

**Charting the Sun**

“If you think of the sun being a ball of fire, only at Stonehenge could you get the straight lines of light...”  
—Daniel Libeskind

...er, really!

Just outside Mayfield, NB

Although an unexplained phenomenon, there is a place on the outskirts of Mayfield, Nebraska, where the sun does not shine.

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Stonehenge 1968–2013  
Built ~2500 BC

**December 2013:**  
£27m visitor centre,  
designed by Denton  
Corker Marshall,  
opens at Airman's  
Corner, 1.5 miles  
west of the stones

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**What time of day is it?**

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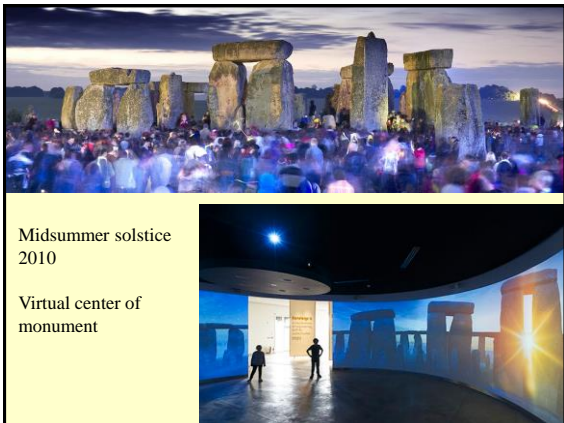
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Summer solar paths are longest, rising north of east, to the highest point due south at noon, and setting north of west.

summer

winter

Winter solar paths are shortest, rising south of east, to the highest point due south at noon, and setting south of west.

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### Summer Solstice (June 21)

- Arctic Circle (66.5° N)**  
24 hours of daylight
- Tropic of Cancer (23.5° N)**  
13.5 hours of daylight
- Equator (0°)**  
12 hours of daylight
- Tropic of Capricorn (23.5° S)**  
10.5 hours of daylight
- Antarctic Circle (66.5° S)**  
0 hours of daylight

polar day (6 months of day)  
polar night (6 months of night)

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### When to use the Sun

Note the Shading Line.

It is the concept of modern architecture to connect itself with the sun.  
Le Corbusier

**Block sun,  
Admit wind  
OR  
Block wind,  
Admit sun**

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### Basic Formats for Sun Charts

	<b>Elevation</b> (Mazria)
	<b>Plan</b> (Sun Angle Calculator)
	<b>Model with sun peg</b> (Insideout)
	<b>Solar envelope</b> (Knowles)
	<b>Three-Dimensional</b> (Solar Tool)

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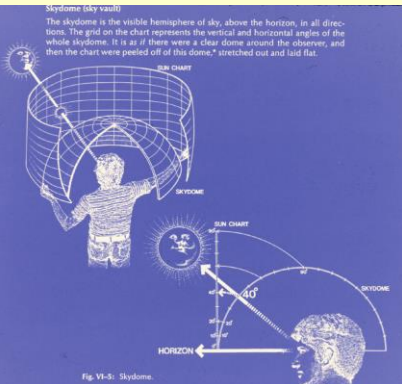
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### Elevation method



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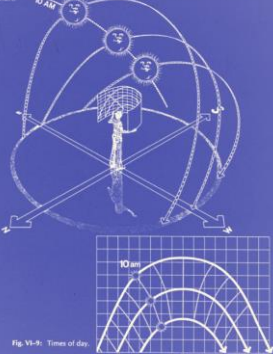
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### Times of Day

Finally, if we connect the times of day on each sun path we get a heavy dotted line which represents the hours of the day. This completes the cylindrical Sun Chart.



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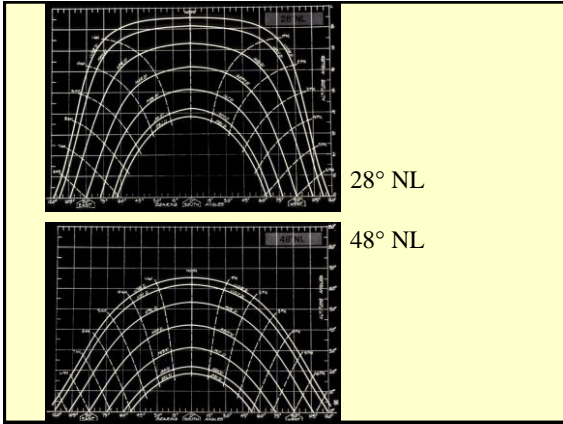
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Main use is to plot the horizon to determine the solar window

Fig. V8-16: Plotting tall permanent objects.

