Holistic Approaches to a Sustainable Regionalism

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regionalism:

an architecture that is an **inseparable** part of its ecosystem
regionalism:

people are an inseparable part of their ecosystem.
but today, most buildings separate us from the ecosystem around us. on purpose.
we have become very good at creating and sustaining artificial climates and environments.
so a lot of our efforts at sustainability involve making our artificial separated environments simply more efficient.
regionalism starts with the region.

(Latin *regere*, to rule)
and the region is made up of a particular climate, geology, ecosystem which form the natural resources for a regional human culture.
however...

the regional environment has progressively less to do with the response of our building culture
Regionalism starts with the region. Any building is a regionalist building. It creates an intimate, ongoing relationship between inhabitant and the surrounding regional environment.
regional architecture doesn't mean looking log cabin.

but behaving lunar module.
so where do we begin?

our buildings should leverage their environment, not resist it.

The Queen’s Building, DeMontfort University, Short/Ford Architects
but to leverage their environment, our buildings and the spaces they enclose must have sufficient interaction with that environment.

This interaction should happen at the interface surface—the envelope.
a key to successfully leveraging the environment is the rediscovery of radiant heat transfer.
So How Did We Get Here?

Electric Light

Air Conditioning

Prime Movers behind our design culture
electric light revolutionizes building depths
air conditioning enables artificial climate!!
current (regional) building culture: (a recipe)

1. accept universal program.
2. design complex conditioning system.
3. don’t forget to use air as thermal storage and transfer medium.
4. make envelope as resistant to heat transfer as possible.
5. don’t forget to hire someone really smart to operate it.
6. put some pitched roofs and logs on the outside.
sustainable (regional) building culture:

1. accept adapt universal program.
2. design complex simple conditioning system.
3. don’t forget to use air as thermal storage and transfer medium.
4. make envelope as resistant to all about heat transfer.
5. don’t forget to need to hire someone really smart to operate it.
6. go ahead and put some pitched roofs and logs on the outside.
sustainable **regional** building culture:

1. accept adapt **universal** program.

If the way we live and work in buildings is related to the outside climate and environment, the basic architectural program should reflect this.

*An office building in New York should be different than an office building in Denver.*
Architectural Programs have two bad habits:
1. Turning Into Architecture.
2. Turning Into Architecture.
architectural programs can too readily drive architectural form.....
make no mistake-

sustainable design success can’t be dependent on 60-year-old program expectations.

we will fail to green the built world if we continue to accept this.
sustainable regional building culture:

2. design complex simple conditioning system.

complex conditioning systems arise when we ask too much of the architectural program and too little of the architectural fabric.
sustainable regional building culture:

3. don’t forget to use air as thermal storage and transfer medium.

water is 832 times as dense as air, using up far less space to move and store the same amount of energy.
sustainable regional building culture:

4. make envelope resistant to all about heat transfer.

dressing as skin: an organic concept that allows for ventilation and thermal mediation to occur more passively and constantly.
sustainable regional building culture:

5. don’t forget to need to hire someone really smart to operate it.

Thermal performance too dependent on high levels of maintenance and active control is probably doomed to fall short of expectations.
6. go ahead and put some pitched roofs and logs on the outside.

A robust regional approach to building has very little to do with nostalgic aesthetics.
a new concept of organic architecture: buildings as organisms
trees: a biological model for architecture
the imperative of shaped and oriented surface area for interchange
the critical relationship of surface area to interior volume
a critical building task:

separate ventilation (breathing) from thermal comfort (regulation)

Buildings should function as environmental and climatic mediators, not as barriers.
separate ventilation (breathing)
from
thermal comfort (regulation)

a critical building task:
To create regional architecture, we want to break the habit of cocooning buildings and occupants.

Our main reason to be designing in this way has been to optimize the use of air as our thermal transfer and storage medium.
If we can break the link between thermal comfort and ventilation (which became associated with the advent of air conditioning), we can begin to reinvent the relationship between architecture and environmental comfort.
A key to making this separation of thermal comfort and ventilation successful lies in the rediscovery of radiant heat transfer and high-mass media for thermal storage and transfer.
Proper radiant heat transfer control and manipulation can allow people to feel comfortable within a much wider range of air temperatures than is possible with reliance only on convection and conduction.
When air temperatures don’t need to be micromanaged, the level of complexity of air handling systems can be reduced drastically.
And we can begin to Refocus the design effort and budget on architecture-as-organism vs. building-as-machine.
And we can begin to refocus the design effort and budget on
architecture-as-organism vs. building-as-machine

Thermally Active Surfaces in Architecture Kiel Moe
So What **ARE** the critical steps?
Step One.

Make program needs function well in shallow-plate buildings.
Deep buildings—like deep organisms—require more complexity and specialization.
Step One.

Shallow plate buildings enhance the relationship between occupant, sun, and mass storage.
Step One.

Make program needs function well in shallow-plate buildings.
Step One.

Make program needs function well in shallow-plate buildings.
Step Two.

Orient all of the building parts properly with respect to the sun regardless of the site shape or orientation.
Step Three.

Couple the building to the earth when possible.
Earth coupling— even subtle— can pay dividends.

Step Three.
Make shallow-plate buildings out of high-mass materials.
Augment thermal high-mass building performance with active-radiant heat transfer system.
Design and manage the architectural radiant environment.

Summer:
Radiant barriers reflect radiant energy, prevent surfaces from heating up.

Interior mass moderates interior temperature swings.

Ground coupling engages earth as heat sink.
Design and manage the architectural radiant environment.

Winter:
Radiant barriers reflect interior radiant energy, prevent cold-sky radiation

Interior mass stores heat energy from solar gain, building loads, and heating system

Ground coupling engages earth as heat source, diurnal swing moderator

Step Six.
Holistic regional design:
a culture of small buildings
Smaller buildings are better building blocks for good cities.
A Question of Balance:
cities of mostly low, high-mass buildings...
with a FEW tall buildings
and a FEW deep-plate buildings
Holistic regional design:
a culture of small buildings

Walmart Today

Walmart Future
Holistic regional design:
a culture of small buildings
Holistic regional design:

a culture of small buildings
Holistic regional design:

buildings made of the soil and stone underfoot
a culture of breathing buildings

Holistic regional design:
Artificial climates and sealed buildings disconnect us from stewardship of the ‘outdoors’

Hmmmmmmm......
Holistic regional design:

Radiant Barrier cooling behavior: shield interior from overheating

Radiant Barrier heating behavior: keep radiant energy from escaping to cold sky

a culture of radiant buildings
Holistic regional design:

a culture of organic buildings
Holistic regional design: