupation with energy was not a solo project. There were many at the time also thinking about energy, from subatomic physicists to Carlos Castaneda. Castaneda's interpretation, as many contemporaries close to him, made of energy a much different force than the subatomic physicists. Reynolds is one of his contemporaries. When Reynolds discusses energy he is trying to re-narrate it and re-deploy it to other ends than those of the physicists. Though, just as for the physicists, energy is a cosmological principle and an ontological principle. It runs everywhere throughout the universe. Potentially it is infinite and eternal. Reynolds takes this perspective and generates an ethics from it, but also an ecumenicism, 'everything is one,' 'everything is connected.'

It appears as if in Reynolds' writing he is re-narrating the meaning of the very same knowledge that gave birth to atomic weapons. He is re-directing it and redeploying it to other ends. Alongside this re-narration, as an impetus, or a subterranean force is a sense of total catastrophe. A Coming of Wizards is full of reflection on energy. It contains descriptions of encounters with wizards that come to meet Reynolds in his pyramid and instruct him on the nature of the cosmos. These wizards, which he says come from space, are the embodiments of energy. Their fundamental ingredients are light and matter, a recipe that Reynolds takes directly from Einstein (and which was also popular knowledge by the point). Infinitely wise and unbounded, they are everything. And we humans are the wizards, he says, we just have not yet realized it, because we too are matter and light, we too are energy.¹¹

For instance, Reynolds writes in A Coming of Wizards:

"Time stands still at the speed of light, therefore, an *eternal present* is the result of the speed of light. Past and future are simply different aspects of the eternal present, isolated and experienced from a 'position' that is out of sync with the speed of light. . . The nature of the atom shows us that matter can be transformed into energy. Energy can move at a the speed of light – energy is light. Energy lives in the eternal present. *Time, future and past, only exists as a result of our being 'out of sync' with light*. As we bring our material form into sync with light (i.e. allow our energy band to prevail), we move toward that eternal present where we have access to all futures and all pasts. We must come to know the energy aspect of ourselves so we can move as light."

Reynolds cites the author Fritjof Capra and his book *The Tao of Physics* as a source of inspiration (and scholarship).¹³ In that book Capra was concerned with making connections between 'eastern mysticism' and the insights of atomic physics, arguing that

¹¹ Ibid., 55.

¹² Reynolds, *Coming of Wizards*, 35. emphasis in original.

¹³ Ibid., 83.
they both come to mutually supportive conclusions. Subatomic physics is finally making it possible for the West to understand what the religious traditions of the East have been saying for ages. What Reynolds finds compelling in Capra is the insistence that everything living and dead, in the past and future, far and wide, is connected through a "continual cosmic dance of energy."¹⁴ Energy unites everything. This is the argument that Reynolds takes from Capra, though instead of making it through ancient mysticism and modern atomic and subatomic physics he makes it through his own mysticism in the form of the wizards.

Why energy? Why this insight at this particular moment? I think that what we can see in Reynolds (and it is equally true of Capra too) that the language of subatomic physics is being re-narrated away from the catastrophic physics that *released* the energy of the atom in the form of the Atomic bomb and later in the form of nuclear power. They take that same knowledge that the universe is made up of energy and try to give it a new sense. For Reynolds, especially, energy comes to mean not a powerful force that can be tapped, but proof of an eternal and forever transforming cosmos where everything is implicated in everything else. It becomes proof of a totality and "oneness". It is fascinating that Reynolds' account of energy (taken from people like Capra) stands in awkward juxtaposition with atomic and sub atomic physics. For physics there was also the tendency to totalize energy, 'everything is made up of energy,' but the use to which this energy was put was much much different.

During the 1960s and 1970s energy became a cosmological idea articulated from different positions. There were the so-called New Age articulations of it represented here

¹⁴ Frijtof Capra, "Dynamic Balance in the Subatomic World," in *Parabola: Myth and the Quest for Meaning*, vol iv, number 2, May 1979. 61-65.

by Capra and Reynolds, which used the discovery of subatomic energy as proof of a united cosmos, and there was nuclear physics which found that energy could be harnessed in a bomb or a power plant.¹⁵

For another instance of this cross pollination of knowledge and its re-narration in different spheres I would like to turn to Capra. In 'Dynamic Balance in the Subatomic World,' an essay which stakes out very much the same territory as that of *The Tao of Physics*, Capra calls to mind the god Shiva as the ancient Hindu articulation of what contemporary physics argues about the nature of the cosmos:

