

The Meaning of Earth: Going Back to It

Assignment 5b: Final Research Proposal

ARCH 420: Contemporary Architectural Theory and Research

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Introduction

The word 'earth' conjures up many images, feelings, and ideas in people's minds. Some people picture the planet Earth. Some people picture soil. Both are closely related but the latter is of more relevance to us here. For many of us, earth is the surface we walk on, the place we plant our seeds in, and the plane we pass through when walking into our basements. The earth itself is of little consequence to us as it has always done what we expect it to do. We have never fallen through it while walking. Once the seed has grown, we pay little attention to the earth it is in. We forget about it entirely while searching for something in the basement even though it surrounds us completely. We cover it with grass, we stop playing in it as we grow older, we do not really think much about it at all. However, earth's constant presence is exactly why we should be giving it more credit.

This research proposal will be discussing earth, what it means for architecture, and why we should be going back to it. While testing the grounds for 'going back to it', this study will not justify digging holes and living inside of them, nor will it show reasons for accelerating our demise and going back to the earth in a casket. By 'going back to it', this study aims to test if we should go back to building with earth like we used to. It will analyze our relationship with the earth in the past and in the present to explore how it has changed over time and provide arguments for what we can do about these changes.

"We gather the lumpen loam to order, clot those softnesses into structure and pack the silken sand floes into brick. Unbaked by any but the sun and dry as ash, these hold until rain comes crumbling, comes rushing and erosion, and back to dust and mud and marsh goes the ground. We move again to gather, to run along rivulets and cluster wetted grains to wall or mound, again to build and weather, to muster and collapse, to circle all this raw earth in and out of standing; in and out of artifice. Eventually, things begin to stick.

We pile up soil on soil and as creaking trees might grow thick in the forest, we slowly raise our buildings from the earth. Slowly rises this unstoppable amass until sprouting, until shooting, and we dig downwards so that our structures might grow higher. We cut through city and country, and again we unbury those bones of the buildings that came before. We rubble up the remains and return them to churning, to industry, from dust to dust to earth as endless matter." (Zarzycki, 2020)

What Earth? Digging Into the Research

This research project will begin with a study of the basic methods of earthen construction, specifically: rammed earth construction, compressed earth blocks (CEBs), and cob construction. Knowing how these construction techniques work – using earth as their main material component – will lead to a discussion about what ‘going back to’ these forms of construction would mean for our world. Finally, this project will explore the meaning behind using earth in our present-day construction techniques. This will explore the tectonic and material reasons, the phenomenological reasons, and the ecological reasons for bringing back and experiencing earthen construction.

The aim of this study is to bring out a renewed passion for the craft and artistry of these construction methods by critically analyzing their use and by showing their beauty. We are at a time where major changes are needed in the construction industry to change the way we build and the materials we use. We need to design and build as nature does using materials that are locally sourced, sustainable and efficient through their full lifecycle, site specific and culturally embedded. Architecture has the power and responsibility to help the Earth we live on, but can architecture move forward by going backward? This study will explore whether that task of helping the Earth can be done by going back to earthen construction.



“Civilization is the sustainable shaping of the earth into a figure that serves mankind. Otto Kapfinger”
(Kapfinger & Sauer, 2015)

Why Earth? Soil Analysis: Methodological, Technical

The methodological approaches will be varied but cumulative. The exploration of the tectonics and materials will be analyzed through a **Visually Based Study** (Borden & Ray, 2014) with references to the work of Maurice Culot and Leon Krier (*The Only Path for Architecture*), Greg Lynn (*Architectural Curvilinearity: The Folded, the Pliant and the Supple*), and Rafael Moneo (*The Idea of Lasting*). This Visually Based Study will use "photographs, diagrams and other visual forms of analysis" (Borden & Ray, 2014) along with text that supports these visual components. It will explore a wide range of images from the purely technical to the more real and physical using architectural details and precedent studies.

Maurice Culot and Leon Krier wrote in *The Only Path for Architecture*, "To "augment our well-being without reducing our pleasure" or at the limit to insure our survival, we must immediately take part in the recognition and reconstruction of artisanry, of manual work. The latter, which has always been the basis for human creativity and personal realization, has become an exercise in degradation through the division of labor" (Culot & Krier, 2008). This 'artisanry, of manual work' will be visually shown in this study to show the issues associated with the 'divisions of labor' but also to show the process of how the work is done and who is doing the work.

