ECOPSYCHOLOGICAL USES OF TECHNOLOGY: RECONNECTING MAN WITH NATURE THROUGH DESIGN

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The psychologist Theodore Roszak is a pioneer in a new field of study, ecopsychology. He begins to search for a deeper, more basic root of today's societal dysfunction—mainly the lack of connection people have with the earth. According to ecopsychologists, addiction, destructive behavior, and strained personal relationships, are just some of the effects of this distance from nature. Can technology (architecture, the built environment) help reverse this condition? Can they re-introduce elements of natural life cycles? This thesis will look at the problems associated with this lack of connection and how the built environment can re-establish that association with the earth in a setting where it is needed the most. It will show that the distance between humans and the earth can be bridged by re-introducing plant and animal life, natural elements and sustainable design using newly developed technologies into the world of the city, creating psychologically pleasing spaces. The context of this project is one that is notorious for its lack of "natural" surroundings, the concrete jungle - the city. The project here will be a forty story mixed-use tower located in downtown Chicago, IL.

...the core of the mind is the ecological unconscious. For ecopsychology, repression of the ecological unconscious is the deepest root of collusive madness in industrial society.

Theodore Roszak
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Architecture, through its very nature, has the ability to change the way people live. Architecture also has the power to provoke thought and inspiration within people. It is for this reason that architecture is a very powerful entity. How the architect uses this power is very important, not only because of its ability to change the psychological state of those who interact with it, but our success as a species is relatively dependent on it.

For now, let's get back to the issue of the psychological power of architecture. Most everyone has been somewhere, whether it was a building, landscape, or other element that has changed his or her worldview to some degree. Images, situations, environments all contribute to the psychological state of those interacting with them. Architecture, and the spaces created by it, also falls into this category. According to Ecopsychologists, physiological and psychological illnesses are a result of our damaged relationship with nature.

**Humans, as a species, have become disconnected with nature.**

In order to repair society's dysfunctions, we must psychologically reconnect man with nature. Taking an ecopsychologist's view, an awareness and interaction of natural elements and systems is needed to create a psychologically peaceful environment. How can buildings, in an urban setting, respond to this? That question is the main issue to be dealt with in this thesis.
Known for its complete disassociation with the natural environment and dependence on artificial systems, the modern skyscraper is perhaps the most psychologically damaging space in the city. Yet this is where most of the people who live in the city spend most of their lives. Imagine the destructive effect this has on their psyche. The project to be undertaken in this thesis will be the redesign of this archetype structure to one that helps bring ecopsychological ideas and nature cycles back into humans' lives. The building will house 550,000 sq.ft. of rentable office space and 50,000 sq.ft. of retail shops with a food court. It is located on a prominent riverside site in downtown Chicago.

Wilderness transformed into city streets, subways, giant buildings, and factories resulted in the complete substitution of the real world for the artificial world of the urban man... Surrounded by an artificial universe when the warning signals are not the shape of the sky, the cry of the animals, the changing of seasons, but the simple flashing of the traffic light and the wail of the ambulance and police car, urban people have no idea what the natural universe is like.
Design Objectives

Architecture and the built environment should no longer be a place where one is not connected to the natural environment.

The two should co-exist seamlessly. Nature should be allowed inside, the inside should extend out. The distinction should be as ambiguous as possible.

One objective of this thesis is to explain why the built forms that dominate the city need to be changed in order to cure the dysfunctions that plague modern society. Continuing research in the field of Ecopsychology will further define these ideas.

Another design objective of this thesis is to show that ecopsychological design and sustainable ideas can be applied on a large scale in major metropolitan areas. Research in Ecopsychology shows that they are a necessity. Technologies have advanced to the point where we can now take advantage of certain untapped resources such as the vertical expanses of building elevations for plantings and the catching of rainwater to be used in other building systems, to name a few. These technologies must be used in a manner that coincides with the ability of the buildings inhabitants to interact with the natural elements and cycles brought forth by the introduction of plant and animal life within the building envelope.

