



arch384: Northerly Island Nature Campus

s.ghazizadeh research essay

"The works of the past always influence us, whether or not we care to admit it, or to structure an understanding of how that influence occurs. The past is not just that which we know, it is that which we use, in a variety of ways, in the making of new work.... The typology argument today asserts that despite the diversity of our culture there are still roots of this kind which allow us to speak of the idea of a library, a museum, a city hall or a house. The continuity of these ideas of type, such as they are, and the esteemed examples which have established their identity and assured their continued cultural resonance, constitute an established line of inquiry in which new work may be effectively grounded."

response

The design of new and interesting architecture is far more complex than a superficial patchwork of aesthetically pleasing elements which come together to form an object which is shallower in meaning than the elements it is comprised of. Rather, great works of architecture require thorough analysis as they are often developed from a complex system of ideas which have come together to form a cogent argument manifested in the form of a building. Therefore, it is imperative that an investigation of all aspects of a project be the precursor and initiator of the design process.

We are constantly influenced by our environment; it is rare that an idea be formed from the abyss. This is why the architect needs to approach the world with an open mind and absorb the precedents which present themselves. In the design of the Northerly Island Nature Center, our team approach was to go through a thorough investigation to form a solid foundation on which to develop our design. The variant which made this project unique was the sources of precedents which lead to the final design. In this paper, I propose to identify and develop the sources of inspiration by examining precedents in architecture which stem from structural systems inspired by nature.²

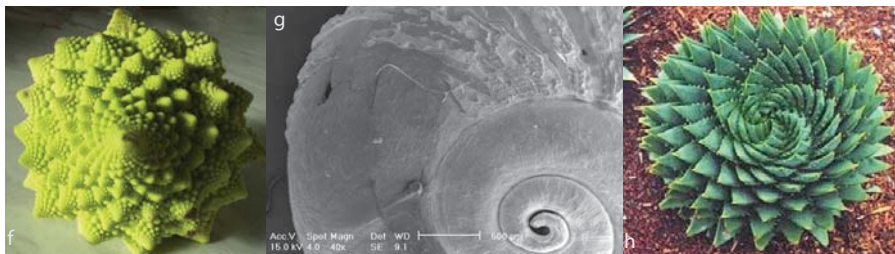
1-The Harvard Architectural Review. Volume 5. Precedent and Invention. Between History and Tradition: Notes Toward a Theory of Precedent. John E. Hancock.

2-Levitt, Andrew. "The Inner Studio: A Designer's Guide to the Resources of the Psyche" Riverside Architectural Press, 2007. p.23-25

cellular structures and fractals

The most basic initiator of ideas in this competition refers to the cellular structure of foam metal. The organizer of this competition was the Metal Construction Association, therefore, the decision to investigate innovative applications of metal came naturally. Through our initial research, we came upon foam aluminum, (Alporas developed by the Shinko Wire Company) a form of aluminum which has been aerated while molten, in order to provide a material which is much stronger based on a unit of weight and density than conventional applications of aluminum. This material is often used for various vehicles but has not been used in the structure of a building as of yet. From this initial discovery, we continued a search for cellular structures in nature, and were able to develop a correlation between foam metal, and the much smaller structure of plant cells.³

Upon a brief investigation of structural systems in nature, it becomes clear that a fractal relationship bonds structural systems in nature. To establish this, we investigated some of the most visually obvious examples of occurrences in nature:⁴



Therefore it was a precedent in nature that was the motivation for the relationship between the structure of our key material, the structural system of the building skins, and the organizational system of the site.



3-Foam Metal, Brief description of foam metal. http://en.wikipedia.org/wiki/Metal_foam

4-Briggs, John. "Fractals: The Patterns of Chaos: Discovering a New Aesthetic of Art, Science, and Nature". Touchstone. p.36-37

cellular structures and architecture

As illustrated above, one of the significant generators for this project was the cellular structure that is consistently present in nature. This would not be such a key generator of ideas if not for specific examples of buildings that had used a structural system that could be adapted for our purpose. One of the most significant precedents in architecture which makes use of the cellular structural system is the Eden Project.

The Eden Project by Grimshaw architects proves to be a valuable precedent in many ways. Firstly, the project serves to legitimize the unique cellular structural system that is applied in the conceptual design of the Nature Center. The system is proven to be able to span large distances without intermediate support, and also demonstrates the ability to create a large dome which is largely transparent and allows for the healthy growth of complex forest life forms. The Eden Project therefore allowed for the design of the aviary building in the Nature Center which also required large plant forms to be grown in an interior environment.^{5,6}



Another example of innovative use of materials resulting in a structural system that is inspired by cellular formations found in nature is the Watercube building by PTW architects. In this case, the structural system is inspired by bubbles of water intersecting to create a unique pattern. The advantage of the Watercube structural system is in the depth of the facade. By utilizing such a structural system, one is able to innovate by means of the integration of a double skin facade.⁷

5-Landscape Design. No. 319, April 2003. "Brave new world: Eden Project" Cole, Dominic. p. 12,13.