For the modern physicist, the dance of Shiva is the dance of subatomic matter. As in Hindu mythology, it is a continual dance of creation and destruction involving the whole cosmos; the basis of all existence and of all natural phenomena. Hundreds of years ago, Indian artists created beautiful bronze statues of dancing Shivas. In our time, physicists have used the most advanced technology to portray the patterns of the cosmic dance. The bubble-chamber photographs of interacting particles, which bear testimony to the continual rhythm of creation and destruction in the universe, are visual images of the dance of Shiva equaling those

¹⁵ The influence of Gaia theories of the Earth are fundamental here too. Gaia enters in as another way of articulating that 'everything is connected'. And through a circuitous path, nuclear energy enters into this picture too. A number of people have argued for the importance of the first picture of Earth from outer space. Lovelock, the person responsible for the first articulation of the Gaia theory is explicit about the influence of that picture and how it spurned a thinking that turned towards the totality of the Earth (as an organism). In a very interesting essay 'The Age of the World Picture', Heidegger argues against the dangers of such an image precisely because it turns the earth into a totality. He argues that turning the Earth into a totality makes it possible to turn it into a target, something to be blown up. It seems that in this instance there is a dual emergence of an idea of a totality and an idea of its destruction. Gaia on the one hand began to argue for the Earth as an interconnected and total organism, where as on the other hand nuclear weaponry brought about images of the total disaster of life on Earth. To save the totality or destroy it? seems to be the question that a picture of the Earth tends to raise. See: Jon Turney, *Lovelock and Gaia: Signs of Life*. (Cambridge: Icon Books, 2003). and Martin Heidegger, 'Age of the World Picture', in *The Question Concerning Technology and Other Essays*. (New York: Harper and Row, 1977).

of the Indian artists in beauty and profound significance. The metaphor of the cosmic dance signifies ancient mythology, religious art and modern science.¹⁶

Thirty five years earlier Shiva was also called upon by Oppenheimer, the civilian director of the laboratory at Los Alamos. On the day the first atomic bomb was tested in July 1945 he thought of Shiva, "I am become Death, the destroyer of worlds." This is a Shiva that is "eternally poised to destroy the earth at a moment's notice."¹⁷

It is interesting that Shiva should be invoked twice at two different times and with two senses, once as the figure who represents a cosmos of energy in eternal flux, which for Capra is generally a benevolent cosmos, while at another time Shiva stands in for an incredibly destructive power that threatens to destroy the world.

For both Capra and Oppenheimer the present state of physics, which for one is the atomic bomb blast while for the other it is the images produced by the bubble chamber, call back to what they consider ancient insights. The past is made present in order to explain the present, and in turn the present is made continuous with the past, which amounts to a making past of the present. Aside from this making past of the present we also have a bifurcation of the present, two similar stories are told with two different purposes. For Capra, the universe that both physics and Shiva are meant to represent is of a different quality to that of Oppenheimer. For Capra there is a general sense of benevolence in the cosmos, Shiva is used to articulate the endless coming into being and passing away of the universe, of the continual becoming of energy. When we read Capra we don't get the sense that the destruction of Shiva is meant to refer to an atomic bomb

¹⁶ Fritjof Capra, 'Dynamic Balance', 65.
¹⁷ Jon Hunner 'Reinventing Los Alamos', 34.

blast. Whereas for Oppenheimer, Shiva comes to mythologize an absolute destructive power in the atomic bomb.¹⁸

There emerges two narrations of the knowledge of physics each of which use the same figure, though that figure comes to represent two different meanings for that physics. This re-narration is also what runs throughout Reynolds' work in his discussions of energy. And just as both Capra and Oppenheimer call on myths to explain the present, and to make the present part of a historical lineage, Reynolds generates a variety of myths which create lineages with a past, but also with a future.

The re-narration of energy becomes for Reynolds a way of taking energy away from its use in Atomic warfare and the catastrophe it threatens and towards a different sort of future. Reynolds though does not just confront energy and atomic warfare. He is also especially concerned with total ecological catastrophe. Principally he is concerned with saying that 'humans' (again, meaning North Americans) are bringing about total destruction of themselves and the Earth they live on. This includes mechanisms like nuclear war, pollution, cities, etc.

In Earthship Volume 2: Systems and Components, Reynolds tells the story of the destruction of the world from the view point of the Alcyonites, interstellar beings who travel around the cosmos in the form of light (again the reappearance of light). They one day came across Earth and took a great liking to the planet for the diversity of its creatures and the harmony they each maintained with each other. That is, until humans showed up on the scene and disturbed the balance, setting everything off kilter.

