

Diyala University

Architecture Department

Architect and Environment

Ass. Teacher Firas Gh. Altamemi

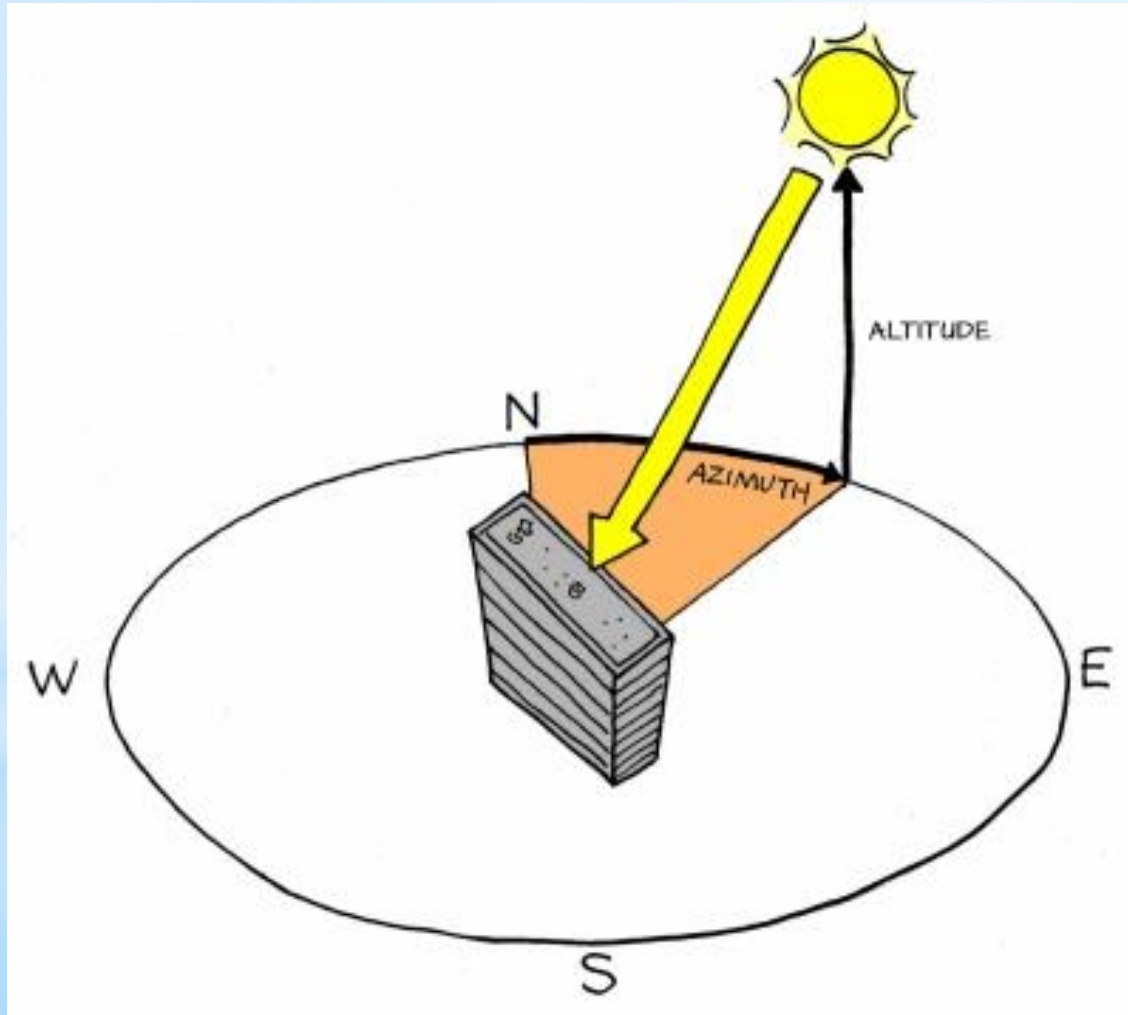
4th stage

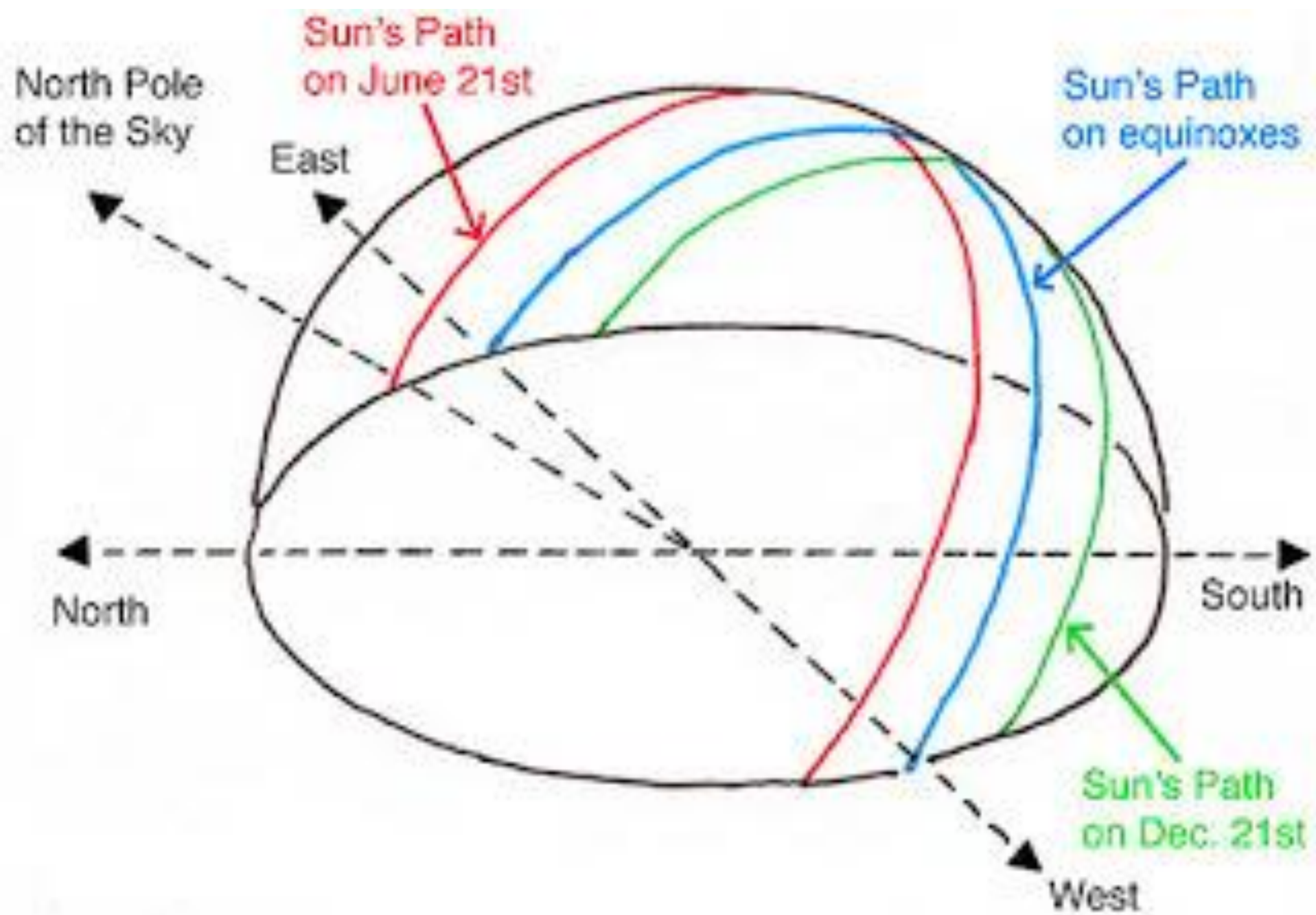
4th lecture.