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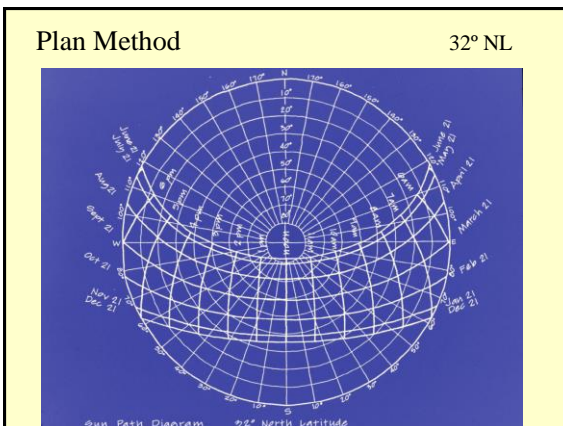
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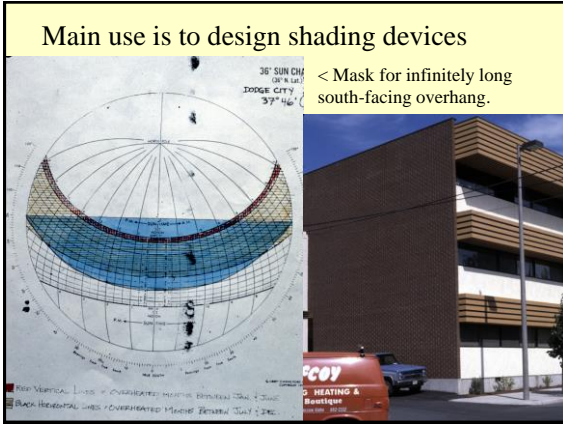
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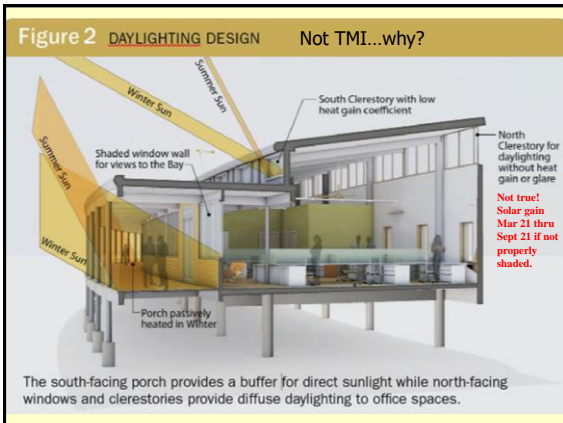
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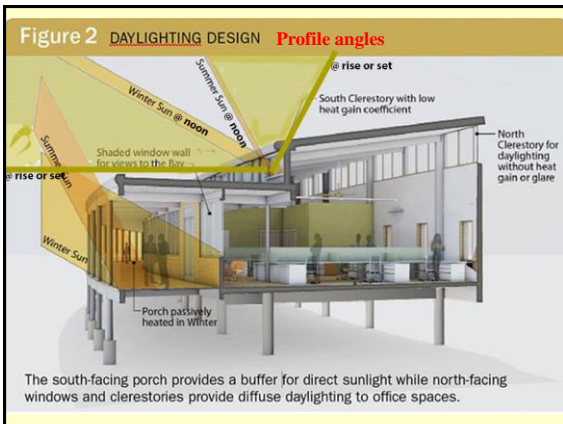
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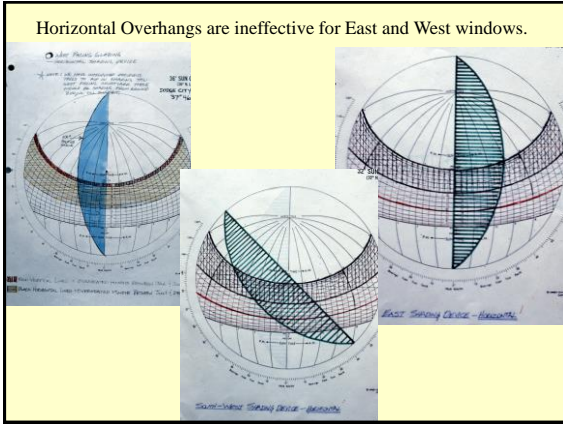
