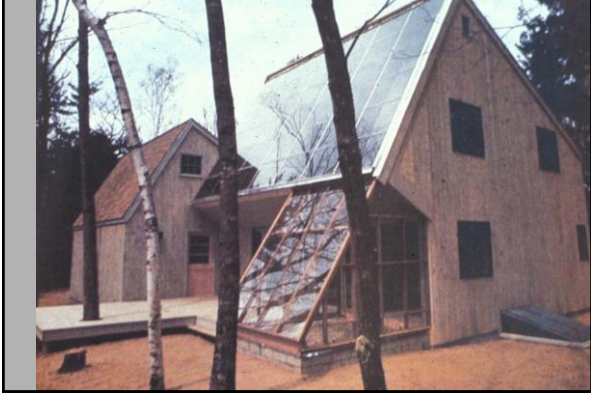


Introduction to Active Solar Space Heating



1

A cartoon illustration of a dog named 'OLE JIM' sitting on a grassy area next to a solar collector and a storage tank. The dog is looking towards the solar collector.

Active Heating

- Mechanical systems
- Remote collectors
- Heat storage
- Control of time of use

Seasonal storage is possible!

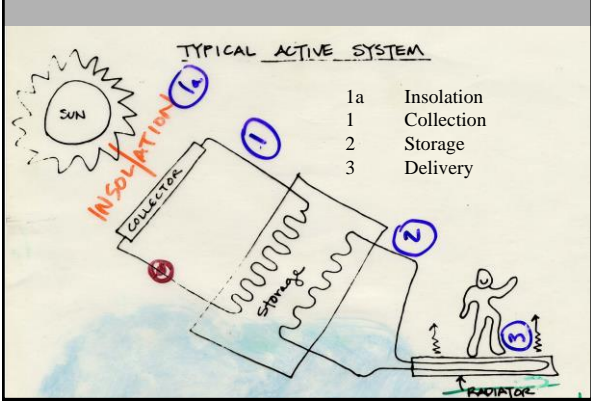
Passive Heating

- No mechanical systems
- Thermal mass storage
- Depends on thermal lag

A cartoon illustration of a dog sitting inside a house. A solar collector is mounted on the roof, and the dog is looking out the window.

2

Active Solar Space Heating



- 1a Insolation
- 1 Collection
- 2 Storage
- 3 Delivery

3





**vs.
Evacuated tube collectors**

- Fixed position
- High efficiency
- Storm risk

Common Ground,
Lopez Island, WA

10

Active Solar Space Heating: A Tale of Two Homes	
	Mayhew House, Coos Bay, OR
	Bevans House, Genesee, ID

11



Henry Mayhew, eccentric solar guy

12

Mayhew House, Coos Bay, Oregon



13



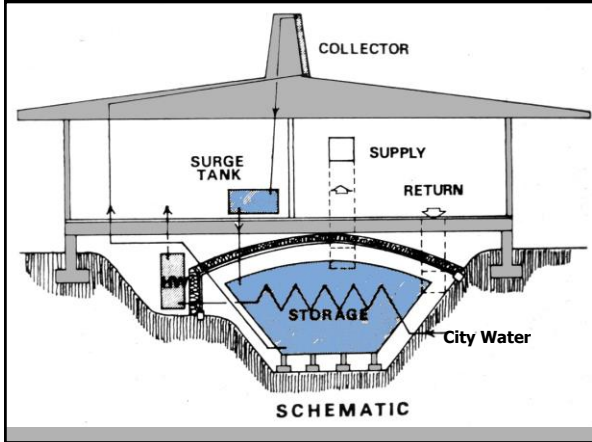
On the collector reflector!

14



Second collector and garden!

15



16



17



18



Very 1970s!

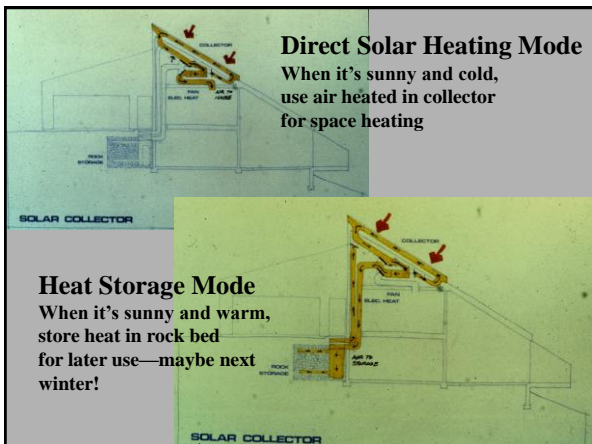
19



2x6 framing for R-19 walls

Rock bed pit under garage.