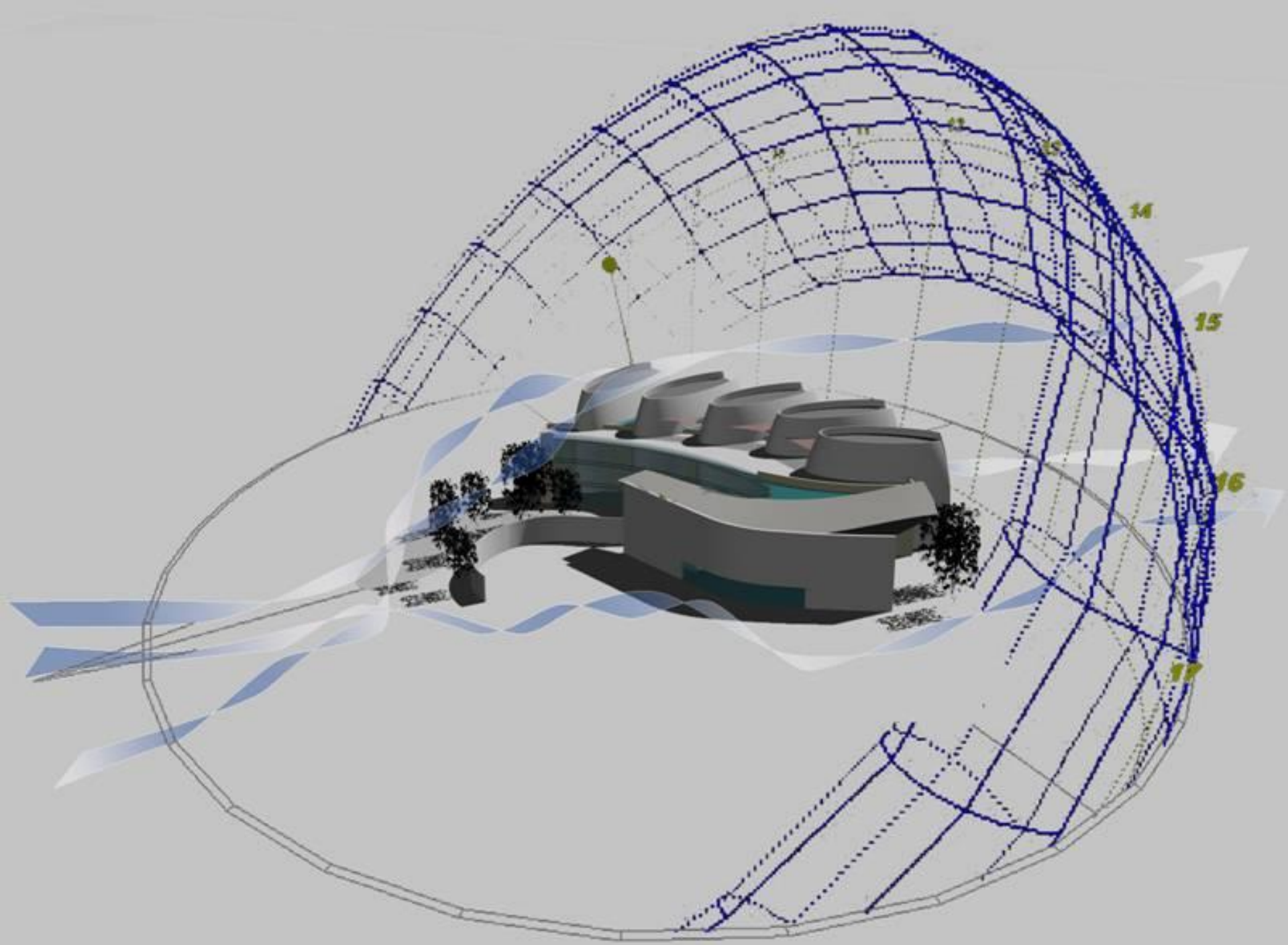
Orientating of building

Sun Path and Solar Position

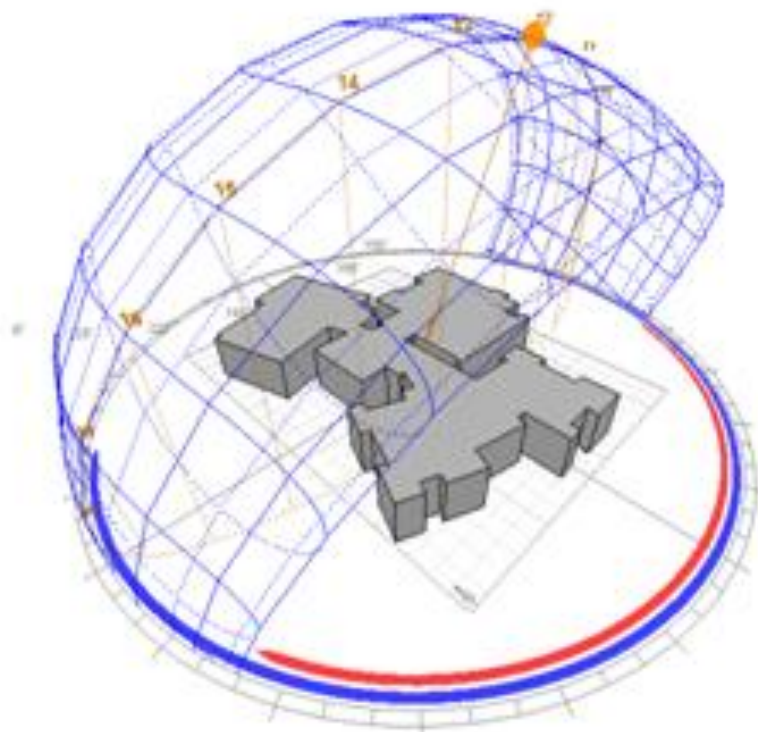
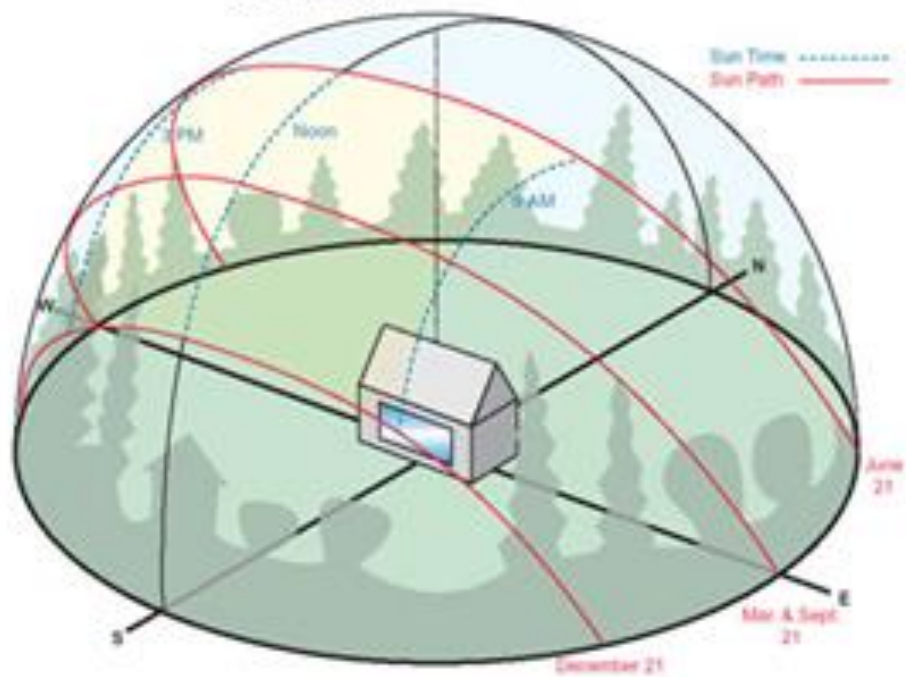
The first thing to understand is the sun's path at your location. At any given point on the sun's path, its height in the sky is called its *altitude* and its horizontal angle relative to true north called its *azimuth*.







