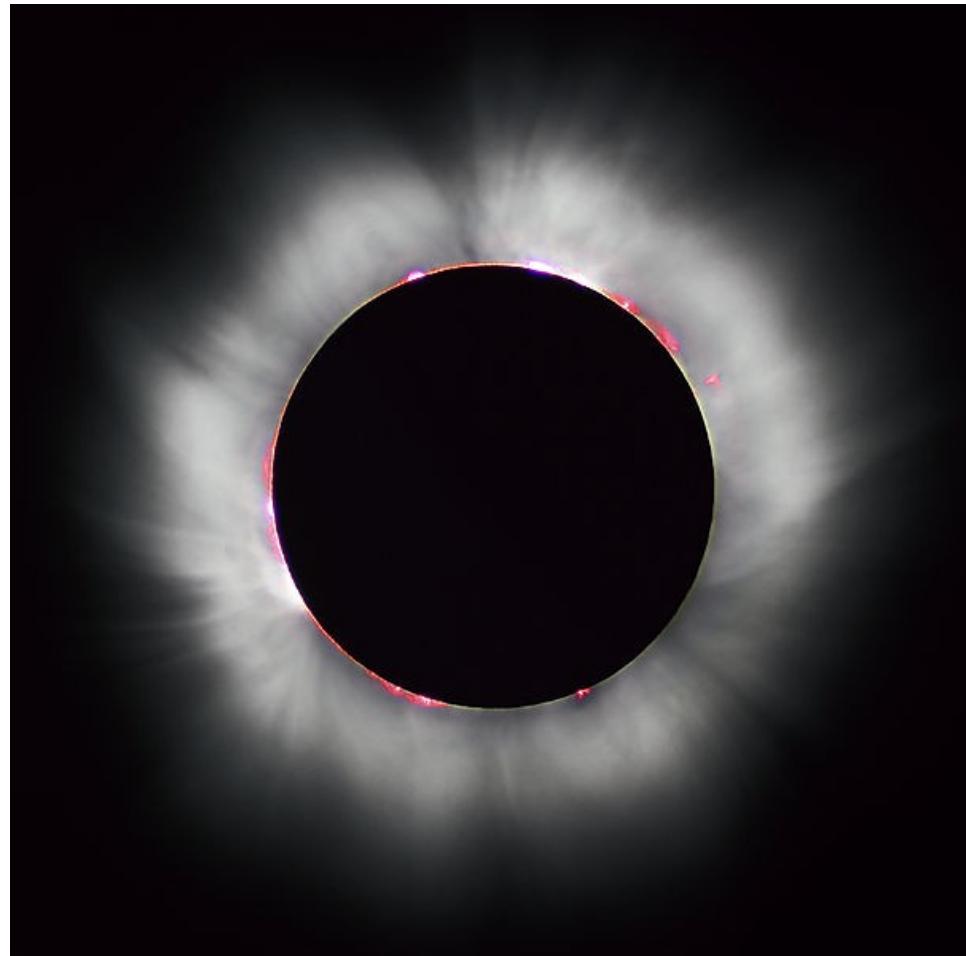
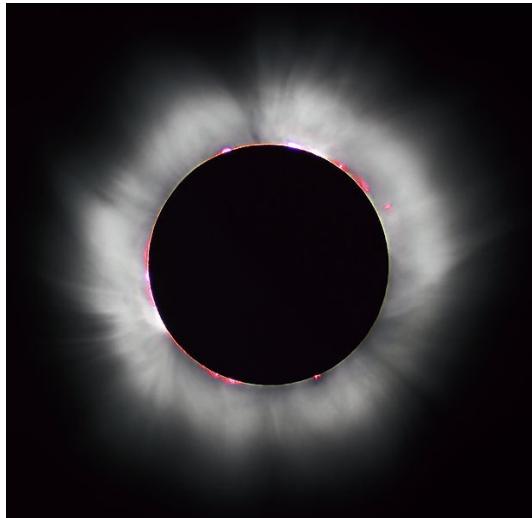


Recent and upcoming Solar Eclipses.



(Total solar eclipse of August 1999)

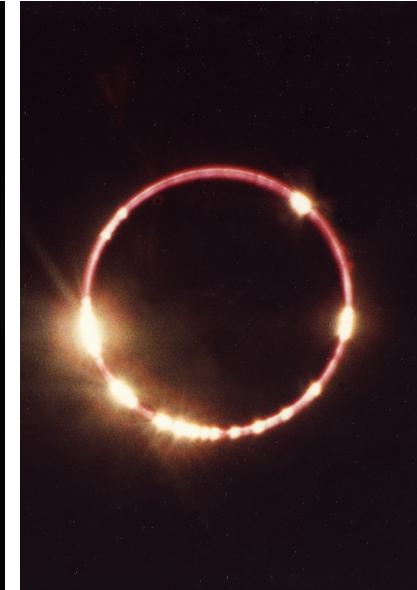
Cool eclipse phenomena



See ... the Sun's corona!