20



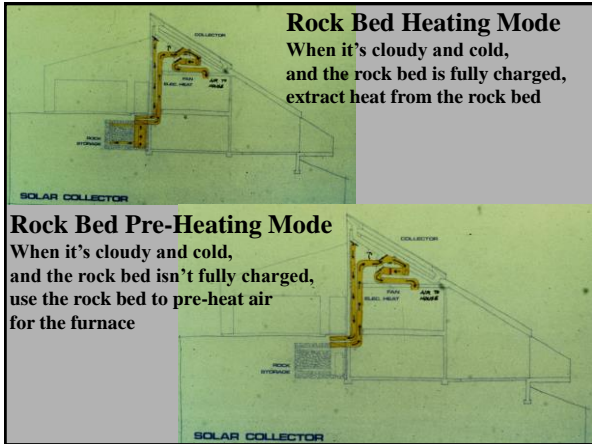
Direct Solar Heating Mode

When it's sunny and cold,
use air heated in collector
for space heating

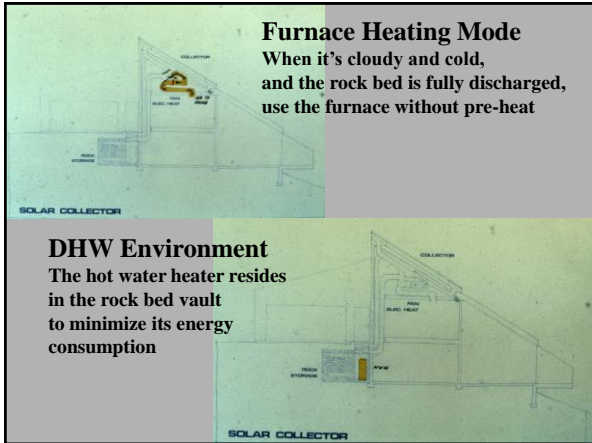
Heat Storage Mode

When it's sunny and warm,
store heat in rock bed
for later use—maybe next
winter!