Solar Window

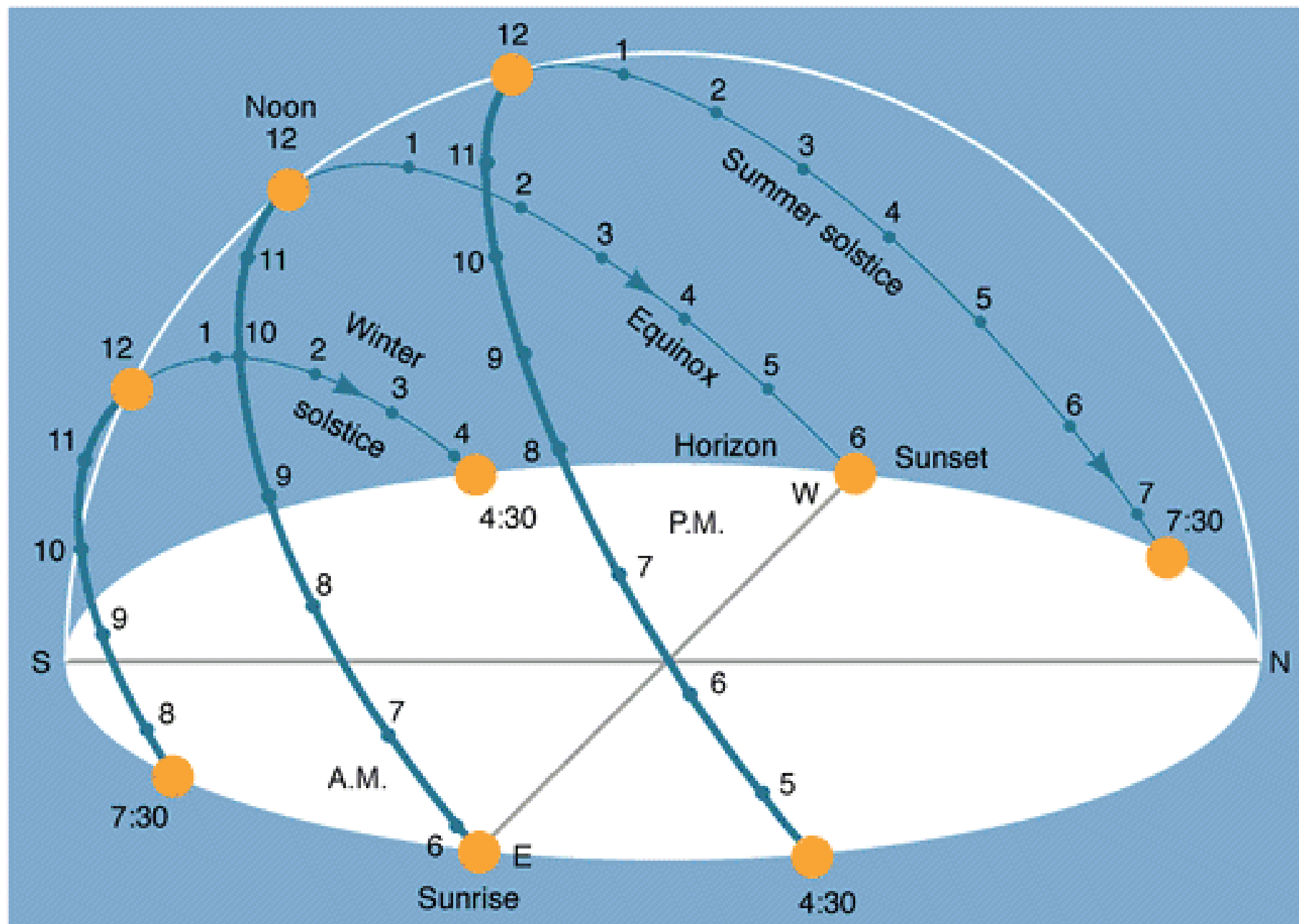


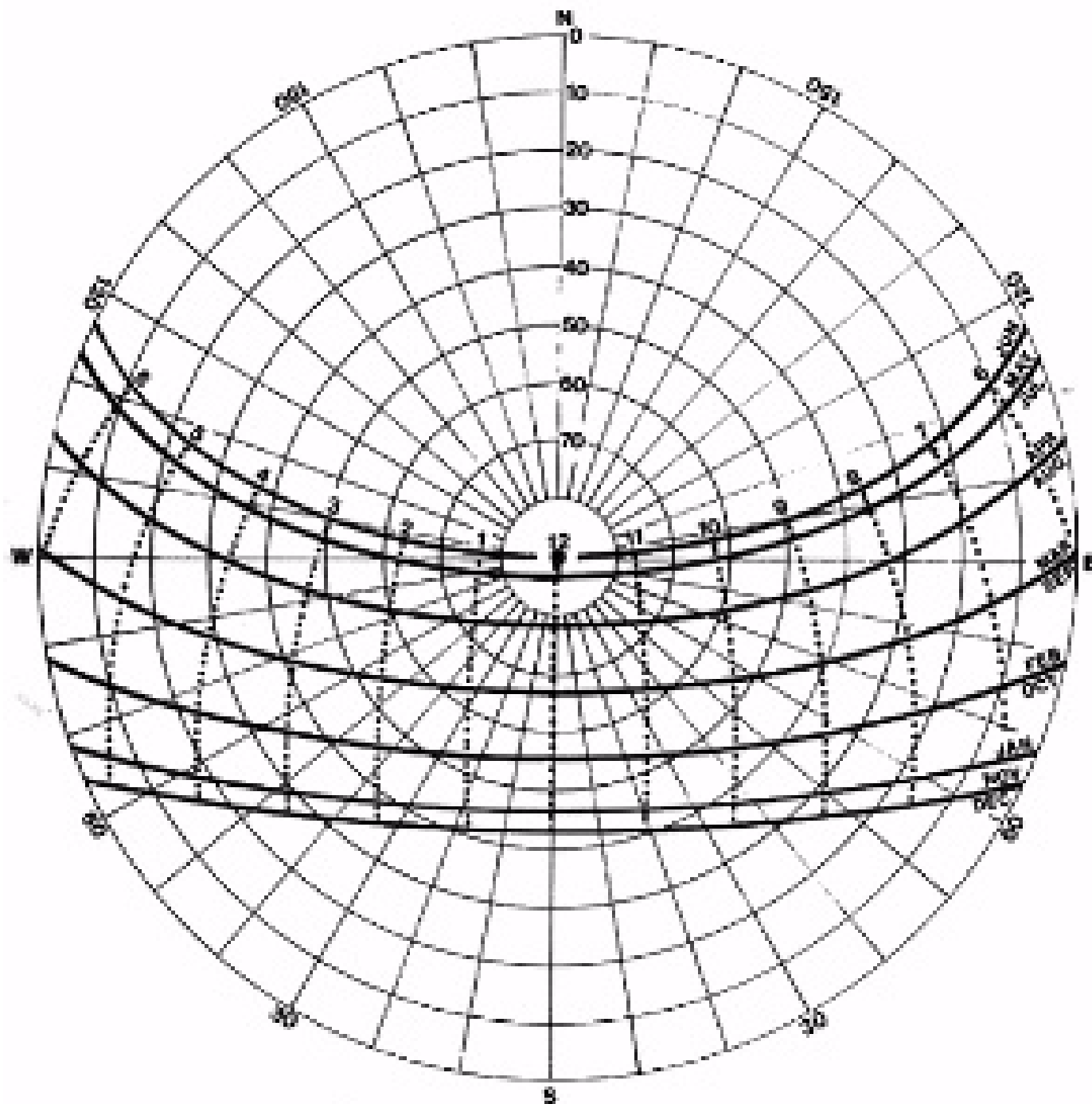
Orientating of building

Orientating the building shape in relation to sun angle, wind direction and its surrounding is an important consideration in improving energy performance.

It can determine the building's relationship between the interior and the exterior environment to a significant degree.

Different faces of buildings get very different amounts of heat radiation from the sun. It is an important design parameter to be considered by the architect.