Depth Psychology, with an ecopsychological emphasis, would contend also that physiological illness is connected to our damaged relationship to nature. Our alienation from the rhythms of the natural world contributes, in a direct way, to our physical suffering.

Stephen Alzenstat
Chicago has survived one crisis before – the fire of 1871, but for it to survive the coming ecological and psychological crisis, changes have to be made to the way buildings are designed. The city has long been in the forefront of cutting edge architecture in this country, as well as the world. The birthplace of the skyscraper should be the place where it is reborn into its modern, ecopsychologically friendly form.

Franklin street was once the heart of the garment district and was lined with warehouses, stores and small factories. The street’s image went into decline after businesses moved out and the buildings began to deteriorate, but now the area is being revitalized due to lack of building sites along Wacker and has become a desirable office location.

The site is located at the intersection of the Chicago River, Wolfe Point. Franklin Street (which will provide vehicular access to the site) is to the east, Kinzie Street to the north. The Merchandise Mart is northeast of the site. There is an El stop on the east side of this building. Directly north of the site is the Illinois Institute of Art Chicago. Michigan Avenue is approximately four city blocks to the east. At 36 stories the building across the river- 333 Wacker- is the tallest in the area. The site receives ample amounts of sunlight due to the unobstructed southern exposure. Strong breezes are common from the northwest, following the river south. Because of the location on the river and the southern view, any built object on the site will be a major focal point – perfect for signaling the coming of a new typology in skyscraper design.

**Site Location:**
Wolfe Point, Chicago IL

**Surrounding Buildings:**
Merchandise Mart (north-east)
Art Institute (directly north)
333 Wacker (south-east across river)
Due to the lowered ground plane of the site, pedestrian access to the main building became a major issue. Pedestrians will approach the site from two major areas; the El stop located on the east side of the Merchandise Mart and from parking structures to the north of the site. Service access to the Illinois Institute of Art is located on the west of the building. The road slopes gently from street level down to the ground level of this site. This area will be used as a vehicular exit the site while vehicular entrance will be off of Franklin Street.
I believe that nature and the environment should be held sacred. That simple thought is what initially sparked the concept for this thesis. I then began to examine what normal people do with an object that they hold sacred. More often than not, people tend to do is try to protect that item. They tend to place the object in a box and shelter it from the world to keep it from harm. This seems like it would be the right thing to do, but in this instance is the exact opposite of what the object wants.

People tend to think of Nature as if it were an object that they can easily push to the side. They think of it as if it were something they have control over. Something they can box up, put away and not think about until it's convenient for them.

This idea is the basis generator for this thesis. What if nature were put into a box? What would happen?

As long as we continue to keep nature locked in its box and those not to live in close harmony with it, the forces of Nature will continue to press against the sides of the box. Eventually Nature will break through the box- spreading out and reclaiming its rightful place. This building has been conceived as though it were the box that Nature is breaking through.
The process for this project developed in a highly linear fashion. Building forms based on the concept came quickly and were stretched, moved, split, twisted, and tweaked until they finally came together into what is on the following pages. The two pages here show a small sample of the work done in order to reach the final design.
The concept of the box quickly became translated into building forms. The central atrium became the starting point from which Nature will push its way out. This is shown by the street level park in the retail section of the plan as well as by the other parks suspended within the atrium. These parks are conceived as being comprised not only of trees, but can be accompanied by other plant species, creating diverse, lush, individual "atrium gardens" throughout the tower. The upper atrium gardens serve several purposes. First, they provide the much-needed visual connection from several floors at a time to a natural element. Second, they provide a meeting place for employees of the various business within the building and their clients as well a giving workers a place to take a break under the comfort of a canopy of trees. Lastly, as a bonus to the psychological benefits, the plant life in the gardens help with the sustainability of the building by cleaning the air (helping reverse the "sick building syndrome" of most high rise office towers) as well providing a filter for the re-use of gray water.

