Like in

August, 2016

To Catch a Breeze

It's evening. After a long hot day, all windows and skylights have been thrown wide open. Cooling breezes bring indoors the fragrances and sounds of summer. A courtyard fountain freshens the air. August in Pennsylvania.

Like more and more people, our family prefers an AC-free life, less hermetically sealed off, less mechanical noise, more in touch with seasons, weather and place.

A building designed to harvest cooling breezes is the medium to make this possible, indeed to make it enjoyable.

Leafy Courtyards and Wind Catcher Chimneys

Leading scientists have calculated that by 2050 up to 27% of all global warming will be attributable to air conditioning gases.

"The U.S. has long consumed more energy each year for air conditioning than the rest of the world combined….In fact, we use more electricity for cooling than the entire continent of Africa, home to a billion people, consumes for all purposes." (Yale Environment 360, 2012)

Indeed, from my own trips to visit family in North Africa I can confirm that homes small or large are seldom equipped with air conditioning. Instead, buildings are laid out for passive night cooling, for harvesting breezes through cross and stack ventilation, and channeling prevailing winds into purposely narrowed passages, leafy courtyards, wind catcher chimneys, masonry domes, and across water features to achieve evaporative cooling. The use of reflective white surfaces is common.

Vernacular Solutions: Riad Porte Royale, Morocco.

Harvesting Mediterranean Breezes, Sidi Bou Said, Tunisia. Photo credits Helena vanVliet

So How About Us?

Greater Philadelphia lies at the southernmost tip of the humid continental climate zone, with some characteristics of the humid subtropical climate that begins just to the South. In the wake of climate change, air conditioning loads can be expected to steadily increase in our area. Granted our buildings have to respond to winter, as well as summer conditions.

Still, there is much we can do to reduce our carbon footprint, especially when it comes to AC.

Since most energy models are based on the study of naturally ventilated buildings, it seems, sustainable design begins with creating shelter and comfort based on existing outdoor conditions, topographic, climactic, seasonal.

In other words, good old fashioned vernacular passive design.

Design for Passive Cooling & Ventilation in Pa

• Building placement & orientation to bring prevailing cooling summer breezes in and through the building
• Deciduous vegetative shading on the South & West sides (trees, vines)
• Guiding summer breezes through deciduous trees, vegetative curtains and/or across bodies of water (harvested rain water if possible)
• Porches, arbors, leafy trellises, colonnades, larger roof overhangs on South and West sides
• Purposely narrow passages or leafy courtyards to channel prevailing breezes into buildings and amplify cooling effect and experience
• Harvesting buoyancy based natural ventilation (cross and stack ventilation) on the interior
• Harvesting natural night cooling
• Harvesting cooler air from the North side of building through creation of interior stack effect
• High performance roof and wall insulation, and green roofs
• Design for occupants' participation in opening and cooling (inhaling and exhaling) of building

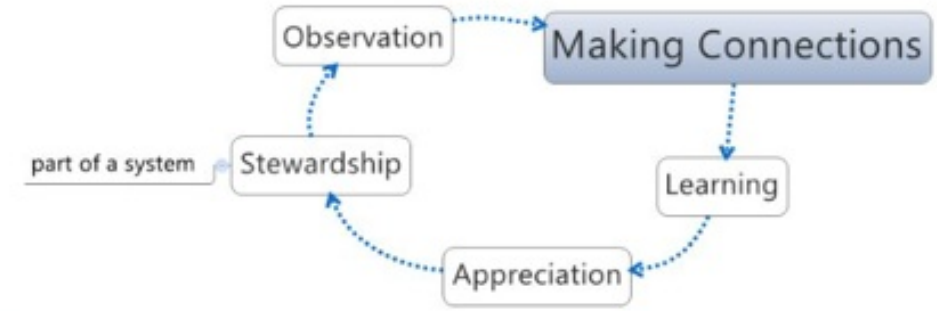
Providing a biophilic multi sensory experience of freshness and coolness:

• auditory: introducing the sound of fountains or other moving water
• auditory: designing for prevailing breezes to create the sound of gently rustling leaves, making breezes audible
• visual: dynamic/moving light patterns (leafy/fractal), making breezes visible
• visual: billowing light colored fabrics, making breezes visible
• olfactory: designing for prevailing breezes to move across areas of mint, pine, cyprus, juniper, orange blossom, lavender, jasmine or eucalyptus
• haptic: providing ability to touch water, cool stone/tile surfaces, or to be intermittently touched by cool water mist