10:00 AM

January 01
December 01
February 01
November 01

March 01

October 01

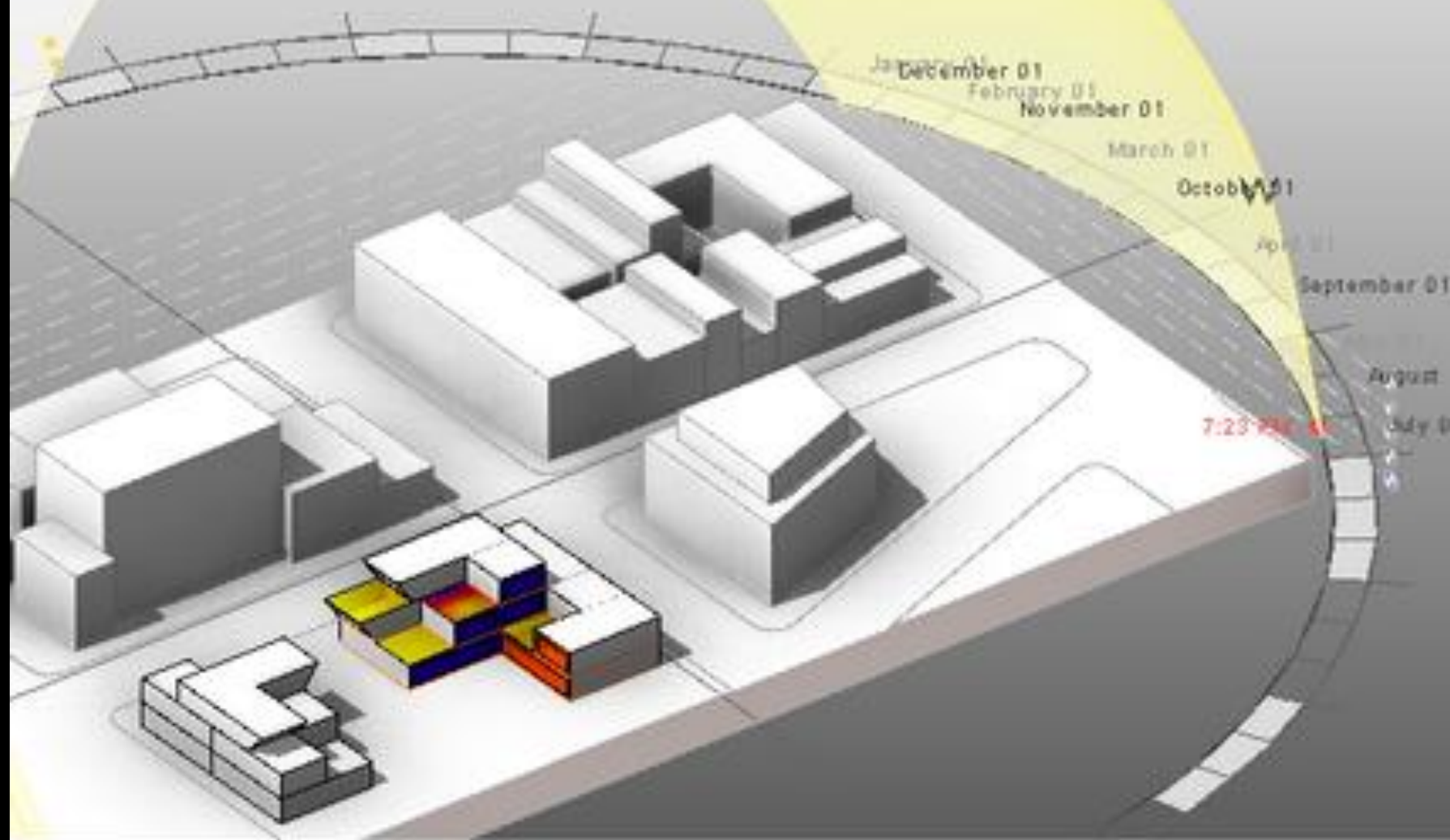
April 01

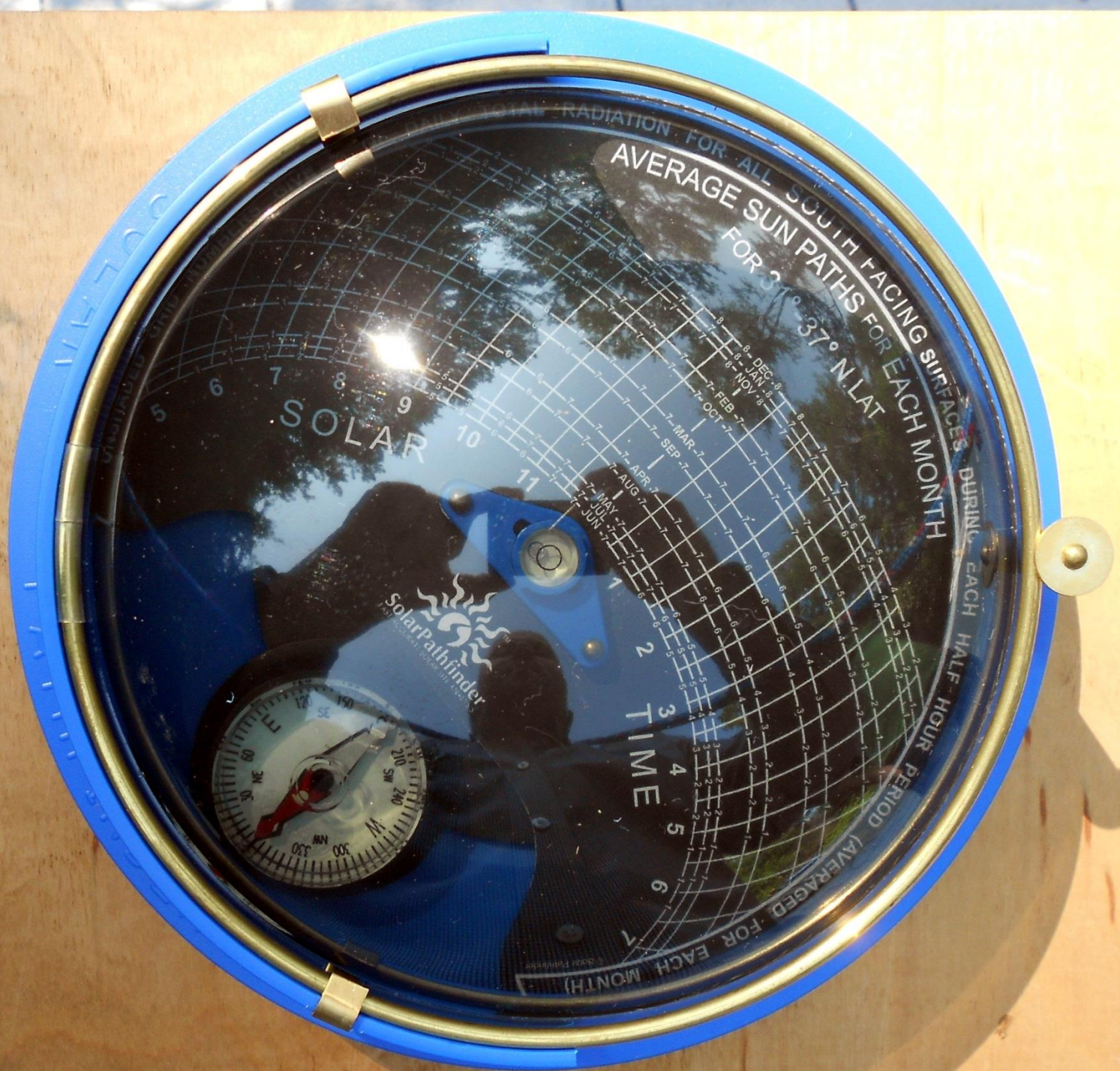
September 01

August

July 01

7:23 PM





AVERAGE SUN PATHS FOR EACH MONTH
FOR 37°-37° N.LAT

SOLAR

TIME

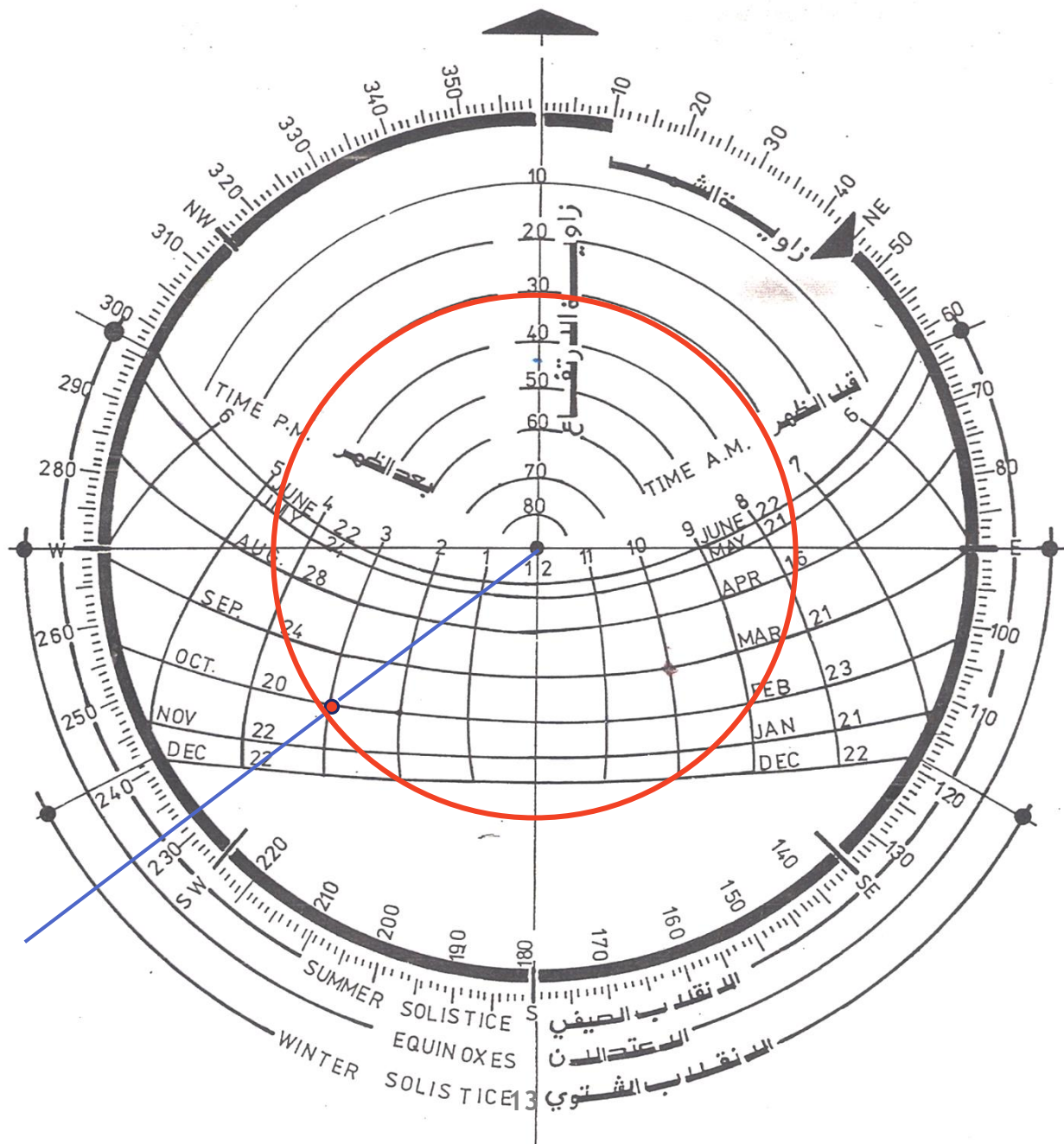
SolarPathfinder
NATIONAL POLAR PATHFINDER



Reading the Sun Position

The position of the Sun in the sky at any time of the day on any day of the year can be read directly from the solar chart.

First you need to locate the required hour line on the diagram. Then locate the required date line.

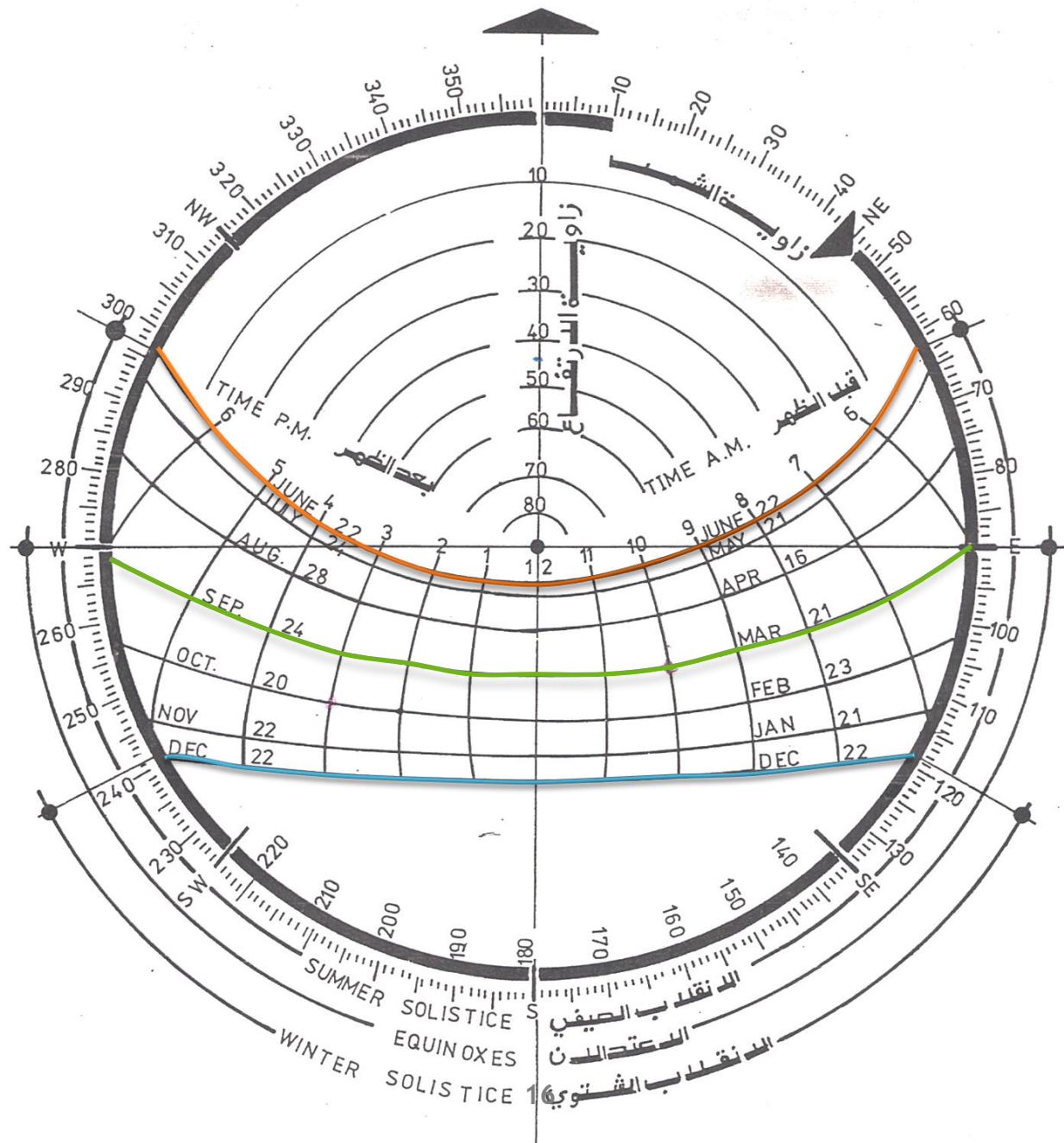


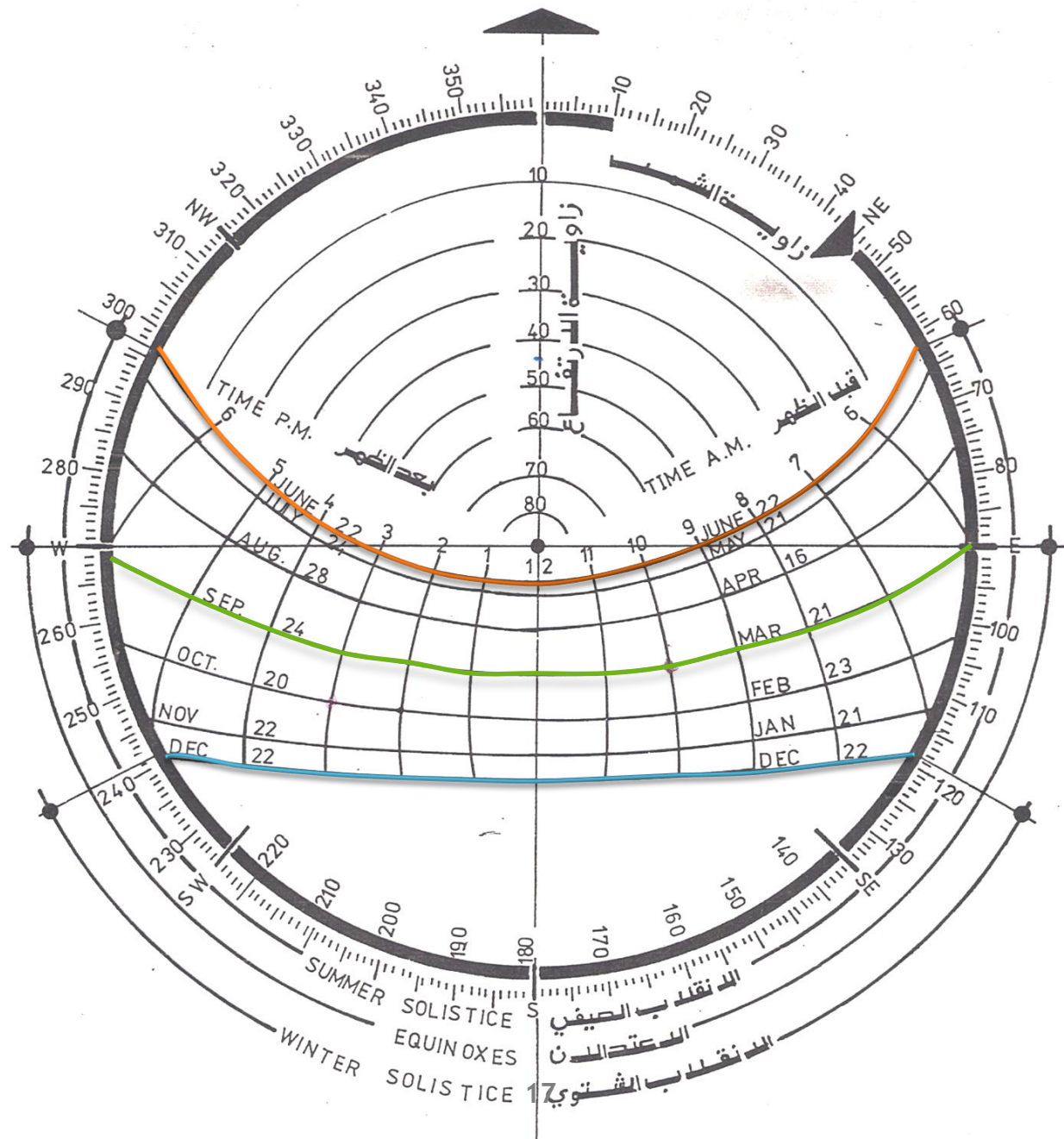
The position of the sun is expressed in terms of altitude and azimuth angles.