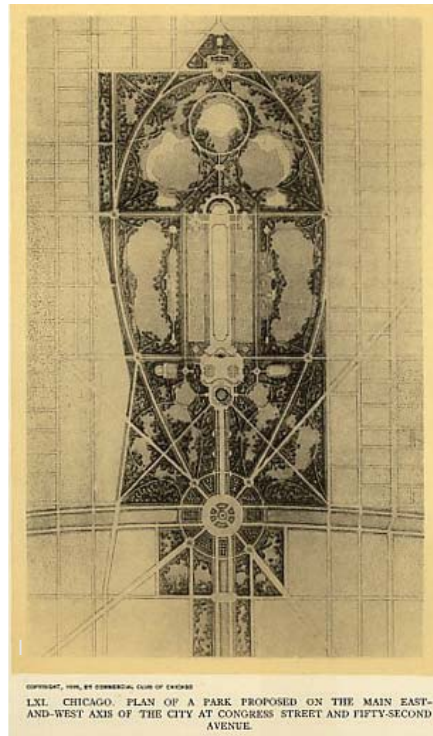
6-Grimshaw Homepage, Description of Eden Project. http://www.grimshaw-architects.com/grimshaw/launcher.html?in_projectid=

7-Moniteur architecture AMC. No. 167, February 2007 "Membranes: Watercube, Centre national de natation, Pékin". Hespel, Christophe. p.102-105

site and alchemy

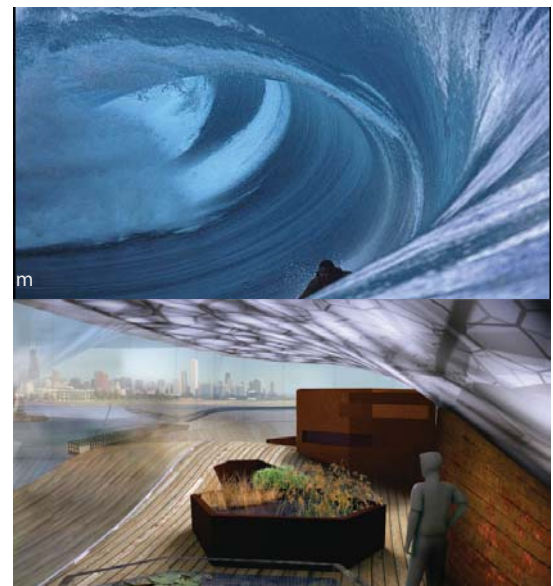
As part of the site strategy in the Nature Center design, the programme elements were divided into four separate buildings that represent the four alchemic elements, or the platonic solids of earth, air, fire and water. The elements were then dispersed across the site in key positions that would allow for the visitor to explore and experience the majority of the site.

The organization of the site was an abstraction of the Burnham Park in Chicago. The decision to use this plan is linked with Burnham's great influence on the whole of Chicago. The decision to use the site as a large public space is also related to Burnham's original intention for Northerly Island.⁸



the elements and precedents in programme

As mentioned above, the programme elements were divided into separate buildings represented by the elements. The precedent for the Water building goes directly to the force of nature. The building captures the durational movement of a rolling wave. This type of alchemic and elemental design is often used by architects such as Diller & Scofidio as exemplified in Blur, or Herzog de Meuron in the Signal Box in Switzerland (a copper and extremely conductive box housing high voltage switches).