¹⁸ Is Shiva here also a way for Oppenheimer to deal, or delimit, responsibility? Does it remove responsibility from the scientists for an instant by suggesting they have only unleashed what stands already 'poised' in the order of the cosmos? They have, after all, only released what was already there, energy.

They watched these new creatures cut the green trees - at first just a few - then, as the creatures prolifically multiplied, serious numbers of trees disappeared from the planet leaving huge bald scars on the mountains. They watched the slaughter of animals of every kind, again just a few at first then progressing until many animal species were totally wiped out. This new creature seemed to consume or destroy all other life on the planet. It also produced some of the most awful, gnarly substances the Alcyonites had ever seen.¹⁹

The Alcyonites save the planet by going to Earth and destroying the humans. At this point the story changes and we enter another narrative, a narrative of Earthships: "The Earth is our space module flying through space. We are riding it. The EARTHSHIP concepts serve as our operator's manual. We can self-destruct shortly after launch or we can sail into the future on the wings of universal energy patterns."²⁰ The rest of the book is a guide to these concepts. It outlines the workings of Solar electric systems, water systems, waste systems, lighting systems, to such things as stairways, cabinets, can domes and vaults and landscaping. This is an operators manual for after 'the end.'

It is important to note here the meaning of ends and how eschatologies work. For Reynolds the end is an extremely productive moment. The sense of an end, of an immanent finitude is not like a cold hard fact that just rests there with some sort of passive certainty. An end is extremely active. The Alcyonites for instance are a way of imagining an end to humanity (and also a way to narrativize human history on a large, species wide scale) but this end frames an introduction to a way of building a different

¹⁹ Reynolds, Earthship Vol 2, Introduction

²⁰ Ibid., introduction

future, or a way of surviving the end when others might not. Ends make all sorts of activities possible.

Brian Massumi writes about limits in this way:

A limit is not a boundary. It is open. It is a point that a curve infinitely approaches but never reaches. Except that it is not a point, because it can never be arrived at . . . The limit is in a different dimension. More precisely, it lacks determinate dimensionality so it can only be described as being 'like' one of the determinable dimensionalities characterizing the movement that governs. The limit-point does not exist on the curve. It is abstract. It exists not on but rather for the curve. Or rather, it almost-exists so that the curve may exist. The curve moves toward the abstract limit as if its concrete existence depended on it. As it does. The limit, though abstract, is not unreal. Quite the contrary, it is existentializing. It is only by reference to the limit that what approaches it has a function: the limit is what gives the approach its effectivity, its reality. The limit is not unreal. It is virtual. It is reality–giving.²¹

For Reynolds the sense of an end shines back on the present and 'gives it reality.' it gives reality to Earthships.

Earthship volume 1: How to Build Your Own, likewise begins with an end though the mythology of this end is more biblical than Volume 2.

"There are many signs of the 'coming flood.' The overall abuse of the earth by humanity is about to leave our ever growing population 'flooded' with survival emergencies, on many levels. This will affect water, air, food, shelter, energy,

²¹ Brian Massumi, Parables for the Virtual: Movement, Affect, Sensation (Durham: Duke University Press, 2002), 147.

etc. All factors of human survival, as we know it, are immediately threatened by the rapidly deteriorating condition of the planet Earth. . . The situation is escalating and in many cases irreparable damage (relative to human life span) is done. This is no special awareness available only to one person. All of us can see the clouds on the horizon.²²

And again we have a similar narrative turn afterwards, the Earthship is offered as a 'life preserver' to sail on the seas of tomorrow.

He also writes of cities as monsters of consumption:

Our crystallized forms and images have introvertedly evolved into massive entities which not only ruthlessly manipulate us; they are actually beginning to consume us and our planet. They are called cities – dragons that consume mind space and fossil fuel. Our current life process keeps feeding human beings to the dragons. Those on whom the dragon chokes will not be consumed. They will evolve beyond the dragon.²³

Are these just scare tactics, or coercions trying to convince people to build Earthships? They are more a way of narrating a sense of history and the future as catastrophe and of framing and justifying the necessity of Earthships. This sense of history and the future does not coerce or try to convert; it rather seeks out readers who already agree and who can join in on the project of re-directing the future, or sidestepping the immanent collapse.

²² Reynolds, Earthship Vol. 1, Introduction. Emphasis in original.

²³ Reynolds, A Coming of Wizards, 12.