- The **altitude angle** is the angle of the sun above the horizon, achieving its maximum on a given day at solar noon.
- The **azimuth angle** is the angle of the sun's projection onto the ground plane relative to north.

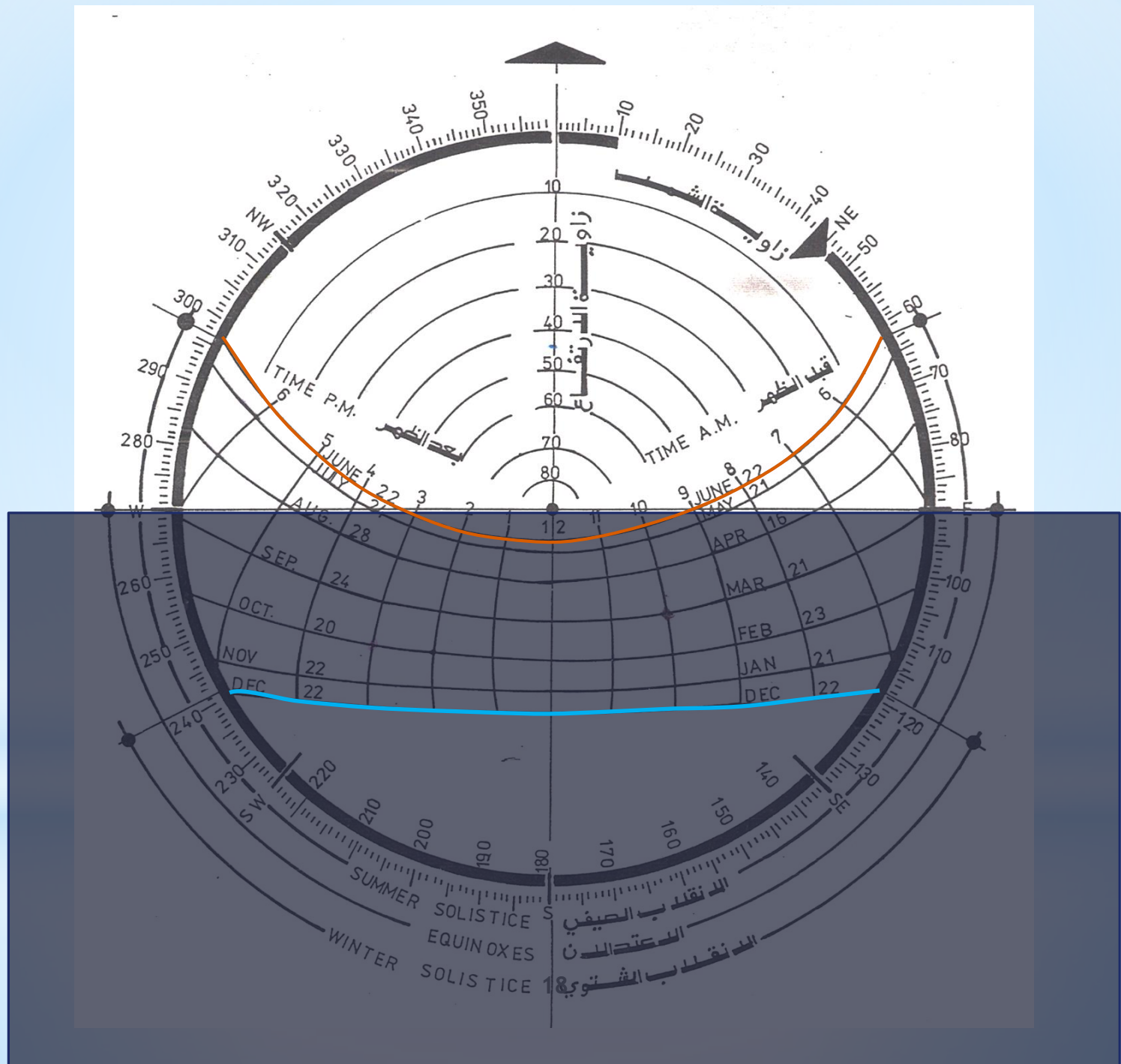
The sun will always cast a shadow on any object.

To properly design shading devices it is necessary to understand the position of the sun in the sky during the cooling and heating seasons.