See ... the chromosphere and
“Baily’s Beads”



See ... the “Diamond Ring” effect!

Cool eclipse phenomena II

See the planets and stars come out!



Meanwhile, back on Earth ...

See animals act funny!

Chickens

See people act funny!

Feel the temperature drop!

See funny crescent-shaped shadows under trees!

See *shadow bands* just before and after totality!

Shadow band video.

The Aug 21, 2017 “Great American Eclipse”

Population access and estimated visitation on eclipse day

On August 21, 2017, a total solar eclipse crosses the United States from Oregon to South Carolina. The closest destinations for the contiguous United States are summarized, as well as high and low estimates for how many people will travel to the path of totality. The methodology for our estimates is summarized at www.GreatAmericanEclipse.com/Statistics.

12.25 million people live inside the path of totality. We estimate that **between 1.85 million people and 7.4 million** will visit the path of totality on eclipse day.

First total solar eclipse in US since July, 1991 (Hawaii).

First in contiguous US since 1979.

First to cross US from coast to coast since 1918.

Half of US population within 400 miles of path of totality.

The lines show the quickest drive path from population centers to the path of totality. Drive lines to destinations are color coded by state of destination. The blue circles inside the path of totality are the destinations.



Map and analysis by Michael Zeiler; May 2017

From greatamerican'eclipse.com

Predicting Eclipses

Eclipses happen during eclipse seasons which are ...

34.5 days in duration (on average)

5.7 months apart

($2 \times 5.7 = 11.4$ months in a Draconic year)

Every 18 yrs 11.33 days an eclipse will happen with the Moon in the same phase, node, and part of its orbit with respect to its perigee. This period of time is a saros.

Every 54 yrs 34 days, an eclipse will repeat on about the same place(s) on Earth.

Predicting Eclipses

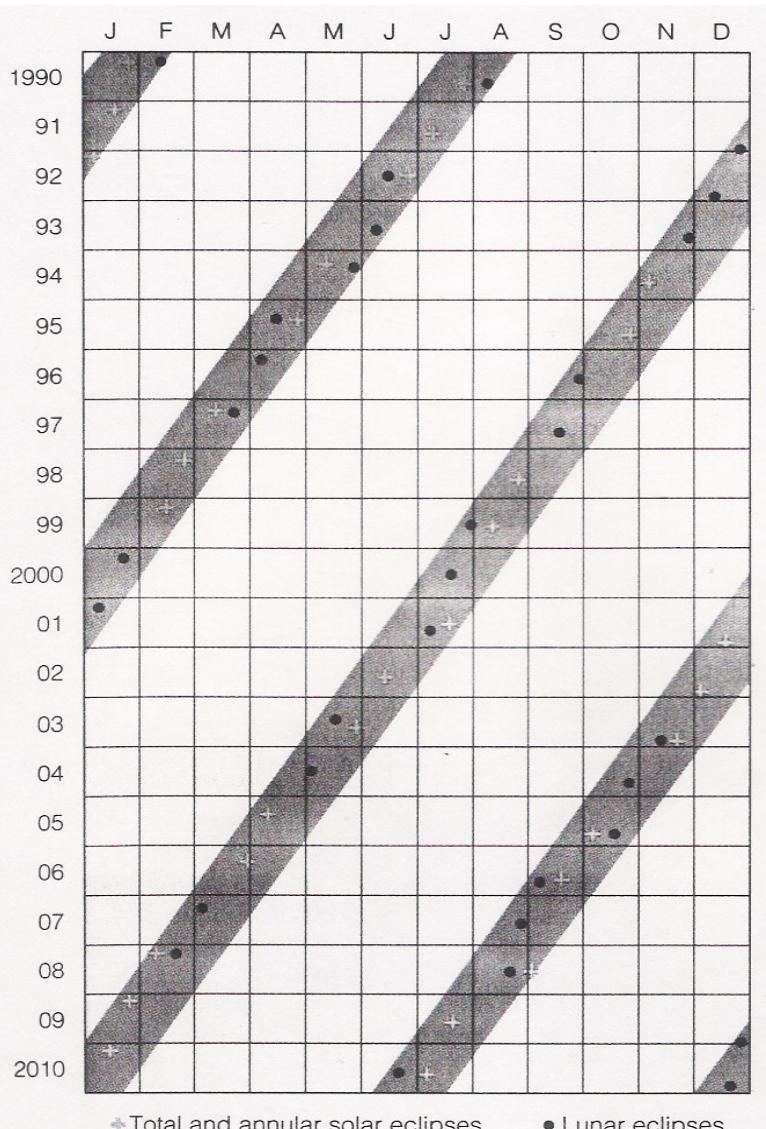


FIGURE 3 - 24

A calendar of eclipse seasons. Each year, the eclipse seasons begin about 19 days earlier. Any new moon or full moon that occurs during an eclipse season results in an eclipse. Not all eclipses are shown here.