As Nature pushes on the inside of the box, the sides begin to bow and crack, in some places even large holes form, allowing Nature to begin to seep outside. The exterior of the building does the same. The sides of the box are expressed by large expanses of metal screen that are symbolically angled in and out, suggesting the struggle present within the box. The metal screen is used to both filter sunlight to the interior spaces and to allow ivy a surface in which to grasp. Between the cracks of the screen grows ivy planted within hanging boxes. As the seasons come and go the ivy spreads and recedes to and from the cracks. This is done for two reasons: first to symbolize the spilling of Nature out
of the cracks in the box, secondly to instill an awareness of natural cycles suggested by some Ecopsychologists to help connect man to Nature. These natural cycles are also expressed in the exterior “façade gardens” that break out of the screens through large holes. As winter gives way to spring, the trees and other plantings within these gardens blossom and flower, signaling a rejuvenation of all living things. Spring then becomes summer and summer becomes autumn, bringing with it the wonderful changing of the leaves. Like the atrium gardens, the façade gardens also create spaces where one can take a break from tedious office work and lift one’s spirits. Small birds will also take up residence in these gardens, laying eggs and caring for their young — again natural life cycles become visible. Imagine working at your desk on the 23rd floor, looking out into a tree and seeing a mother bird feeding its infant just outside your window. Pleasant thought, no?
Spatial Qualities of Major Elements

Walkway.

Since ground level of the site is 25 ft. below street level, access from street level to the entrance of the building is by way of a raised walkway flanked on either side by trees. Not only does this walkway offer a means of access into the building, but it also serves as an experiential view of the natural cycles of the site. It will offer outstanding viewing opportunities into the lives of birds, squirrels, and other small creatures that will inevitably reside and interact within the site. As the trees grow with time, views to the building will become increasingly obstructed, creating a unique experience of being in a canopy of trees while still being in the larger context of the city. The walkway is also large enough to serve as an outdoor piazza space where one can relax on a bench and view the changing of the leaves in autumn as well as their blossoming in spring. When the weather takes a turn for the worse, a small structure allows access under the northern portion of the walkway to a glass enclosed space offering an escape from the cold winds of winter or springtime showers. While moving along this space, views to the lower portion of the site are unobstructed, allowing one to interact visually with native plantings along its length and have a closer relationship with the riverfront. At the end of the walkway is the vertical circulation to providing admittance back to the street level floor as well as the elevators servicing all the retail floors and the food court.

Food Court.

The food court is an element of the program intended to draw not only inhabitants of the

north Elevation
building, but also others who may be working in the surrounding buildings. With its southern location and a strong indoor/outdoor relationship provided by 20ft glazed walls, the space is flooded with daylight during the lunch hours. The openness also allows for excellent people watching during the spring and summer months when the outdoor open space becomes a haven for office workers as well as shoppers wanting to enjoy the rays of the sun while sitting on the banks of the river. Like the walkway, the food court becomes a space where one can become reconnected to the natural cycles of the site while being sheltered during times of inclement weather. During the winter months, the space will be heated by the sun, creating a warm space to have a cup of coffee on cold, dreary days.

**Retail spaces.**

Located on the first three floors of the building are the retail spaces. On all three floors the circulation is placed adjacent to the atrium, creating a strong connection to the first floor atrium garden as well as creating a socially interactive space important to retail with views to the lower floors. Along the circulation the railings are alive with the same ivy that would cover the exterior, giving shoppers physical contact with plant life while cleansing the air. The vertical circulation within the space moves around the edges of the trees, allowing one to experience them in the same manner as on the walkway. As well as the visual connection with the first floor garden, there are also façade gardens on the south-west corner of each floor creating spaces were weary shoppers can recharge their batteries by interacting and feeding the birds or just enjoying the cool breezes that flow down the river from the north.