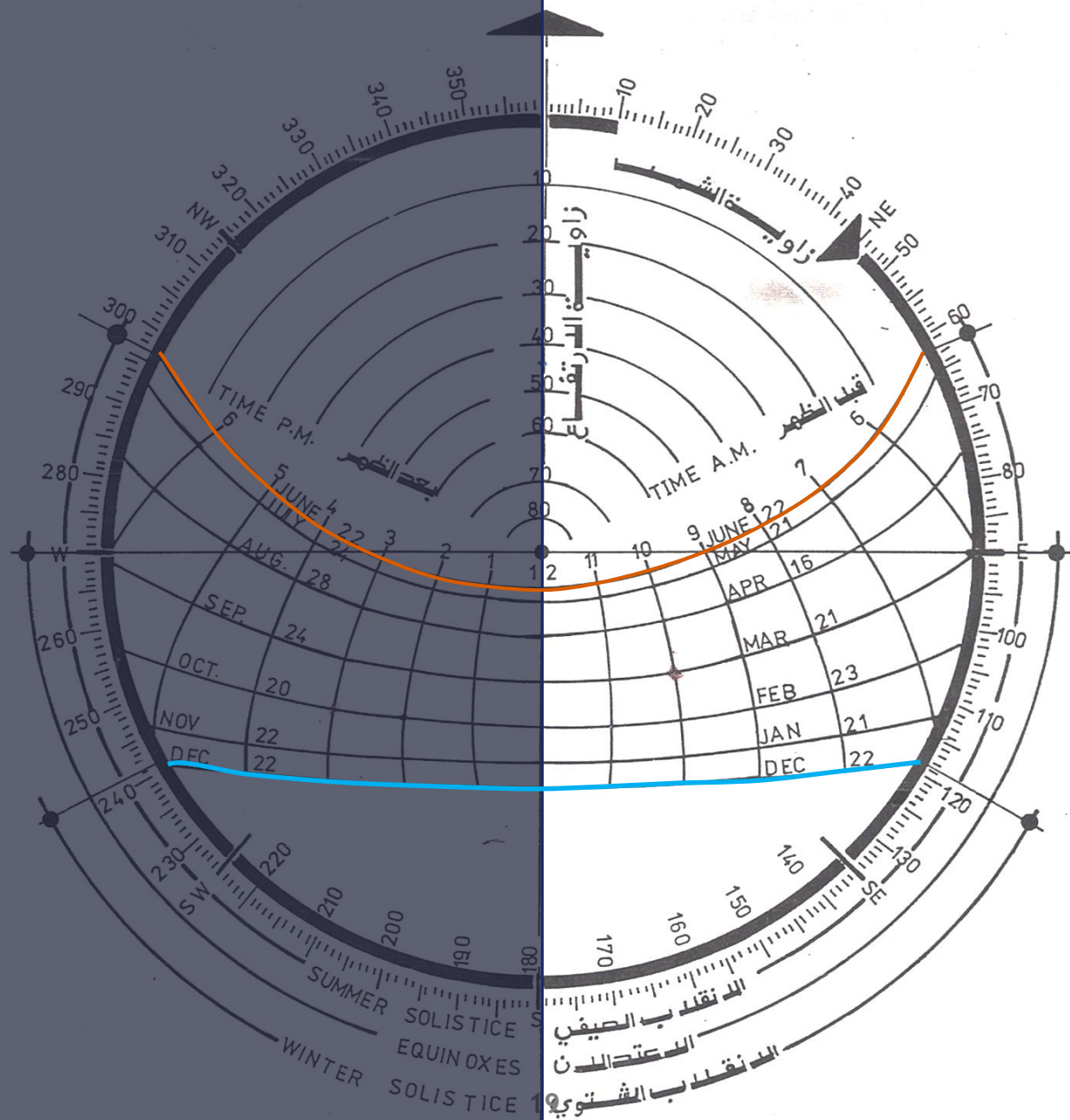




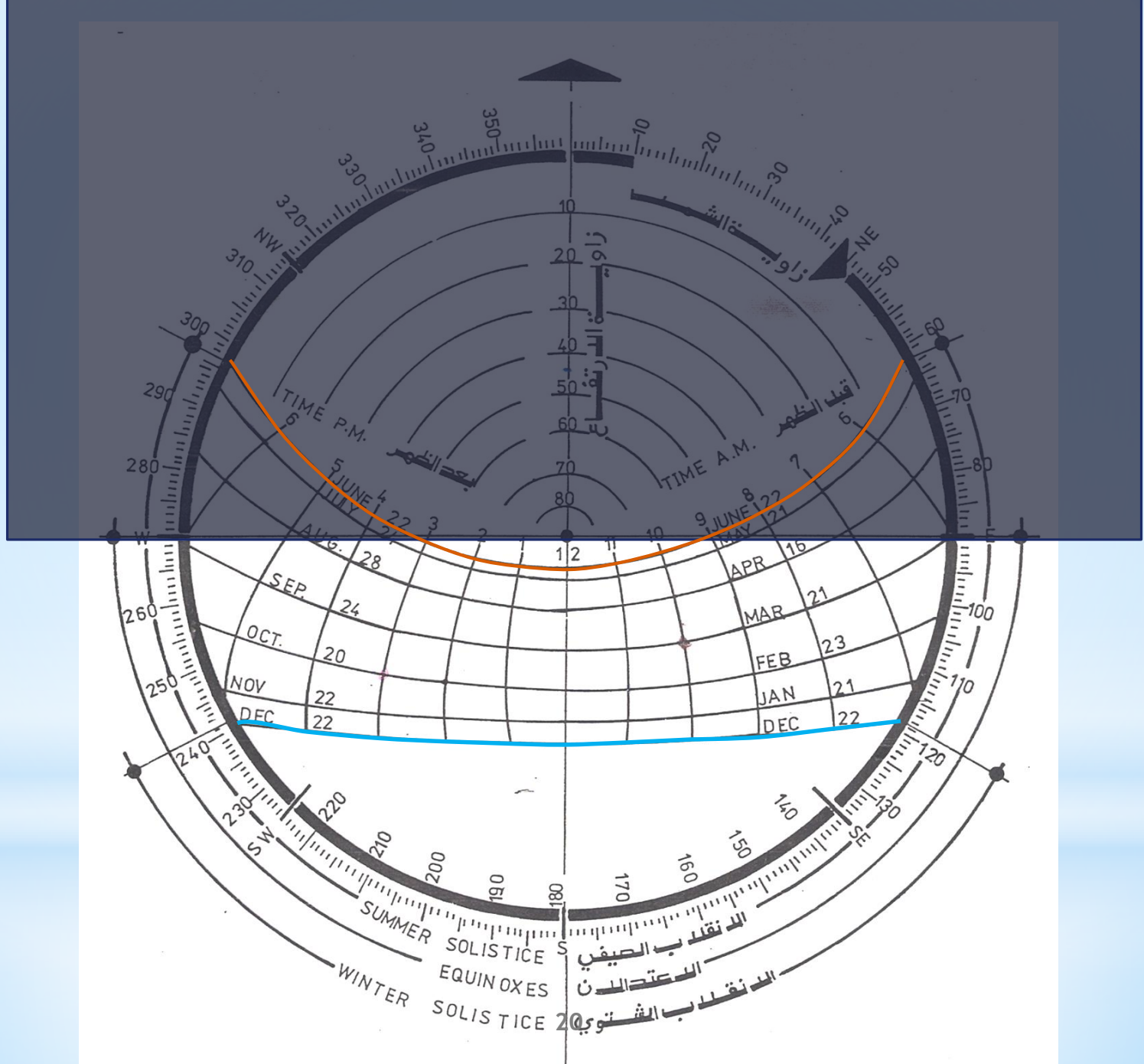
North



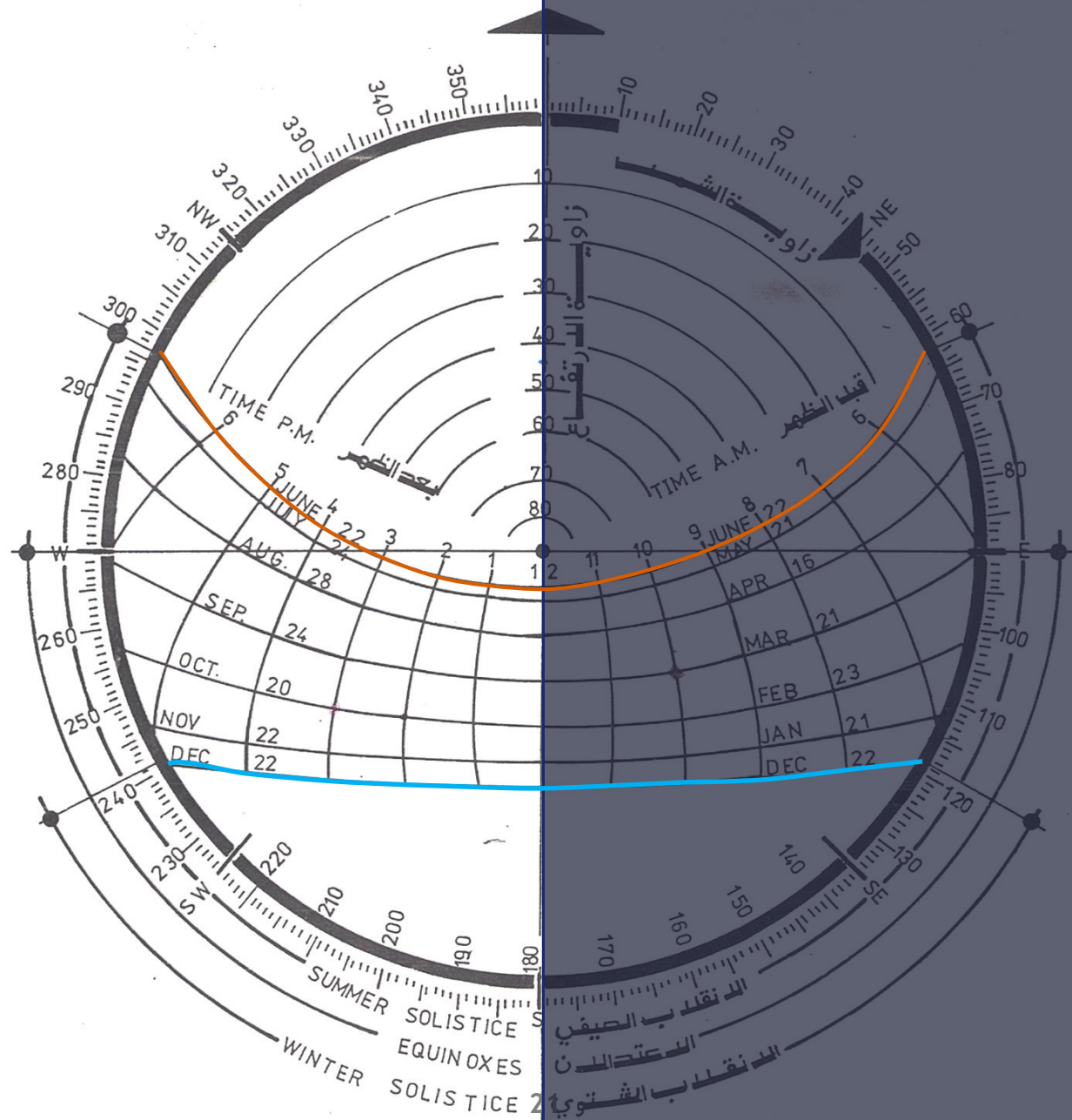
East



South



West

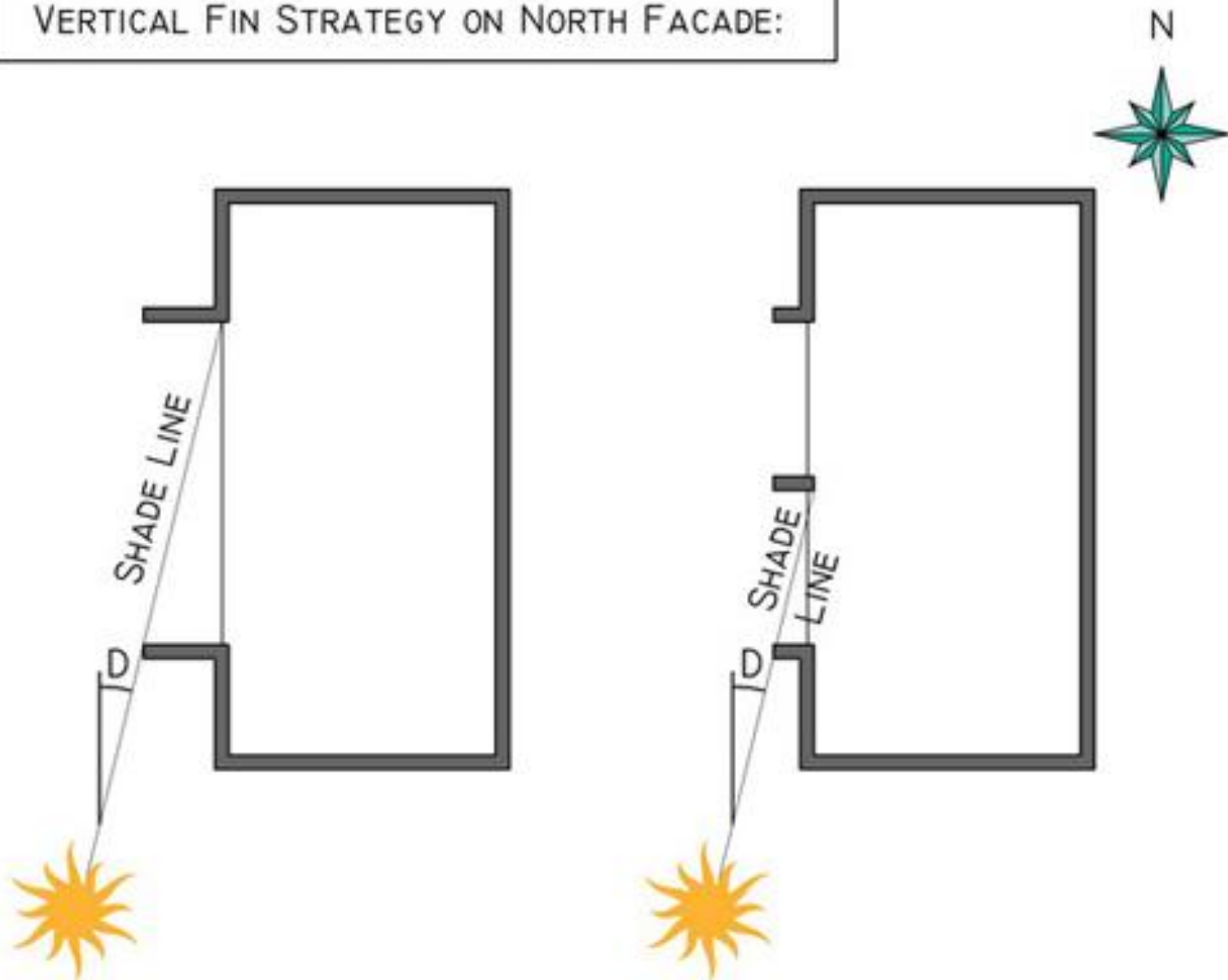


Northern Facade

This facade is least exposed to the sun. In fact, exposure occurs only in the early and late hours of summer days when the angle of altitude is low.