Greg Lynn wrote in *Architectural Curvilinearity: The Folded, the Pliant and the Supple*:

"Folding employs neither agitation nor evisceration but a supple layering. Likewise, folding in geology involves the sedimentation of mineral elements or deposits which become slowly bent and compacted into plateaus of strata. These strata are compressed, by external forces, into more or less continuous layers within which heterogeneous deposits are still intact in varying degree of intensity.

A folded mixture is neither homogeneous, like whipped cream, nor fragmented, like chopped nuts, but smooth and heterogeneous. In both cooking and geology, there is no preliminary organisation which becomes folded but rather there are unrelated elements or pure intensities that are intricated through joint manipulation" (Lynn, 2008).

This passage is 'visual' on its own and very literally applies to this study. The folding, layering, and manipulation is key to the process and materiality of earth construction.

Rafael Moneo wrote in *The Idea of Lasting*, "That is one of the reasons why architecture today so frequently appeals to the superficial image of its predecessors; today's society does not believe in the lasting condition of its own creations. The initial impact of the building is what counts, not its long life" (Moneo, 2008). This speaks to the tectonic and material quality of these earthen construction techniques. It will support images showing the strength and durability that these buildings have that outweigh their visual impact.

The exploration of the phenomenology will be analyzed through a **Theorized and Interdisciplinary Study** (Borden & Ray, 2014) with references to Juhani Pallasmaa (*Tradition & Modernity: The Feasibility of Regional Architecture in Post-Modern Society*), and Herman Hertzberger (*Homework for More Hospitable Form*). The Theorized and Interdisciplinary Study will "look to other disciplines to find interpretative frameworks, research methods, primary sources and secondary literature in order to explain architectural issues" (Borden & Ray, 2014). The philosophical concept of phenomenology will be used as an interpretative framework to analyze these architectural earth-based creations.

Juhani Pallasmaa wrote in *Tradition & Modernity: The Feasibility of Regional Architecture in Post-Modern Society*.

"The First Modernism aspired to immaterial and weightless movement, whereas the Second frequently expresses gravity and stability and a sense of materiality and earth. The return of earth and gravity as expressive means of architecture has more than metaphoric meaning; after its arrogant and utopian journey, architecture has returned to the safety of Mother Earth, back to the source of rebirth and creativity" (Pallasmaa, 2008).

This study of the phenomena of returning 'to the safety of Mother Earth' and of 'gravity and stability and a sense of materiality and earth' will focus on the lived experiences of being within these earthen constructed spaces.

Herman Hertzberger wrote in *Homework for More Hospitable Form*,

"Whatever goal architecture may have set for itself, it can only be meaningful today if it is making a demonstrable contribution towards improvement of living conditions and circumstances.

Form must improve conditions, or rather, must lend a helping hand to people, inciting them to make their own improvements" (Hertzberger, 2008).

This statement speaks to the positivity of the architect's phenomenological mission in using forms to inspire rather than to create forms that simply exist without being extrapolated by our mental images and the creations of the past.

Finally, the exploration of the ecology will be analyzed through a **Social History Study** (Borden & Ray, 2014) with references to William McDonough and Michael Braungart (*Cradle to Cradle: Remaking the Way We Make Things*), Rachel Carson (*Silent Spring*), and Kenneth E. Boulding (*Earth as a Space Ship*). The Social History Study will analyze the "social context of architecture" (Borden & Ray, 2014) with regards to the ecological sentiments of the past and the present.

William McDonough and Michael Braungart wrote in *Cradle to Cradle: Remaking the Way We Make Things*.

"Natural systems take from their environment, but they also give something back. The cherry tree drops its blossoms and leaves while it cycles water and makes oxygen; the ant community redistributes the nutrients throughout the soil. We can follow their cue to create a more inspiring engagement – a partnership – with nature. We can build factories whose products and by-products nourish the ecosystem with biodegradable material and recirculate technical materials instead of dumping, burning, or burying them. We can design systems that regulate themselves. Instead of using nature as a mere tool for human purposes, we can strive to become tools of nature who serve its agenda too. We can celebrate the fecundity in the world, instead of perpetuation a way of thinking and making that eliminates it. And there can be many of us and the things we make, because we have the right system – a creative, prosperous, intelligent, and fertile system – and, like the ants, we will be "effective"" (McDonough & Braungart, 2008).