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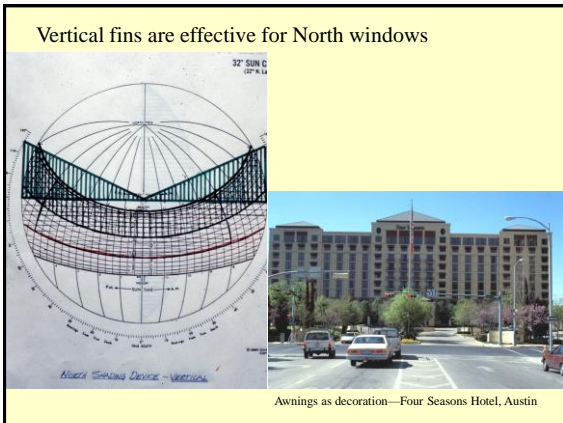
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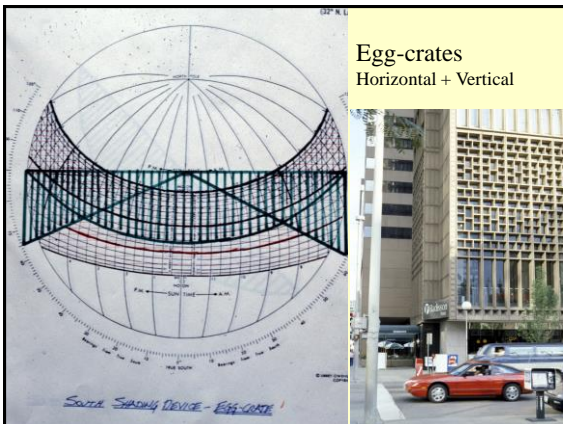
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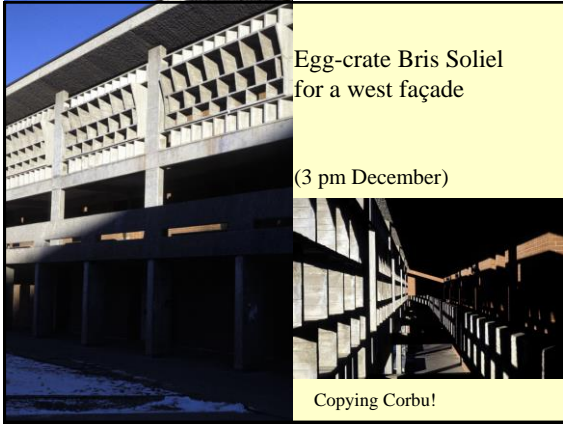
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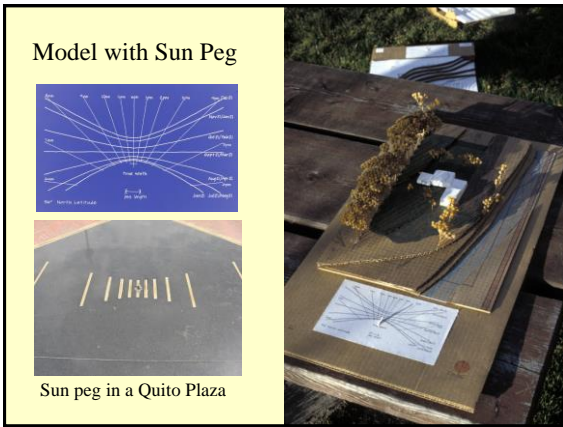
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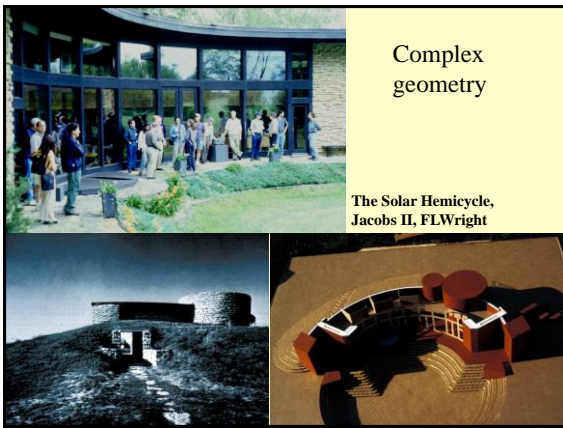
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**Pop Quiz for "Solar Professionals"**