Deryk Houston – British Columbia

Connecting The Dots

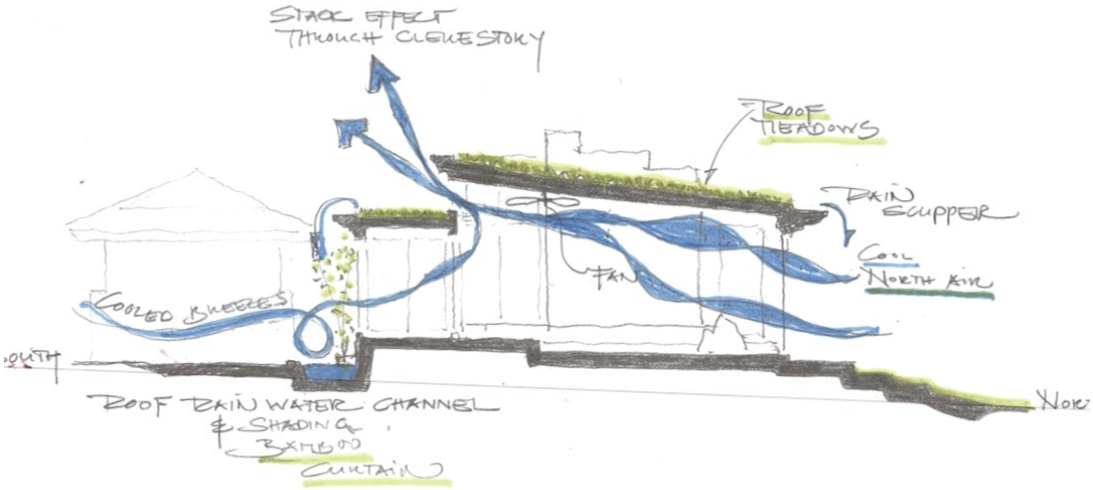
“We should change our experience of place from “What am I looking at?” to “What am I connected to or a part of?” ~ Ibrahim Abdul-Matin, Living Future unConference 2015



Connection Cycle

Connection gives birth to unique, place-specific solutions. From small to large, our team has designed several AC-Free buildings.

Vernacular Biophilic System for Passive Cooling:



• Harvesting buoyancy based natural ventilation: prevailing summer breezes bring the freshness of trees, and the coolness of the adjacent creek deep into the building.
• Building placement creates a narrow space, which collects and guides breezes across a rain water channel, and through a cooling and gently rustling curtain of bamboo deep into the building.
• French doors open into the wind, and collect those breezes like giant sails.
• A ventilating stack effect is created by a ribbon of awning clerestory windows and the sloped ceiling, which allow the lighter weight hot air to escape at the roof.
• A West/East cross ventilating bay window effect on the North side, and through the gallery, pulls prevailing breezes in and through.
• The lower-roofed gallery on the South side will act as a temperature buffer to keep main space cooler.
• During hot midday hours, the South side of the building (except for the clerestory windows) may be closed entirely, pulling in only cool North air.
• On exceptionally hot & humid days, the clerestory windows may be the only ones open, passively pulling cool air up from a dry basement through the stack effect.

Project Helena van Vliet

Biophilic Buildings are Inherently Resilient

Resilient buildings buildings are those, which function adaptively, comfortably, even in the absence of mechanical systems. In light of expected more extreme weather patterns and potential increase in power outages, passive buildings are inherently resilient buildings.

Biophilic passive buildings add the experience of place and all-sensory delight. Its a joy to be freed from the noise, vibration and heat out-put of AC units and once again hear the sounds of summer, especially at night: cicadas, crickets, locusts… and the first bird of the morning.

Science has confirmed what we intuitively know: being in touch with nature and its seasons is a health imperative.

By their very nature, biophilic buildings are resilient because they seek to become of the place, to belong, to connect the dots, to weave themselves into the topographic, climactic and seasonal tapestry of the place they, and we, can call home.

Nature in the News

How Sunflowers Follow the Sun, Day After Day

This Side of Paradise

Review: ‘An Art That Nature Makes,’ an Illuminating Look at Rosamond Purcell

The New Science of the Creative Brain on Nature

Artist Spotlight

Michael Biddison
“Finding the enchanted in the refused, growing the seed of awe in the mundane…"

Learn more about **Building Places that Re-Connect with the Natural World**. For Land Planning, Architecture and Collaborative Design, please email me or call me at: 610-299-7530 for more information.

Now contributing to: Human Spaces: Spaces designed with the human in mind.

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