**Office spaces.**

From the fourth floor to the fortieth floor is
rentable office space. The basic layout is a U-shaped floor plate with the open end to the south. Elevator lobbies are at the north end of the floor. Directly adjacent to the elevator lobbies and overlooking the atrium gardens is the main circulation area were one can move to either the east or west wing offices. Each floor is generally broken up into two separate offices with the entrances directly off of the main circulation area, but on several of the lower floors the east and west wings may be broken up into even smaller office spaces. In these instances, a circulation hall similar to those in the retail spaces provides access to the smaller offices. Like those on the retail floors, the handrail that surrounds the circulation on the office floors is comprised of a soil box planted with ivy and a metal screen, which allows the ivy to grow on and hang from.

Natural daylight can have a healing effect on those who are fortunate enough to feel its warm rays. With the maximum width of any space only being 50ft., floors were designed to provide excellent daylight penetration in an attempt to create a more psychologically pleasing space as well as a more energy efficient layout. The structure of each floor is left exposed, providing a large ceiling height which also aids in daylight penetration. A number of floors have access to façade gardens, giving workers a visual as well as physical connection to the natural cycles that surround them. Using an open-plan layout of the workspaces gives each employee a sight line to either a façade garden or a window view of the city. On the floors that are not provided a façade garden, views to the ivy growing between the "cracks" in the metal screen still allow a visual connection to an element of nature. The ivy also creates interesting and ever-changing shadow patterns when the sun shines through, giving every space a natural, decorative motif. Views to the interior atrium also maintain a visual connection to plant life through the atrium.
gardens and the hand railing.

**Building core and vertical circulation.**

The core of this building is designed as a structural core, independent from the rest of the structure and is located on the northern side of the building for several reasons. The first is to allow direct southern daylight to hit the entire building. One notable characteristic of the site is the unobstructed southern exposure, which I wanted to use to its fullest potential. The second reason for the layout deals with views. The Illinois Art Institute building to the north is not extremely pleasing to the eye, so views to it were not desirable. Since views and sunlight penetration are not an issue to be dealt with in the space, restrooms are also placed on the northern side of the building. HVAC chases are provided on both the east and west sides of the tower, allowing each side to be separately controlled.

Vertical circulation (excluding the retail circulation) is provided by two banks of 5 passenger + 1 freight/passenger elevators for a total of 12 elevators that can be used during peak transit times: morning up-peak, two-way lunch peak, and afternoon down-peak. On each floor the elevator lobbies are provided with natural daylighting and ventilation from northern-facing glazing, reducing the need for mechanical intervention and thus saving energy. The fire escapes also provide a means of vertical circulation throughout the building. They are located near the four corners of the building and are completely day-lit. Being used as a normal mode of movement between floors, the southern set of stairs offer the inhabitants excellent views of the city and oversized landings give passers-by a spot to chat with fellow inhabitants of the building.

1. Main Entrance
2. Facade Garden
3. Access to Enclosed Walkway
4. Atrium Garden
5. Courtyard Garden
6. Roof Garden
7. Atrium Garden
8. Roof Garden
9. Atrium Garden
10. Roof Garden
2. Facade Garden
6. Atrium Garden
1. Main Entrance
2. Facade Garden
3. Food Court
4. View from upper walkway
   view inside enclosed walkway
views from exterior open space
office reception areas
The HVAC system for this building is a forced air supply with a plenum return. Both are linked to the main mechanical chases located in the northern service core of the building. Each office wing is 40-50 ft. wide so that during times when climate permits the use of non-mechanical heating/ventilating the building can accommodate this by having operable windows on the exterior shell of the building, as well as windows that open into the interior atrium space. This allows the solar chimney effect to take place, drawing cool breezes through the office space.

The mechanical spaces required for this building are located on the ground level adjacent to the loading dock and storage area as well as on the roof.
The structural system in this project is based on a 40' square grid. It is a hybrid system comprised of steel columns, beams, and vierendeel trusses. The vierendeel trusses are used within the office and retail space in order to allow the needed space for mechanical systems. They're open design also creates less of a barrier, allowing light to bounce more freely within the space.
Only follow where ecological science leads... Somewhere within this emerging vision of biospheric wholeness lies a new, environmentally based conception of sanity.

Theodore Roszak

Several aspects of the sustainability of these elements have been briefly discussed earlier in the text; here they will be explained in more depth.