Note that all questions refer to the northern hemisphere.

1. How many days per year do sunrays hit the north side of a building?
2. How many days each year does the sun rise due east and set due west?
3. How many days per year are there 12 hours of daylight and 12 hours of darkness?  
Is that true for all degrees of latitude? What are the exceptions?
4. How many degrees north of east does the sun rise on June 21?
5. What is the furthest north in degrees that the sun ever rises in the northern hemisphere? Where?

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6. How far south do you have to go so that the sun is directly overhead on June 21 at 12 noon?
7. Does the sun ever rise due south anywhere in the northern hemisphere?  
Where and when?
8. At the equator, is it more important to shade the south wall or the north wall?
14. What is the best shading system for north walls? (Circle answer)  
a) Vertical fins      b) Horizontal overhangs  
c) Combination of a & b
15. A window has an overhang that is as wide as the window and completely shades it on March 21 at noon. How long is the window completely shaded before being outflanked by the sun?

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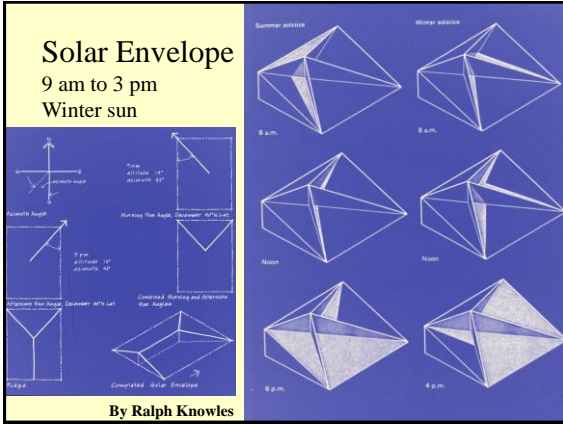
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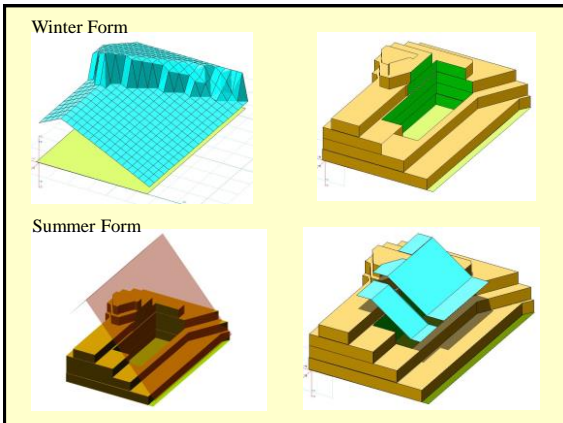
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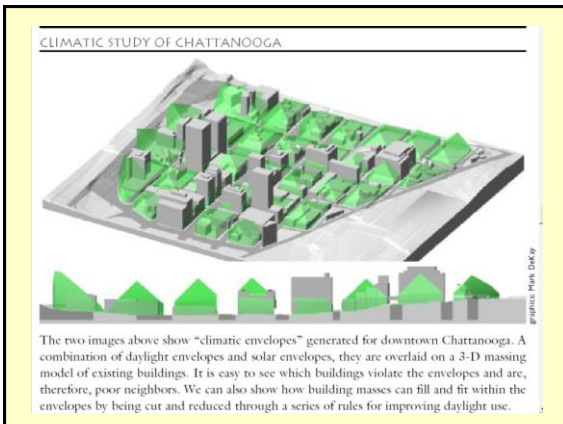
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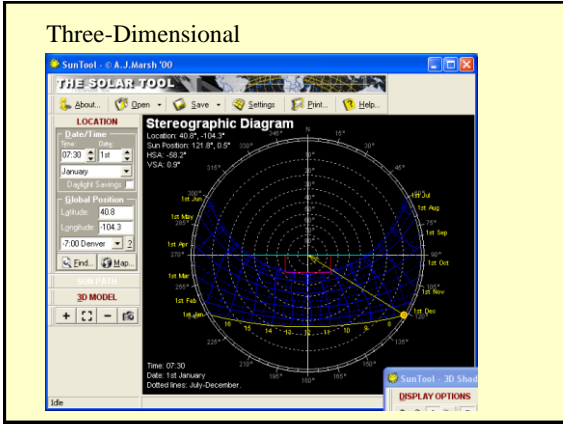
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### Three-Dimensional