If Reynolds sketches an image of immanent catastrophe, he also paints a picture of a ruinous past. This first chapter discussed how garbage for Reynolds has become our natural resource. It has become unnecessary to distinguish the detritus from the 'natural.' The Earthship emerges then from the ruins of society, it builds with them, recombines them. We can think of the tire, and the tin can that are used as 'natural building materials.' Nature becomes detritus, and the past is the store house of the detritus left by a society headed towards collapse.

Walter Benjamin found precisely this preoccupation in the German baroque tragedians. The past is left to us in ruins. The contemporary world is built in and with ruins, and itself is bound to irresistible decay. "Nature was not seen by them [the tragedians] in bud and bloom, but in the over-ripeness and decay of her creations."²⁴

Benjamin also writes that "the experimentation of the baroque writers resembles the practice of the adepts. The legacy of antiquity constitutes, item for item, the elements from which the new whole is mixed. Or rather: is constructed. For the perfect vision of this new phenomenon was the ruin. The exuberant subjection of antique elements in a structure which, without uniting them in a single whole, would in destruction, still be superior to the harmonies of antiquity...²⁵

The theory of history as ruin that Benjamin finds in the Baroque is of course not just about the Baroque, he is writing about the present. This is even clearer when we consider his famous 9th thesis on the philosophy of history, where the angel of history is being pushed along into the future and where "we perceive a chain of events, he sees one single catastrophe which keeps piling wreckage upon wreckage and hurls it in front of his

²⁴ Walter Benjamin, The Origin of German Tragic Drama (London: Verso, 1998), 179.

²⁵ Benjamin, Tragic Drama, 178.

feet".²⁶ The difference between Earthships though is that they are trying to find a way out, a way to jump out of the present.

When I visited the Potters it was clear that they too had a sense of historical collapse. For them the immanence of resource depletion was a very troubling and real concern. As I have already written, they spent a long portion of their lives as environmental activists which gave them a picture of nature as polluted and left to rot by power and capital. In our conversation though there was a mixed sense of dread and a kind of matter of factness and sometimes lightness. The end is coming, but oh well.

Reynolds' response to the catastrophe of history is a concept that he develops in the Wizard book, direct living. The catastrophe of the past that we are left with in the form of all its detritus and refuse, which keeps growing towards total failure brings Reynolds to attempt to sidestep this present with direct living. He writes that:

Direct living makes use of the existing roots of our existing reality. It involves new and forgotten approaches to an *existing* overall concept of life. Direct living will buy us the time and mind space to allow us to participate in our own evolution. Our own evolution will in turn take us beyond our present concept of life. Direct living is an immediate, tangible step we can take now. It will move us into closer contact with the unarguable phenomenon that we will eventually 'ride' beyond direct living and beyond or existing concept of life.²⁷

A Coming of Wizards contains early experiments with the Earthship form, buildings built entirely out of recycled material, with much cruder aesthetics than the rather polished and sleek ones built now. They appear as obvious interpretations of the

²⁶ Walter Benjamin, *Illuminations* (New York: Schoken Books, 1968), 257.

²⁷ Reynolds, Coming of Wizards, 142.

elements, with their large windmills and sometimes exposed tire walls. They are more obviously built of refuse, of the abandoned and forgotten bits of modernity. They stand like monuments to its passing as they point toward a different future, a future after the end when all that is left is the bits and pieces to make a life from.



(Early Earthship plan. From Michael Reynolds, A Coming of Wizards, 141.)

Reynolds writes in A Coming of Wizards:

The combination of human by-products, human energy and simple caring is an alchemy that can produce a human shelter. This is shelter produced with minimal use of fossil fuel energy, corporate products and high technology. This is an application of the concept of direct living.²⁸



(A house built of recycled aluminum cans. Windmill on top. From Michael Reynolds, A Coming of Wizards, 142.)

Every project leans further in the direction of making housing available to people with less stress to them and to the planet. The details get more simple

²⁸ Ibid., 108.

while the performance gets better. We are learning to ride the wave both of the Earth and of ourselves.²⁹

²⁹ Ibid., 134.

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Conclusion:

As much as Michael Reynolds attempts to present an alternative model to suburban development it must be pointed out that Earthships still maintain a subterranean connection with the suburbs. This connection requires investigation for its potentially oppressive nature.

Earthships are built for mass production. As much as they are a response to a situation of the mass produced home, Reynolds does not question the very status of mass production, he maintains its form and replaces its content. The Earthship is built with such flexibility that it can be built virtually anywhere, as Reynolds suggests, they are "dwellings indigenous to the entire planet."¹ In so far as the whole planet is suffused in garbage, in discarded automobile tires, etc..., Earthships can be built.

At times Reynolds moves into a dangerous position when he suggests that Earthships *should* be built everywhere. He has said that he would rather see whole city blocks destroyed and replaced with urban Earthships but what stands in the way is people's nostalgia for old buildings.² We have a modernism which is of the scale of Le Corbusier and the suburbs. Though rather than efficiency being the prime mover of this project, it is a sense of the end times. None the less, it is still an imposition of a form, one of the very things Reynolds dislikes so much about the suburbs.

The authors of *A Pattern* Language write:

Modern construction-that is, the form of construction most commonly practiced in the mid-twentieth century [and still]-usually forces social spaces

² Ibid.,78

¹ Reynolds, Earthship Vol. 1, 7.

into the framework of a building whose shape is given by engineering considerations.

There are two different versions of this incongruence.

One the one hand, there are those buildings whose structural form is very demanding indeed and actually forces social space to follow the shape of the construction—Buckminster Fuller domes, hyperbolic paraboloids, tension structures are examples.

On the other hand, there are those buildings in which there are very few structural elements—a few giant columns and no more. In these buildings the social spaces are defined by light-weight nonstructural partitions floating free within the 'neutral' physical structure given by the engineering. The buildings of Mies van der Rohe and Skidmore Owings and Merrill are examples.

...both these kinds of incongruence do fundamental damage----for entirely different reasons.³

The imposition of a built form onto its inhabitants does damage because it forces the interior life to conform to the building, rather than have the two emerge in a relationship. This desire for imposition is there in Reynolds when he can so easily dismiss other people's "nostalgia".

This is also a problem of utopias, where the built form is seen to precede and determine the life that takes place inside, where creating spaces of liberty will actually generate liberty. Foucault has spoken to this problem in an interview:

It cannot succeed. If one were to find a place, and perhaps there are some, where

liberty is effectively exercised, one would find that this is not owing to the order of objects, but, once again, owing to the practice of liberty. Which is not to say that, after all, one may as well leave people in slums, thinking that they can simply exercise their rights there.⁴

The built form will not guarantee how it will be taken up and lived, to what purposes it will be deployed. It can not be certain what new forms of segmentation and striation will appear, or what lines of flight will emerge. From the same interview Foucault also noted that,

I do not think that there is anything that is functionally-by its very natureabsolutely liberating. Liberty is a *practice*. So there may, in fact, always be a certain number of projects whose aim is to modify some constraints, to loosen, or even break them, but none of these projects can, simply by its nature, assure that people will have liberty automatically, that it will be established by the project itself. . . I think that it can never be inherent in the structure of things to guarantee the exercise of freedom. The guarantee of freedom is freedom.⁵

I have argued throughout this thesis for the potentiality of Earthships, for the potentially radical relationships they can create between a house and domestic space, between domestic space and the elements, how these new relations can bring about new perspectives on the elements and the place of architecture. But these new relations are potentialities. There is nothing in an Earthship that demands that these new relations emerge, and especially, there is nothing in them that does not absolutely prohibit new or

³ Christopher Alexander, Ara Ishikawa, Murray Silverstein, Max Jacobson, Ingrid Fiksdahl-King and Shlomo Angel (*A Pattern Language: Towns, Buildings, Construction*. New York: Oxford University Press, 1977), 942.

⁴ Rabinow, Paul, ed. The Foucault Reader. (New York: Pantheon Books, 1984), 245.

old forms of dominance to emerge.

If one looks at the Earthship biotecture web site, for instance, you can find Earthships for sale that run around \$200,000, and which come with a plasma screen television set. Or, there is the Earth Yacht, a massive Earthship with three floors and fifteen rooms, owned by an old movie star. Does the Earthship simply provide a better way to amass wealth because the energy costs are so low, and compared to a mansion they are much, much less expensive? Is it possible that given enough wealth people could buy enough solar panels and battery power that they could run any old appliance? Would life continue on as before but within a house that is made of tires rather than brick and mortar?

There is a blind spot here that is not only related to Earthships but can be found in much green architecture. It is a certain nature blindedness, where the principle justification behind green building is the 'saving' of the environment or nature to such a degree that it becomes impervious to the social relations and structures inside the building. It can become possible to justify Earthships this way, where it doesn't really matter what is going on inside because in the end it is the environment that is profiting; at least trees aren't being cut down, and tires left to mar the landscape.