This was written in the year 2000 during a renaissance of an ecological movement started in the 1960s and it speaks of the cradle to cradle systems that the authors want us to adopt when designing. The social context when this was written can be extended to today with regards to our construction industry. Our buildings very rarely 'give something back' to the environment during their lifecycle or when their lifecycle is over. Earthen construction could be away to 'become tools of nature who serve its agenda' by creating architecture that 'recirculates technical materials' in a more ecological manner.

The social context in 1962 when Rachel Carson wrote *Silent Spring* was that of the beginning of this 1960s ecological movement that she was largely credited for starting. She was deeply concerned with the 'irreversible' changes humans were making to the environment through the use of synthetic, chemical and radioactive compounds. She wrote that:

"To a large extent, the physical form and the habits of the earth's vegetation and its animal life have been molded by the environment. Considering the whole span of earthly time, the opposite effect, in which life actually modifies its surroundings, has been relatively slight. Only within the moment of time represented by the present century has one species – man – acquired significant power to alter the nature of his world" (Carson, *Silent Spring*, 2008).

The present Anthropocene age is one of 'significant' human impact on the nature of this world. By going back to earthen construction, we could start modeling our home out of the earth and with the earth ('molded by the environment') to strive towards a stalling of our negative impacts.

Lastly, Kenneth E. Boulding wrote *Earth as a Space Ship* in 1965, and he brought out the social context of the entire planet as if it was all living on a giant spaceship. He wrote that:

"Man is finally going to have to face the fact that he is a biological system living in an ecological system, and that his survival power is going to depend on his developing symbiotic relationships of a closed-cycle character with all the other elements and populations of the world of ecological systems" p. 362 (Boulding, 2008).

This passage predates William McDonough and Michael Braungart cradle to cradle work by 35 years and its purpose is largely the same. This helps to set the context for a slow but growing movement of socially and ecologically minded people fighting for a new form of designing and building.

This process from the **Visually Based Study**, to the **Theorized and Interdisciplinary Study** will take these earthen construction practices from visualizing how they are built and what they look like to the theories that establish their meaning in architecture and in society through what value holds in experiencing these old forms of construction. Lastly, through the **Social History Study**, it will situate the ecological need for bring back these construction techniques today by analyzing the social context of the

successive ecological movements of the past. This thorough study will establish if there is a need for our return to building with earth and help us understand why the continued use of earthen construction has failed in the past.

The research methodology will also be supported by varied but cumulative research techniques. As the layers of soil rest and build upon themselves, this research will work in a successive manner to build, from foundational ideas to the social implications, the arguments for these techniques from the ground up. The research that this project will pull from *Architectural Theory: Volume II An Anthology from 1871-2005* (Mallgrave & Contandriopoulos, 2008) is largely done through note-taking (Borden & Ray, 2014). This research project will also rely heavily on illustrations, photos, and diagrams in an attempt to 'show' as much as 'say'. One further source of material will be through reading, note-taking, and photocopying from journals. *The Architectural Review* released an issue entitled 'Soil' in February of 2020 (The Architectural Review, 2020) from which a plethora of excellent resources will be drawn from.

What *on* Earth? Precedents

Zoma Contemporary Art Center - Addis Ababa, Ethiopia



"Addis Ababa's First Contemporary Art Museum Aims to Revive a Local Architectural Tradition" (Mattioli, 2019).

This stunning work by curator Meskerem Assegued and artist Elias Sime shows the intricate and detailed use of wattle and daub construction (like cob) at the Zoma Contemporary Art Center in Addis Ababa, Ethiopia. Metropolis magazine explains, "The museum—now more than 20 years in the making—occupies two acres of land in Addis Ababa's Mekanisa neighborhood. Compared to the brimming city beyond, the Zoma is a green oasis, an architectural statement opposing the idea that modernity and development come solely in large-scale concrete forms. (Mattioli, 2019). This work shows all three aspects on this research project in one beautiful creation. It is further discussed in the 'Soil' February edition of The Architectural Review (The Architectural Review, 2020).