It might be necessary to provide vertical shading on the north side to protect glass from sun penetration.

VERTICAL FIN STRATEGY ON NORTH FACADE:



THE "SHADE LINE" AT ANGLE "D" DETERMINES FIN SPACING & DEPTH.

Southern Facade

An advantage of southern exposure in the Tropics and Subtropics is that the sun is high over the horizon in summer and can be shaded using a relatively small overhang.

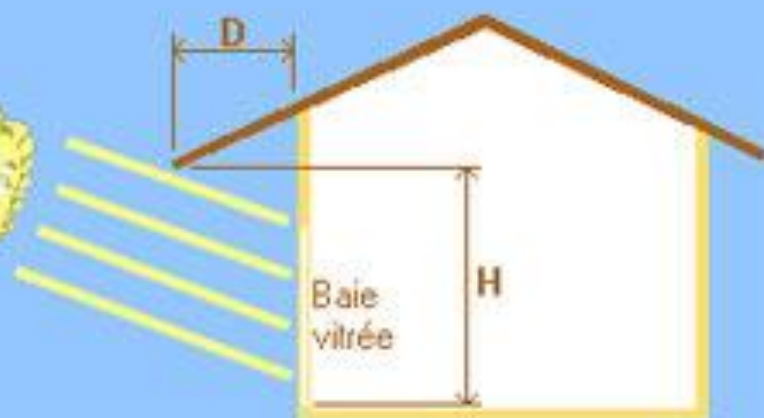
In winter it is low, allowing the sunshine to penetrate when it is most desirable.

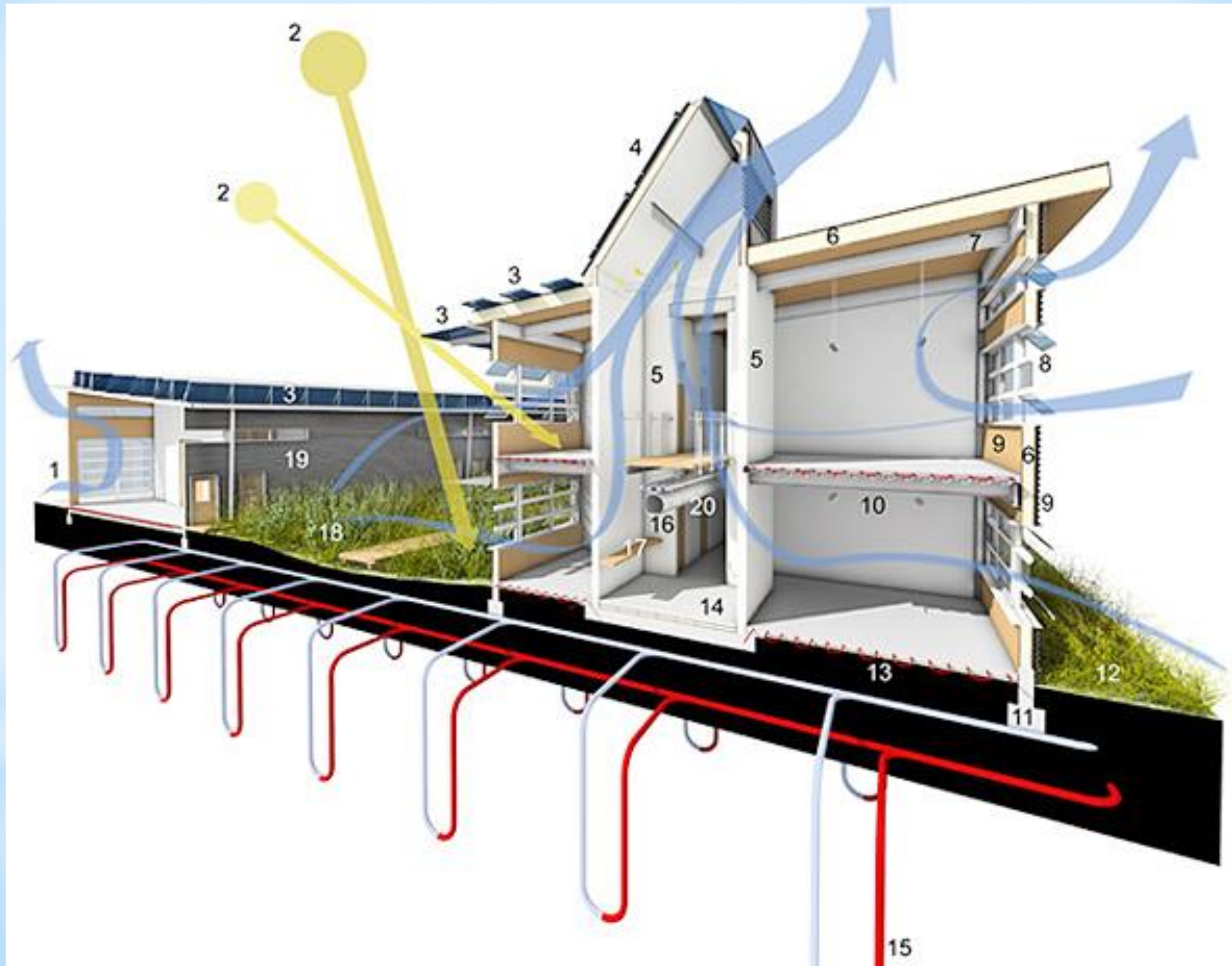


1 - Summer



2 - Winter



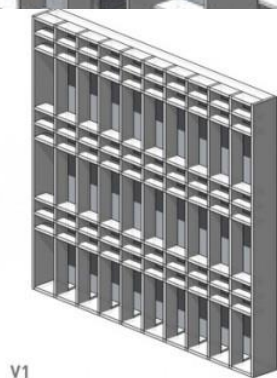
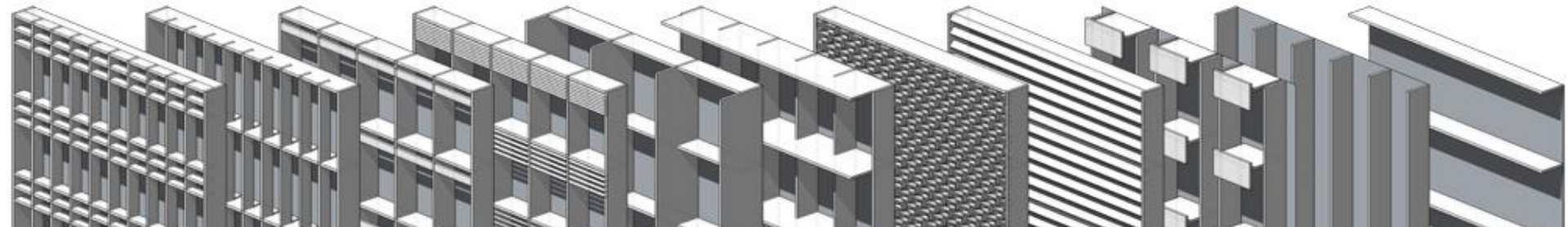


Eastern and Western Facades

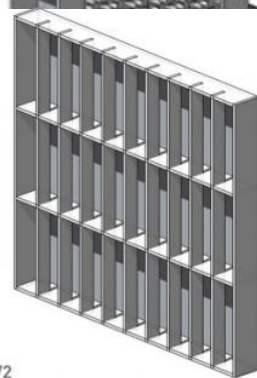
The east and west sides, the more difficult sides to shade due to the lower angle of the sun in the morning and afternoon. The east and west sides can be protected from the sun with vegetation or

Screen walls, Vertical fins and Eggcrate elements

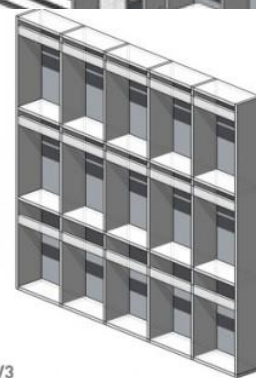
The eastern facade is exposed to the sun's rays from sunrise to noon. The walls cool down considerably by evening, making this exposure more suitable for bedrooms than the western exposure.



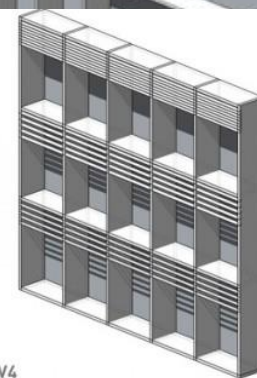
V1



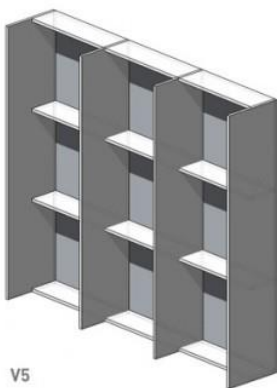
V2



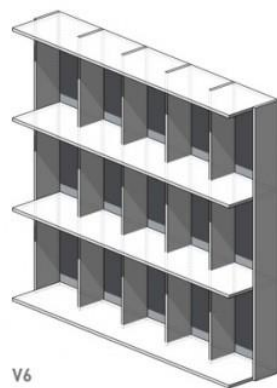
V3



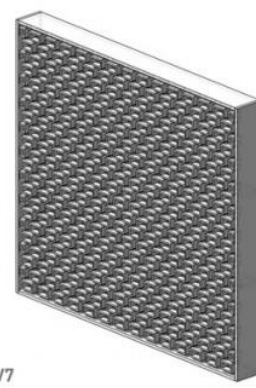
V4



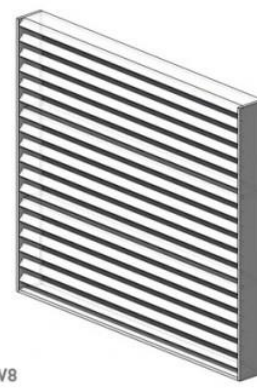
V5



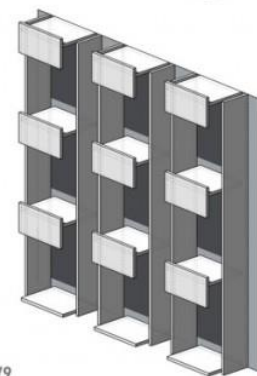
V6



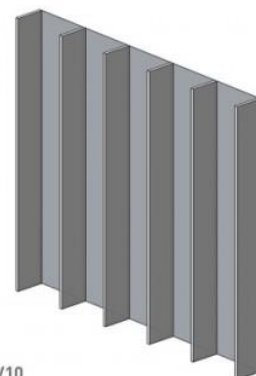
V7



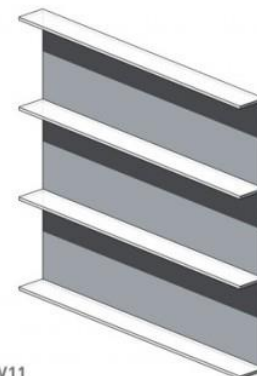
V8



V9



V10



V11



EAST-WEST

BLINDS & SHUTTERS

CLICK HERE
FOR SPECIALS!!