I would like to point to one example, Wal-Mart in Vancouver. Wal-Mart wanted to build a new Wal-Mart store in the city of Vancouver. The city council voted against it on the grounds that Wal-Mart did not meet the criteria of sustainable growth in the city. Wal-Mart responded by hiring Busby Architects, a leading Canadian green building firm, to build a sustainable Wal-Mart. Busby provided an incredible design, where the store would be lit almost entirely by natural light, would heated by reservoirs of water sunk into the earth such that the energy consumption would be brought down by over fifty percent. The parking lot would contain an equal distribution of car lanes and trees. The city of Vancouver still denied Wal-Mart based on the fact that it would require people to drive to its location and thereby attracting unwanted fuel emissions. Virtually contemporaneous with the submission of Busby's design to the city of Vancouver, Wal-Mart was closing down an outlet in Quebec over so-called "labour disputes," that is, workers trying to unionize the first Wal-Mart in North America.

'Green building' secures nothing in the way of social relations. It is false to imagine that it will automatically produce more freedom. It is necessary to always ask, what new forms of dominance does a given architecture give rise to and which old ones does it repeat? What does it mean that green architecture is not in the least threatening to a giant like Wal-Mart? And what would it change about Wal-Mart aside from allowing it to open another branch and pay less hydro bills?

This is not without hope though, not at all, nor without the deep belief in the liberatory potentiality of buildings. I hope that I have illustrated a few things about the radical potentiality of Earthships, how a particular architecture can create a logic and a way of perceiving relations between people and domestic space, architecture and nature. I hope too that I have shown that Earthships create a space where these connections are seen as complex and interwoven, singular *and* collective. Where power of action flows back and forth between its inhabitants and the space itself, where no one has essential priority. A horizontal house, through and through.

Finally, I would like to counter the desire for standardization. Architecture is too much in the hands of a few. To be an architect you must pay expensive fees to go to school, whereupon graduating you are often stuck in an office designing stairwells, or you must become a superstar to be allowed the freedom to generate meaningful spaces. Being a builder, on the other hand, is to be bound to clients with often uninventive demands, or there is construction work-becoming a laboring body in a factory process.

On the production side, the tight grip of codes and/or landlords makes it also impossible for people to intervene in their lived space to any fundamental degree. Unfortunately, many people are left with what they get or are forced to settle for what is handed to them, which, it is true, makes many a contended soul. Earthships though have the potential to offer a different model where the owner works closely with planners and builders, It is very common for people to be intimately involved in the building *and* the design of their places. It becomes an opportunity for people to engage in the building process, and to encounter the elements. Often they put people into a profound relation with the elements and domestic space, making it something quite special and significant. The Earthship engages building, dwelling *and* thinking. It makes them inseparable. This engagement thankfully is also not only left to the rich who can afford to build their own houses. It is extremely accessible.

What seems necessary is a DIY⁶ and anarchist architecture. Such an architecture is an experimental architecture. Unfortunately though, even experimental architecture is also too much in the hands of an elite. Either of the high theorists or technological savants who design computer based architectures that cannot actually be built. There is also a divide between those who design and those who build creating a disconnection between design and the powerful knowledge that materiality can create. It is

⁶ Do it yourself.

unfortunately uncommon for people to take up arheitecture of their own accord, to actively engage in a horizontal and 'organic' construction and re-construction of their own spaces; where people break things down and re-construct them according to their own desires and wishes; where people actively experiment with materiality and create embodied knowledges of it; where people take it upon themselves to live directly.

The reality of such an architecture seems unlikely because the iron fist of law, code, professionalism, division of labour and ownership of land, is tightly clenched on building and designing. How could it be done? What kind of clandestine building projects are possible? What kind of new experiments with materials? I have seen such architecture in those who 'liberate' solar panels from highway construction signs and police speed meters and re-install them in their apartments; or those who take trash from back alleyways and condominium construction sites and build new levels into their apartments. Or, those who rebuild the cabinetry work in their appartments. I have also seen such a dedicated architecture in the two volume works of genius, The Timeless Way of Building and A Pattern Language: Towns, Buildings, Construction, written in the 1970s. A subtle and beautiful architecture which takes freedom, horizontality, diversity, communality and happiness as its main concerns. A brilliant architecture which does not impose forms, which eschews drawings and plans in favor of buildings and spaces which grow from the ground up, from use and re-use, from experimentation, from the active interaction and engagement with space. And where creating meaningful spaces emerges from and produces diversity rather than cancel it out or submit it to form.