World Building of the Year 2017 - Guangming Village in Zhaotong, China



This project was completed after an earthquake destroyed many homes in Guangming Village in Zhaotong, China. The goal was to create a simple and strong structure that could be built by the local people that would survive future earthquakes. This home is a perfect example of a project that allows rammed earth construction to truly make a difference to the people living in this home and for the community at large. It was designed by professor Edward Ng, the "Chinese University of Hong Kong (CUHK) and a team of seismic design experts at the University of Cambridge" (Jordahn, 2017) "Earthquakes are not a Chinese problem, they're a worldwide problem. A lot of people live in mud houses. So if you can find a way to help these people by designing a safer structure for them then we are solving a problem for maybe 100 million people - Edward Ng" (Jordahn, 2017).

https://www.youtube.com/watch?v=g_E0GwL4qDI&feature=emb_title

The Great Wall of WA - Western Australia, Australia



Luigi Rosselli designed this truly inspiring work with a long zigzagged rammed earth wall that acts as a retaining wall and as the façade to the front of the twelve residences. The rich and vivid colour comes from the high iron content in the soil. "The design of the accommodation represents a new approach to remote North Western Australia architecture, moving away from the sun baked, thin corrugated metal shelters to naturally cooled architectural earth formations" (ArchDaily, 2015). This project is both phenomenologically captivating and ecologically focused.

Wa Shan Guesthouse - Xiangshan, China



Wang Shu is a master of rammed earth construction and uses alternative building techniques and materials liberally. The Wa Shan Guesthouse above highlights his tectonic work and it shows his desire to do things differently and with a purpose.

“For Wang though, it is not the method of artistic expression that is important but its purpose. The liberated artist, whether an architect, poet, painter or calligrapher, has, in his view, two choices: to become a recluse or an activist. For him, the latter honours the literati tradition and it is the path he has chosen to take. For him it is the only means by which to effect change while evading the endless cycle of revolution and counter-revolution that consumes the masses. Being autonomous, the literati could be both subversive and politically active, and herein lies Wang’s determination to remain outside the mainstream while pursuing his art. Nonconformity defines not only his unique approach to building, but his entire outlook on life, from the title of the practice that he shares with his wife, Lu Wenyu, ‘Amateur Architecture Studio’, to his role at the China Academy of Art” (Denison & Ren, 2013).

Annotated Bibliography

Aerecura. (n.d.). *Aerecura*. Retrieved from Aerecura Sustainable Builders:

<https://www.aerecura.ca/>

- Aerecura is a construction company that specializes in rammed earth construction. Based out of Prince Edward County, Ontario they are a good resource for a Canadian context for this construction type. I have been in touch with them through email and they have been helpful in answering any questions I have about details and construction methods.

ArchDaily. (2015). *The Great Wall of WA / Luigi Rosselli*. Retrieved from ArchDaily:

https://www.archdaily.com/771780/the-great-wall-of-wa-luigi-rosselli?ad_medium=gallery

- (Precedent #3) is an example of a rammed earth residence in Western Australia, Australia. ArchDaily is a valuable resource for architecture in general and this project is directly applicable to my research.

Borden, I., & Ray, K. R. (2014). *The Dissertation: A Guide for Architecture Students*. New York: Routledge.

- This book discusses the art of writing a dissertation. This resource has helped guide me through the process of writing a dissertation and it specifically taught me about the methodologies of research.

Boulding, K. E. (2008). Earth as a Space Ship. In H. F. Mallgrave, & C. Contandriopoulos (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (pp. 361-363). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

Building Alternatives Inc. (n.d.). *Building Alternatives Inc.* Retrieved from Building Alternatives Inc.: <http://www.buildalt.com/index.htm>

- This online resource also a good Canadian reference and it provides information on alternative building methods from an engineering context.

Carson, R. (2008). Silent Spring. In H. F. Mallgrave, & C. Contandriopolous (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (p. 357). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

Crist, C. (n.d.). *Rammed Earth Pattern*. Retrieved from Pinterest: <https://www.pinterest.ca/pin/430445676857856738/>

- The image of the rammed earth pattern was taken from this source and it was used to show the layering pattern of rammed earth construction.