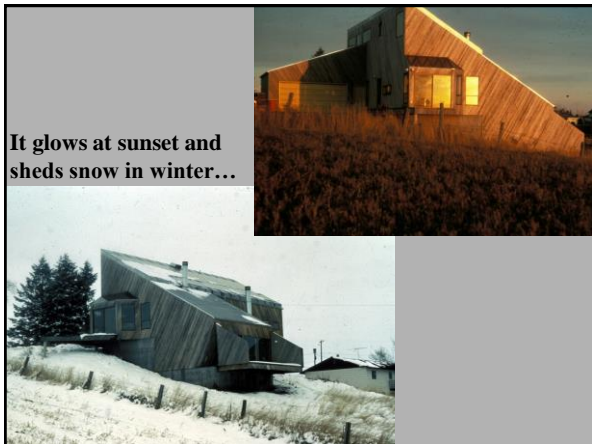
21



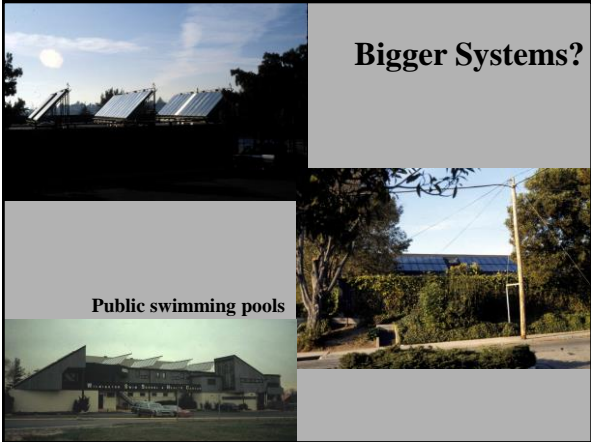
22



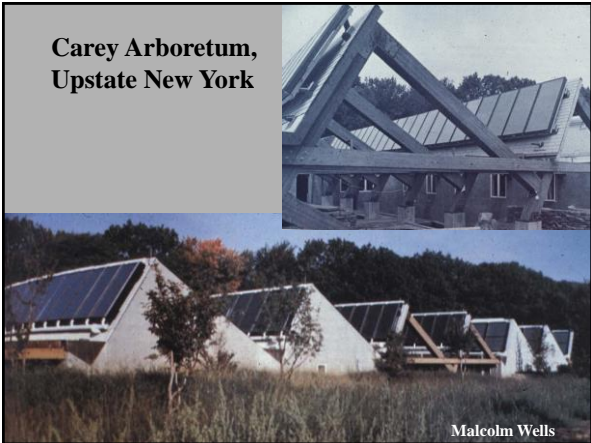
23



24



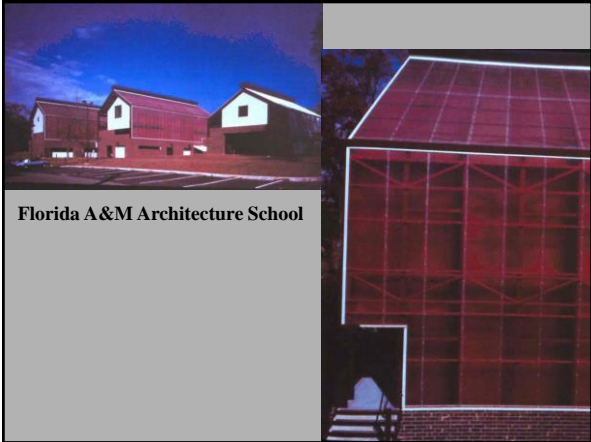
25



26



27



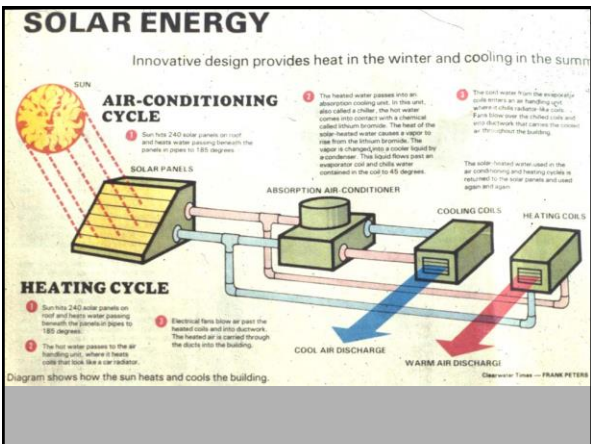
Florida A&M Architecture School

28



Clearwater Times Building—2004

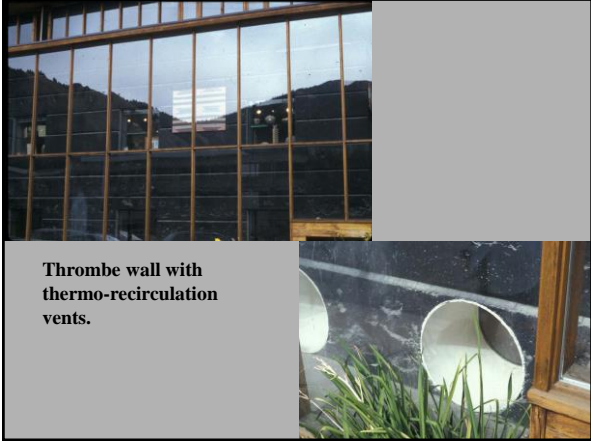
29



30



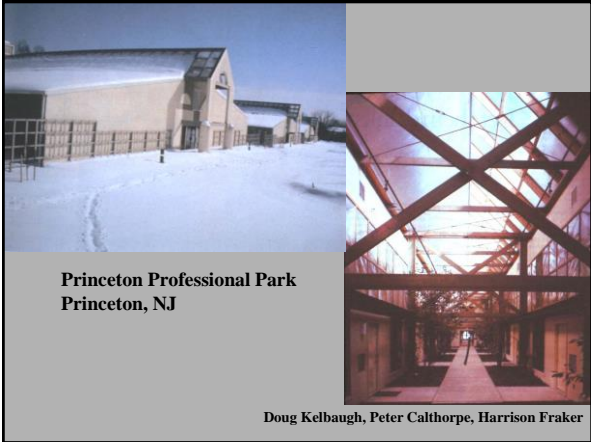
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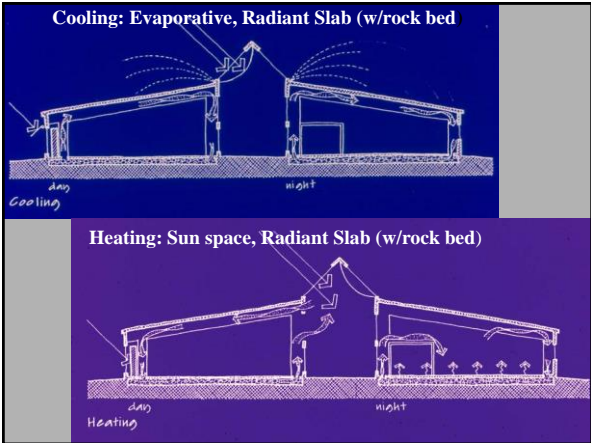
32