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Bibliography

- Adorno, Theodore and Horkheimer, Max. Dialectic of Enlightenment: Philosophical Fragments. Stanford: Stanford University Press 2002.
- Alexander, Christopher. The Timeless Way of Building. New York: Oxford University Press, 1979
- Alexander, Christopher, Ara Ishikawa, Murray Silverstein, Max Jacobson, Ingrid Fiksdahl-King and Shlomo Angel. *A Pattern Language: Towns, Buildings, Construction.* New York: Oxford University Press, 1977.
- Andreotti, Libero and Xavier Costa, eds., Situacionistas: Arte, Politics, Urbanismo/ Situationists: Art Politics, Urbanism. Barcelona: Museu d'Art Contemporani de Barcelona, 1996.
- Architectural Association. AA Documents 3: The Function of the Oblique: The Architecture of Claude Parent and Paul Virilio, 1963-1969. London: Architectural Association, 1996.
- Ballard, J.G. Millenium People, London: Flamingo, 2003.
- Benjamin, Walter. *The Arcades Project*. Cambridge: Harvard: The Belknap Press of Harvard University Press, 1999.
- Benjamin, Walter. Illuminations. New York: Schocken Books, 1968.
- Benjamin, Walter. The Origin of German Tragic Drama. New York: Verso, 1998.
- Canaday, John. The Nuclear Muse: Literature, Physics and the First Atomic Bombs. Wisconsin: The University of Wisconsin Press, 2000.
- Capra, Frijtof. "Dynamic Balance in the Subatomic World." *Parabola: Myth and the Quest for Meaning*, May 1979, 61-65.
- Capra, Fritjof. The Tao of Physics: An Exploration of the Parallels Between Modern Physics and Eastern Mysticism. Boston: Shambhala, 1991.
- Dean, Jodi and Passavant, Paul A., eds. *Empire's New Clothes: Reading Hardt and Negri*. New York: Routledge, 2004.
- De Landa, Manuel. "Nonorganic Life." in *Incorporations*, eds. Jonathan Crary and Sanford Kwinter, 129-168. New York: Zone Books, 1992.
- De Landa, Manuel, A Thousand Years of Non-Linear History, New York: Zone Books, 1997.

Deleuze, Gilles. Difference and Repetition. New York: Columbia University Press, 1968.

- Deleuze, Gilles. *The Fold: Liebniz and the Baroque*. London: University of Minnesota Press, 1993.
- Deleuze, Gilles. The Logic of Sense. New York: Columbia University Press, 1990.
- Deleuze, Gilles and Guattari, Felix. A Thousand Plateus: Capitalism and Schizophrenia. London: University of Minnesota Press, 1987.
- Deleuze, Gilles and Guattari, Felix. *What is Philosophy?*. New York: Columbia University Press, 1994.
- Duany, Andres., Jeff Speck and Elizabeth Plater-Zyberk, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream. New York: North Point Press, 2000.
- Earthship Biotecture, *The Packaged Plan Booklet*. Pamphlet, (No publication information)
- *Earthship Biotecture*, Web site. [cited August 5 2005) Available from www.earthship.com
- Earthship Construction Summary and Tips, Pleasant Valley Earthship Chronicles, Website. [cited 15 March 2005] Available from www.sanjuancountry.com/personalpage/constructin.html.
- The End of Suburbia: Oil Depletion and the Collapse of the American Dream, (Film) Gregory Greene, dir. (Electric Wallpaper: Canada, 2004).
- Frampton, Kenneth. 'Toward a Critical Regionalism: Six Points for an Architecture of Resistance' In *Postmodernism: A Reader*, ed. Thomas Docherty, New York: Harvester Wheatsheaf, 1993.
- Friedman, Avi. *Planning the New Suburbia: Flexibility by Design*. Vancouver: UBC Press, 2002.
- Fuller, r. Buckminster. *Operating Manual for Spaceship Earth*. London: Southern Illinois University Press, Second printing, 1970.
- Goddard, Michael. 'The Fold, Cinema and Neo-Baroque Modernity', in Traces: 3.
- Guattari, Felix. Chaosmosis: An Ethico-Aesthetic Paradigm. Bloomington: Indiana University Press, 1995.
- Grosz, Elizabeth. *The Nick of Time: Politics, Evolution, and the Untimely.* Durham: Duke University Press, 2004.

Halsey, Mark. 'Environmental Visions: Deleuze and the Modalities of Nature'. *Ethics and Environment*. (Fall 2004, Vol 9, Iss2) pg, 33.

Hardt, Michael and Antonio Negri. Empire. Cambridge: Harvard University Press, 2002.