**Façade gardens and ivy screens:**
Vertical landscaping, in all forms, serves as a passive means of lowering ambient air temperature as well as reducing the urban heat island effect, by up to 5° at street level. Vertical façade planting also reduces external heat reflection, glare, and lowers the amount of solar radiation that reaches the interior. Water from the soil is carried through plants and evaporated from their leaves in the photosynthesis process. This evaporation helps to control and regulate humidity and temperature. Studies have been performed showing that vertical plant cover on exposed wall surfaces improves the energy efficiency of the wall by up to 8 percent. This happens partly because the vegetation forms an insulating layer of stationary air, and partly because it prevents rainwater from filling air voids within the façade of the building (a dry wall is a better insulator than a wet one). Heat loss in winter can be reduced by as much as 30% due to the layer of insulating air trapped by the matrix of vegetation. This improved efficiency reduces the overall consumption of energy required of the building while still providing the ecopsychological needs of the inhabitants.

**Atrium gardens:**
Along with the psychological benefits of the atrium gardens, the gardens also serve other purposes. “Sick building syndrome” is a term used to describe situations in which building inhabitants experience health problems that appear to be linked to time spent in a building, but with no specific illness or cause that can be identified. The atrium gardens will eliminate the possibility of this syndrome.
by creating a system that mimics the way Nature cleans the earth’s atmosphere. The introduction of plants to the interior of the building is used to cleanse the interior air by eliminating toxins common to high-rise buildings such as (but not excluded to): xylene, toluene, benzene, trichloroethylene, and ammonia (chemicals emitted by photocopiers). Increasing the organic mass inside the building also helps regulate the humidity and temperature of spaces associated with the plants. The plants are also a better method of humidification than electric humidifiers or air-conditioners because they do not provide a favorable breeding ground for bacteria. Without needing electric methods of humidification, energy can be conserved and made available for other uses. The atrium gardens will also be used as a way to re-use gray water created by the usage of the restrooms. The gray water created by these restrooms would be sufficient to hydrate the seven gardens.

Atrium design:

Designed to create the stack effect, the atrium is an integral part of the sustainability of this design. Hot air rising through the atrium creates a negative pressure that when coupled with the slim floor plate width (50ft. max.) will give excellent cross ventilation. Natural ventilation is overwhelmingly supported by the fact that energy consumption is usually about half that of completely air-conditioned buildings in cases where natural methods are used. System maintenance is considerably less than that of a mechanical system and there is also a reduction of carbon dioxide emissions.


Thinking back on the beginning of this thesis, I never would have guessed my thought processes would have taken the turns they have. I have felt a strong relationship to the natural environment ever since I was a child, but not since I discovered Ecopsychology have I been able to understand why. Ecopsychology and the ideas behind it have now become a major element in my life. I suggest whoever is reading this thesis should also read Roszak’s book, Ecopsychology: Restoring the Earth, Healing the Mind. It has drastically changed the way I view the world. My life and therefore my architecture will never be the same.

Speaking about architecture – I’d like to say a few things about this project. I have to admit at the beginning I was a bit nervous about my ability to take on a project of this size, but am happy to say I think it turned out successful in the end. Taking on a project of this size has had its high and low points. One of the major low points is the amount of spaces that one has to design. This makes it hard to get very detailed with the spaces, which is something that I feel is integral to good architecture (detail that is). On the other hand, the large amount of spaces needing designed is also a plus because it lets one concentrate on their spatial relationships and how the spaces interact on a more abstract level. So on the whole, the project size was ok, it was a new experience for me and I have learned a lot about my abilities as a designer.

Overall, this project has been a great learning experience. I've learned a lot from what I've done and just as much from what I didn't do. I'd like to give a sincere “thank you” to everyone who has helped me along the way.
...builders of the next millennium must embrace a radically changed philosophy for preservation and new construction to reverse the continuing trend toward omnivorous construction technologies and thoughtless waste. In its place, **any relevant and responsible architecture must be conceived in harmony with nature.**

James Wines