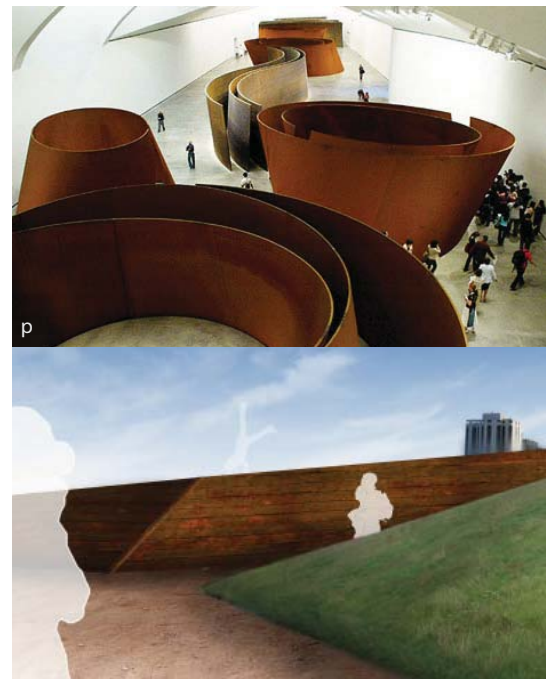
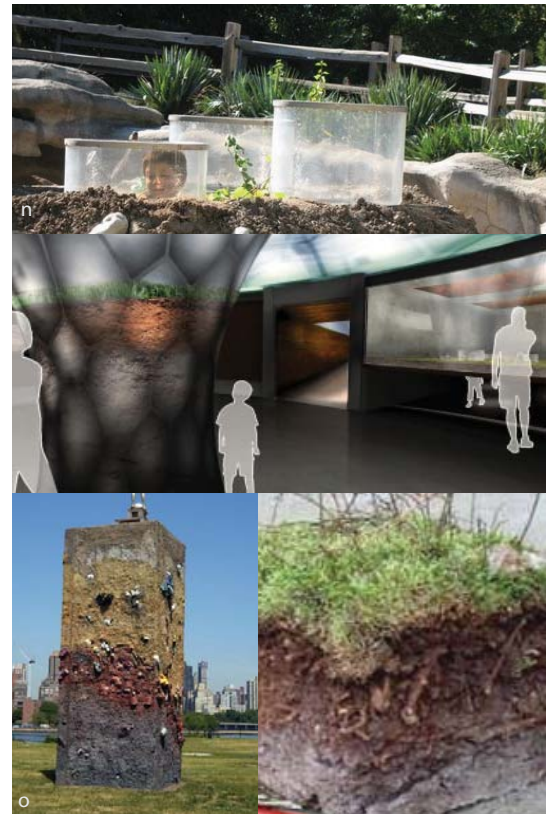
⁸-Burnham Park, An illustrated description of Burnham park. http://en.wikipedia.org/wiki/Burnham_Park_%28Chicago%29

The Earth Building refers to unique and interesting precedences in installations which serves to create an exciting exhibit space for potential visitors. The experience of being swallowed by the earth is mimicked through a slow decent into a semi submerged space.

Once inside, the visitors are faced with a large core sample which has been preserved in the center of the building. The direct precedent for this type of installation comes from Ron Baron's work *Excavation*.⁹ To the side, visitors are invited to take part in an interactive prairie dog display that is an adaptation of a similar display in the Detroit Zoo.⁹

The active built components of the site experience are the corten steel retaining walls which serve to create enclosures not only for the earth and planting, but for the individual visitors on the opposite side. Inspired by the works of Richard Serra served as the generating principle which the labyrinthian site experience was based upon.

Although the form of the site is developed from a cellular structure which brings consistency to the overall design, the pathways that are created are reminiscent of the works of Richard Serra. The retaining walls are able to form corridors high enough to completely submerge visitors into surreal pathways which can be experienced when moving through Serra's works.¹⁰



9-Ron Baron, *Excavation*, *Unearthing the American Dream*. http://www.socratessculpturepark.org/Archives/2005_sport/artist_pages/baron.htm
 10-Bibliography, *A bibliography for Richard Serra*. <http://www.pbs.org/art21/artists/serra/index.html>

conclusion

In order to develop unique and interesting ideas, the architect must approach the world with an open mind. It is rare that an idea be formed in a vacuum, therefore precedents, whether in architecture or in nature, play a major role in design. The role of the architect becomes that of the researcher. The architect must collect inspiration and meaning from nature and the built world, and he must formulate a clear argument by convincingly interrelating his findings into a synthesized solution.

Image sources.

a - http://www.flickr.com/photo_zoom.gne?id=2118484639&context=photostream&size=l

b - http://www.flickr.com/photo_zoom.gne?id=273838630&size=l

c - <http://www.bit7.com/whitepage/metalfoams/images/six.gif>

d - http://www.flickr.com/photo_zoom.gne?id=157843525&size=o

e - http://www.flickr.com/photo_zoom.gne?id=2118484639&context=photostream&size=l

f - http://people.tribe.net/rachels_forest/photos/5246d74a-0cba-4b9d-845b-6c35a1217c29

g - <http://www.bren.ucsb.edu/facilities/MEIAF/portalimages/original/SNAIL2.jpg>

h - <http://www.funpike.com/view/Image-Gallery/Pictures/Cool-Plant-Bushes/>

i - http://www.arch.mcgill.ca/prof/sijpkcs/D+C-winter-2005/pavillions_steel_polymer/edenproject.jpeg

j - <http://en.beijing2008.cn/cptvenues/venues/nac/headlines/nac/n214122909.shtml>

k - http://www.danda.be/reviews/olympic_watercube/4/

l - http://en.wikipedia.org/wiki/Burnham_Park_%28Chicago%29

m - <http://deoxy.org/img/tube.jpg>

n - <http://picasaweb.google.com/rmurraygr/October07/photo#5124681026030420642>

o - http://www.socratessculpturepark.org/Archives/2005_sport/artist_pages/baron.htm

p - <http://mocoloco.com/art/archives/001166.php>