Culot, M., & Krier, L. (2008). The Only Path for Architecture. In H. F. Mallgrave, & C. Contandriopoulos (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (pp. 418-419). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

Denison, E., & Ren, G. Y. (2013, May 21). *Wa Shan Guesthouse, Xiangshan, China by Wang Shu*. Retrieved from The Architectural Review: <https://www.architectural-review.com/today/wa-shan-guesthouse-xiangshan-china-by-wang-shu/8648188.article>

- (Precedent #4) is an example of a rammed earth building in China. The Architectural Review is a journal that discusses a wide range of topics and has many articles relating to the use of earthen construction.

Hertzberger, H. (2008). Homework for More Hospitable Form. In H. F. Mallgrave, & C. Contandriopoulos (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (pp. 440-442). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a

vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

Jordahn, S. (2017, December 1). *World Building of the Year 2017 could help 100 million people, says Edward Ng*. Retrieved from Dezeen: <https://www.dezeen.com/2017/12/01/movie-waf-world-building-of-year-winner-earthquake-resistant-video/>

- (Precedent #2) is an example of a rammed earth home built after an earthquake to help rebuild a village. Dezeen is also a great online resource of architecture articles.

Kapfinger, O., & Sauer, M. (Eds.). (2015). *Martin Rauch: Refined Earth: Construction & Design with Rammed Earth*. Munich: Detail.

- This book details many projects designed by Martin Rauch and discusses in depth the process and construction methods of rammed earth building.

Krahn, T. (2019). *Rammed Earth Construction: The Complete Step-By-Step Guide*. Gabriola Island: New Society Publishers.

- Tim Krahn is one of the engineers that is a part of the Building Alternatives Inc. (referenced earlier). This book details both graphically and in writing the process of building with rammed earth. It was suggested to me through conversation with Aerecura and ORE (both rammed earth builders in Ontario).

Lynch, D. (2019, May 21). *Soil is the key to Earth's history (and future)*. Retrieved from Phys.org: <https://phys.org/news/2019-05-soil-key-earth-history-future.html>

- The image of the soil on page 2 was taken from this source.

Lynn, G. (2008). Architectural Curvilinearity: The Folded, the Pliant and the Supple. In H. F. Mallgrave, & C. Contandriopoulos (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (pp. 543-544). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

Mallgrave, H. F., & Contandriopoulos, C. (Eds.). (2008). *Architectural Theory: Volume II An Anthology from 1871-2005*. Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

Mattioli, G. (2019, January 22). *Addis Ababa's First Contemporary Art Museum Aims to Revive a Local Architectural Tradition*. Retrieved from Metropolis:
<https://www.metropolismag.com/architecture/addis-ababa-zoma-museum-design/pic/51400/>

- (Precedent #1) is an art museum built out of waddle and dob construction that shows the artistic side of earthen construction. Metropolis magazine is also a great online resource for architecture projects.

McDonough, W., & Braungart, M. (2008). Cradle to Cradle. In H. F. Mallgrave, & C. Contandriopoulos (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (pp. 597-598). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

Moneo, R. (2008). The Idea of Lasting. In H. F. Mallgrave, & C. Contandriopoulos (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (pp. 522-524). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this projects thesis.

ORE. (n.d.). *ORE*. Retrieved from Ontario Rammed Earth: <http://ontoriammedearth.ca/>

- ORE is another rammed earth builder in Ontario. I have been in contact with the owner through email as well and he has been helpful in answering questions too.

Pallasmaa, J. (2008). Tradition & Modernity: The Feasibility of Regional Architecture in Post-Modern Society. In H. F. Mallgrave, & C. Contandriopoulos (Eds.), *Architectural Theory: Volume II An Anthology from 1871-2005* (pp. 525-527). Malden, MA, USA: Blackwell Publishing.

- Each reference from this source (*Architectural Theory: Volume II An Anthology from 1871-2005*) is to support the methodologies used in this study. This is a vital resource that through the research technique of note-taking has allowed me to find many poignant and salient viewpoints that discuss this project's thesis.

Rael, R. (2000). *Earth Architecture*. Princeton: Princeton Architectural Press.

- This book provides a detailed overview of many architecture projects that principally use earthen construction as their building technique.

The Architectural Review. (2020). Soil. *The Architectural Review*, 1-116.

- The February 2020 edition of The Architectural Review is dedicated to Soil and I was able to find many projects and resources from this journal edition.

Zarzycki, L. (2020). February 2020 on Soil. *The Architectural Review*, 97-98.

- The poem on page 2 was taken from this edition as well.