Water and Naturalized Environments in Architecture

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Prospect – Refuge Theory

Hildebrand is the proponent of this attitude and uses it to establish a “sense of place” arguing that Hadrian was “drawn” to his Villa site in Tivoli

It proposes that environments which offer both outlook and enclosure provoke not only feelings of safety but also of spatially derived pleasure.

Villa d' Este
Tivoli, Italy

Water and
naturalized environments
go hand in hand in design

Water can be an overt
design element or used in
support of other functions

“A review of findings from the field of environmental psychology shows that humans are aesthetically attracted to natural contents and to particular landscape configurations. These features are also found to have positive effects on human functioning and can reduce stress.”

“Architectural Lessons from Environmental Psychology: The Case of Biophilic Architecture” – Yannick Joye 2007

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Stress Recovery Theory (SRT)

- Studies conducted under varying conditions
- Stress measured using capacitive skin resistance and blood cortisol levels

There have been over 30 separate quantitative attempts to examine the theory.

"Within the field of restorative environments research, it is commonly assumed that restorative responses, triggered by exposure to natural elements and settings, are ultimately adaptive traits originating from our species' long evolutionary history in natural environments. … we specifically focus on Stress Recovery Theory (SRT), as this theoretical framework has most extensively elaborated on the supposed evolutionary origins of restoration."

"Is Love for Green in Our Genes? A Critical Analysis of Evolutionary Assumptions in Restorative Environments Research" - Yannick Joye and Agnes van den Berg 2011

- Subjects were presented with merely a “naturalized” photo
- Within minutes, stress levels were reduced by more than 10%

The Cost of Stress in Built Environments

• In 2001, the median number of days away from work as a result of anxiety, stress, and related disorders was 25 – substantially greater than the median of 6 for all nonfatal injury and illness cases (Bureau of Labor Statistics, 2001).

• In a study of a large, multi-employer, multi-site employee population, healthcare expenditures for employees with high levels of stress were 46% higher than those for employees who did not have high levels of stress (Goetzel et al., 1998).

• Job stress is estimated to cost U.S. industry more than $300 billion a year in absenteeism, turnover, diminished productivity and medical, legal and insurance costs (Rosch, 2001).

The American Psychology Association "Psychologically Healthy Workplace Program Fact Sheet: By the Numbers"

Rainwater Harvesting

Rainwater harvesting systems collect and store rainfall for later use. When designed appropriately, they slow and reduce runoff and provide a source of water. This practice can be particularly valuable in arid regions, where it can reduce demands on increasingly limited water supplies. They can be purely functional.

El Monte Sagrada
Taos, New Mexico

Cenote landscape water feature and rainwater storage

Designed to be a Demonstration Building

13-story Class A office building
277,500 SF
900 employees

Rainwater Harvesting System
- 25,000 gallon cistern
- Reuse for irrigation
- 25 Micron Filtration
- UV (optional)

Living Machine
- Collects and treats building's wastewater
- Reuse for toilet flushing
- 5,000 gpd capacity

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San Francisco Public Utilities Commission – tidal wetlands

Brooklyn Grange

65,000 Sq Ft Commercial garden, the Grange sells 70% of its produce to restaurants. It has a Community Supported Agriculture (CSA) program, and is a vendor at a Sunday farmers' market in Greenpoint's McGolrick Park, yoga classes and “Butcher Paper Dinners”

50,000 SF
Six-story Office
NET-ZERO ENERGY

Parapet roof captures rainwater and brings it to downspouts that carry the water to a 56,000-gallon concrete cistern in the basement.

On its way down, the water is funneled through a vortex filter which removes large particulates

“day-use tank” that holds 500 gallons of clean, potable water:

- ceramic filters
- ultraviolet light
- activated charcoal
- small amount of chlorine removed at the faucet head by activated charcoal

Bullitt Center - Seattle

and generates all the building power needs with renewable energy thereby avoiding the use of fossil fuels and mitigating climate change impacts

Thank you!

Additional information

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