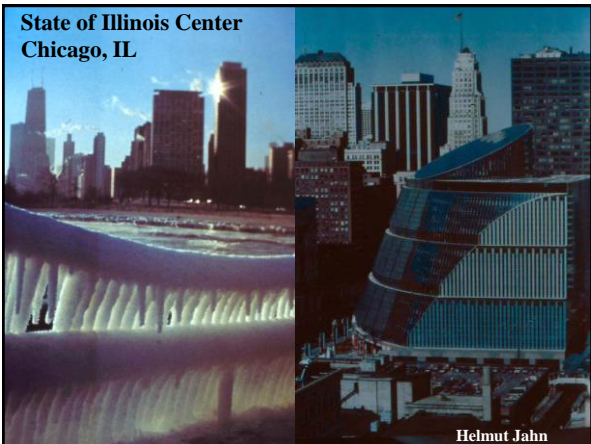
33



34




35



36

STATE OF ILLINOIS CENTER



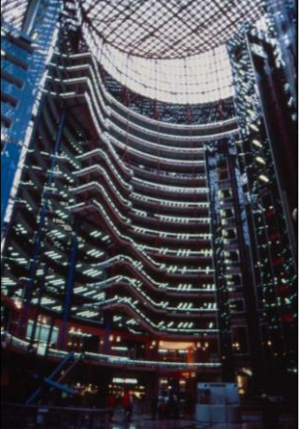
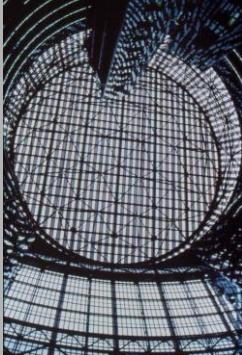
Did You Know?

- The building welcomes 125,000 visitors a month.
- The Center's steel frame weighs 10,442 tons.
- The building has a 17-story rotunda with a 160-foot diameter.
- 24,600 windows form the exterior surface.
- The building offers 1.2 million square feet of space that spans a city block.
- A 51-foot-long elevator that can hold 30 tons carries trucks to the sub-basement, where they are rotated on a huge turntable to line up with one of six loading docks.

ILLINOIS: Building for Today And Tomorrow
Looking west...

Note: Designed before everyone had a PC or was aware of climate change.

37

YIKES!
SE-facing glass and unshaded skylight!

38

The Energy Story

The energy system designed for the State of Illinois Center stands at the frontier of innovative engineering.

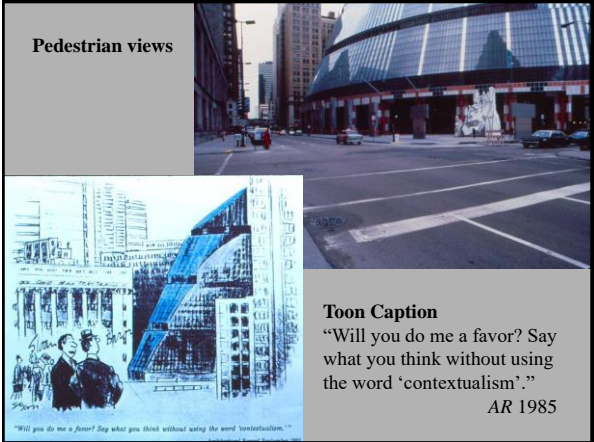
Solar energy enters the building through its glass "skin" and helps illuminate and warm it in the winter. Special fans move air warmed by the sunlight through ducts as large as seven feet in diameter to warm cooler parts of the building.

In warm weather, eight giant ice cubes are frozen at night and used to cool air that is distributed throughout the building. The cubes are frozen in ice banks—40 feet

← And more so in the summer!

long, 12 feet wide, and 14 feet tall—in the building's sub-basement, which is 37 feet below street level. In all, an equivalent of 400 tons of ice are frozen each night.

39



40



41