- Heidegger, Martin. 'Building, Dwelling, Thinking', From *Basic Writings*, New York: Harper San Fransciso. 1993.
- Heidegger, Martin. 'The Question Concernig Technology', From *Basic Writings*, ed. David Farell Krell, New York: Harper San Fransciso. 1993.
- Heidegger, Martin. 'Age of the World Picture', in *The Question Concerning Technology* and Other Essays. New York: Harper and Row, 1977.
- Jack Todd, Nancy and Todd, John. From Eco-Cities to Living Machines: Principles of Ecological Design. Berkely: North Atlantic Books, 1993.
- Jurca, Catherine. White Diaspora: The Suburb and the Twentieth-Century American Novel. Princeton: Princeton University Press, 2001.
- Kamper, Dieter and Wulf, Christoph, eds. Looking Back on the End of the World. New York: Semiotext(e), 1989.
- King, Peter. *Private Dwelling: Contemplating the Use of Housing*. New York: Routledge, 2004.
- Latour, Bruno. Pandoras Hope: Essays on the Reality of Science Studies. Cambridge: Harvard University Press, 1999.
- Latour, Bruno. *Politics of Nature: How to Bring the Sciences into Democracy*. Cambridge: Harvard University Press, 2004.
- LeCour, Karen, *Three Years Living Consciously*. Website. [cited 15 March 2005]. Available from www.sanjuancounty.com/personalpage/oneyear.html.
- Levinas, Emmanuel. *Totality and Infinity: An Essay on Exteriority*. Pittsburgh: Duquesne University Press, 1969.
- Massumi, Brian. Parables for the Virtual: Movement, Affect, Sensation. Durham: Duke University Press, 2002.
- Massumi, Brian ed. A Shock to Thought: Expression after Deleuze and Guattari, London: Routledge, 2002.
- Massumi, Brian. A Users Guide to Capitalism and Schizophrenia: Deviations from Deleuze and Guattari. Cambridge: The MIT Press 1993.

- "Mould Manifesto Against Rationalism in Architecture". In Hundertwasser. Web Site [cited 15 April 2005]. Available at www.kunsthauswien.com/english/philosophie.html.
- Rabinow, Paul, ed. The Foucault Reader. New York: Pantheon Books, 1984.
- Reynolds, Micheal. Comfort in any Climate. Taos: Solar Survival Press, 2000.
- Reynolds, Micheal. A Coming of Wizards: A Manual of Human Potential. Taos, New Mexico: High Mesa Press, 1989.
- Reynolds, Micheal. *Earthship Volume 1: How to Build Your Own.* Taos: Solar Survival Press, 1990.
- Reynolds, Micheal. Earthship Volume 2: Systems and Components. Taos: Solar Survival Press, 1990.
- Reynolds, Micheal. Earthship Volume 3: Evolution Beyond Economics. Taos: Solar Survival Press: Taos, 1993.
- Smith, Sharon. "The Completely Recycled Home: 'Earthships' are Spreading the Message that Homes can be Environmentally Sound and Practical", *Financial Times* (UK): September 18, 2004. Avilable from ProQuest.
- Szasz, Ferenc Morton. The Day the Sun Rose Twice: The Story of the Trinity Site Nuclear Explosion July 16, 1945. Albuquerque: University of New Mexico Press, 1984.
- Todd, Anne Marie. "The Aesthetic Turn in Green Marketing: Environmental Consumer Ethics of Natural Personal Care Products". *Ethics and the Environment*, no. 9.2 (2004) 86-102. Available from http://www.jstor.org
- Turney, Jon. Lovelock and Gaia: Signs of Life. Cambridge: Icon Books, 2003.
- van Wyck, Peter C. Signs of Danger: Waste, Trauma, and Nuclear Threat. Minneapolis: University of Minnesota Press, 2005.
- Virilio, Paul. Bunker Archeology, New York: Princenton Architectural Press, 1994.
- Whitehand, J.W.R. and Carr, C.M.H. Twentieth-Century Suburbs: A Morphological Approach. London: Routledge, 2001.
- Zeman, C. Scott and Micheal A. Amundson, eds. *Atomic Cluture: How we Learned to Stop Worrying and Love the Bomb.* Boulder: University Press of Colorado, 2004.

Zournazi, Mary, ed. Hope: New Philosophies for Change. New York: Routledge, 2002.

Zimmerman, Michael, E. Contesting Earth's Future: Radical Ecology and Postmodernity. Berkeley: University of California Press, 1994.