YouTube



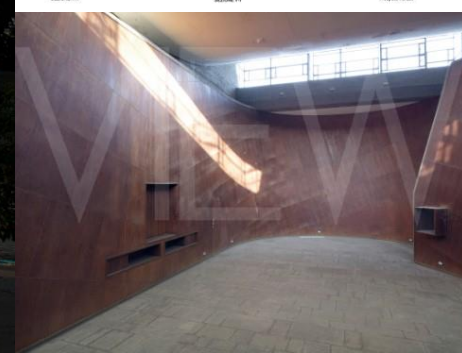
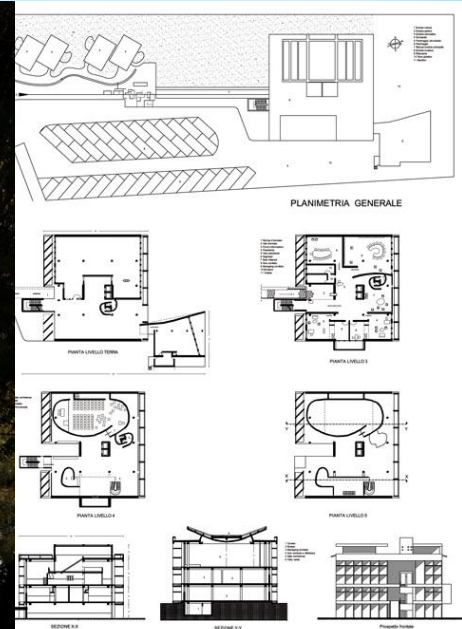
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Millowners Association Building, Ahmedabad, India (1954)

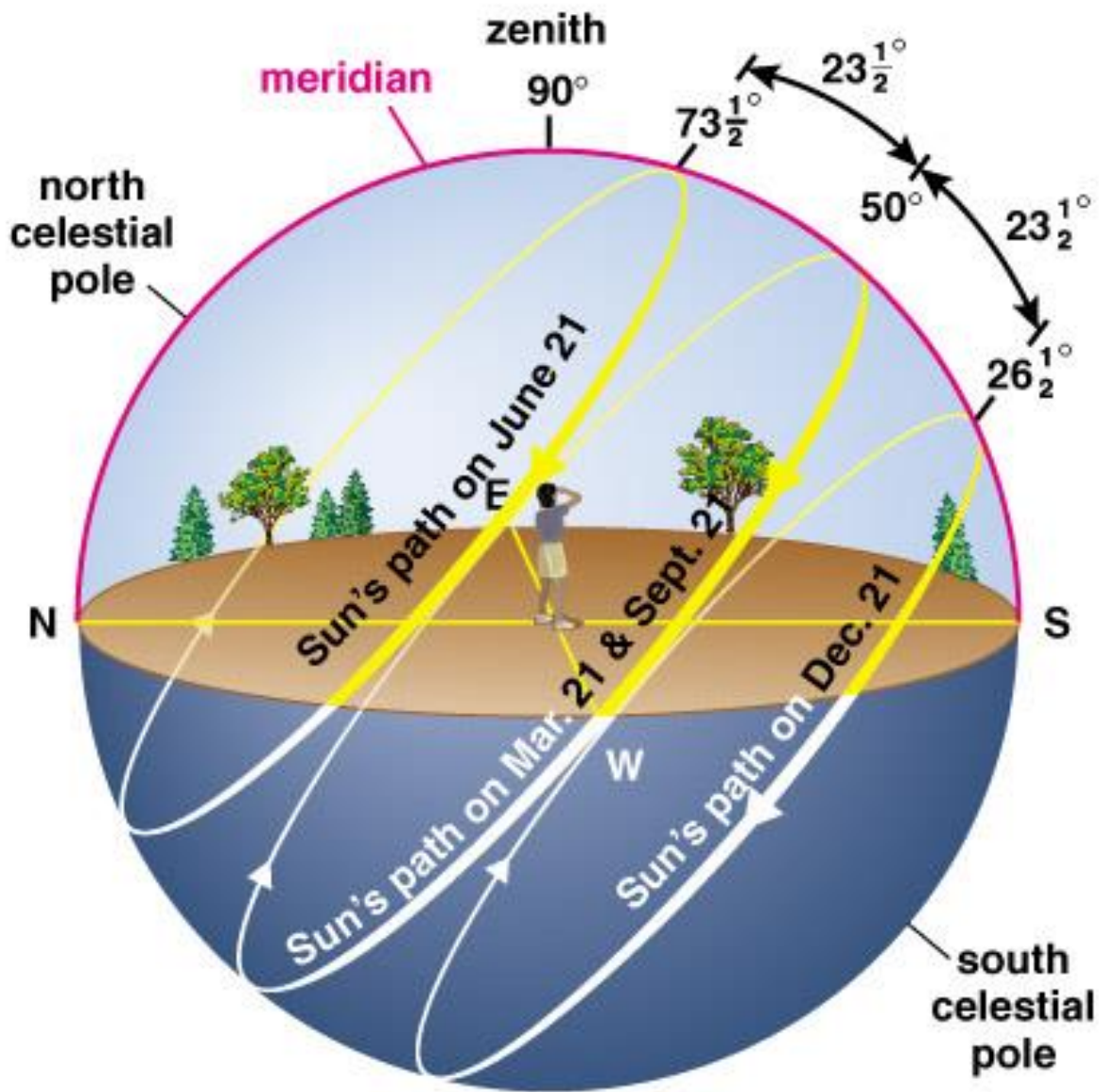
Walls of brise-soleils on the east & west facades to shade interior. Hall is indirectly lit by reflections from curved ceiling, which is kept cool by two gardens & a water reservoir on roof.



Heliodon

Heliodons are design and educational tools for sun move analysis with physical models.

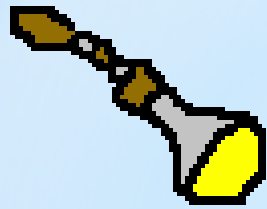




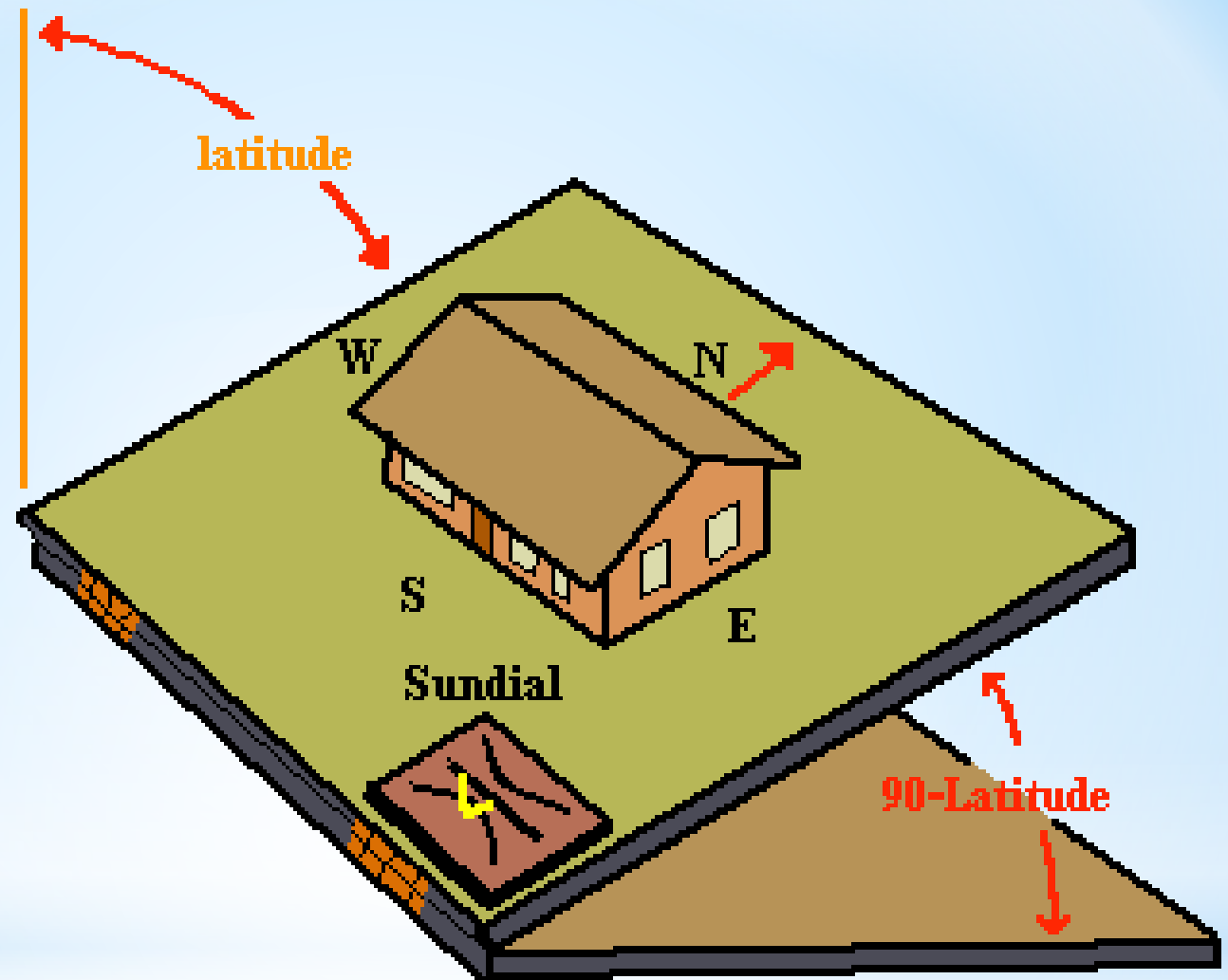
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move light
for month



pivot for time of day



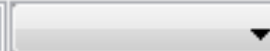






Date:

April 01



Time:

15:30



Latitude:

0