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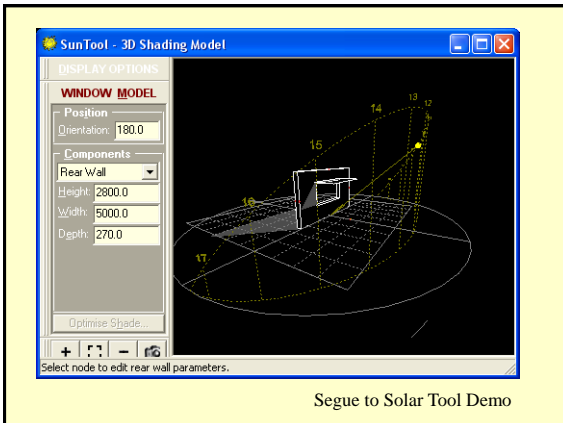
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Segue to Solar Tool Demo

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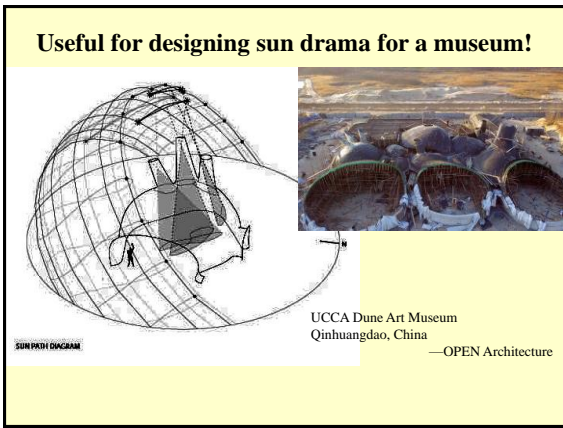
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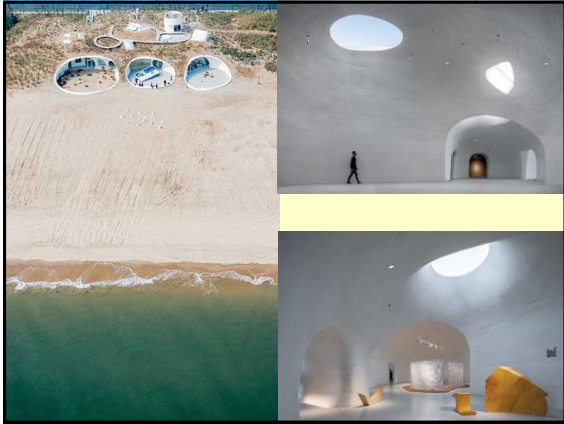
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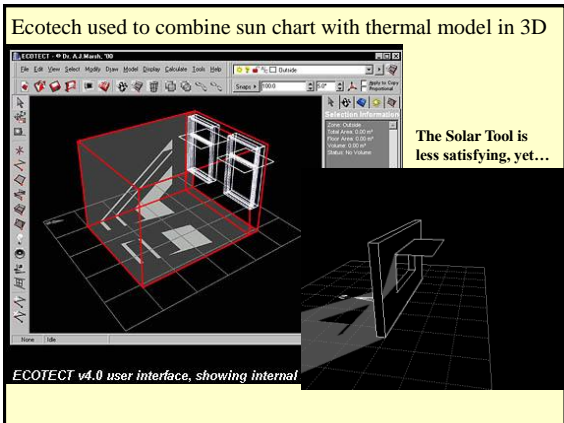
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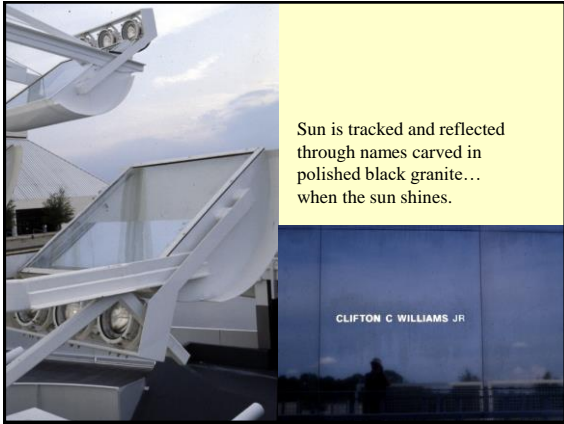
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