Eclipse Seasons.

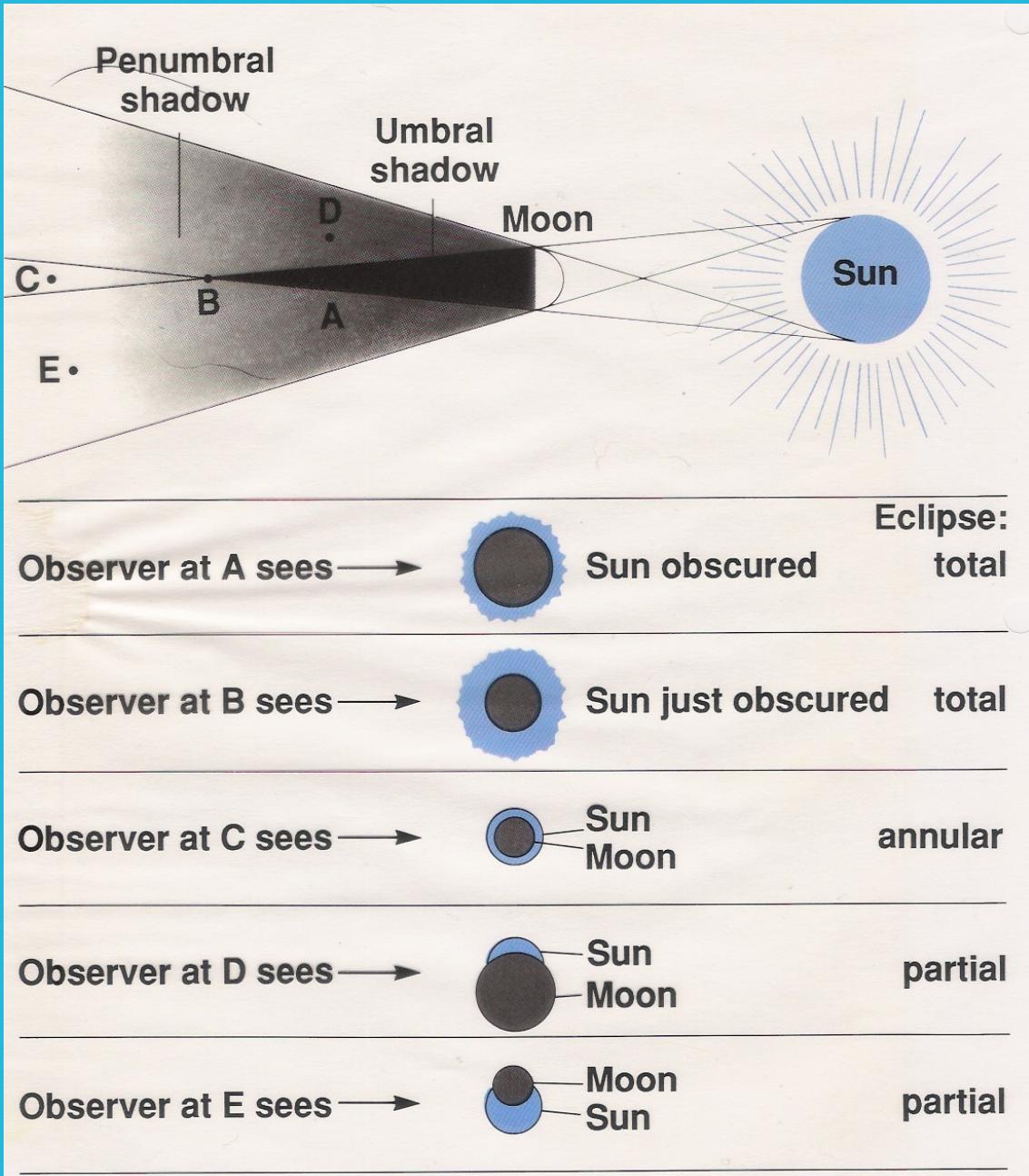
There are a minimum of 4, and a maximum of 7 eclipses per year (all types included).

There is a minimum of 2, and a maximum of 5 solar eclipses per year. (Same for lunar.)
A lunar and solar eclipse are often 2 weeks apart.

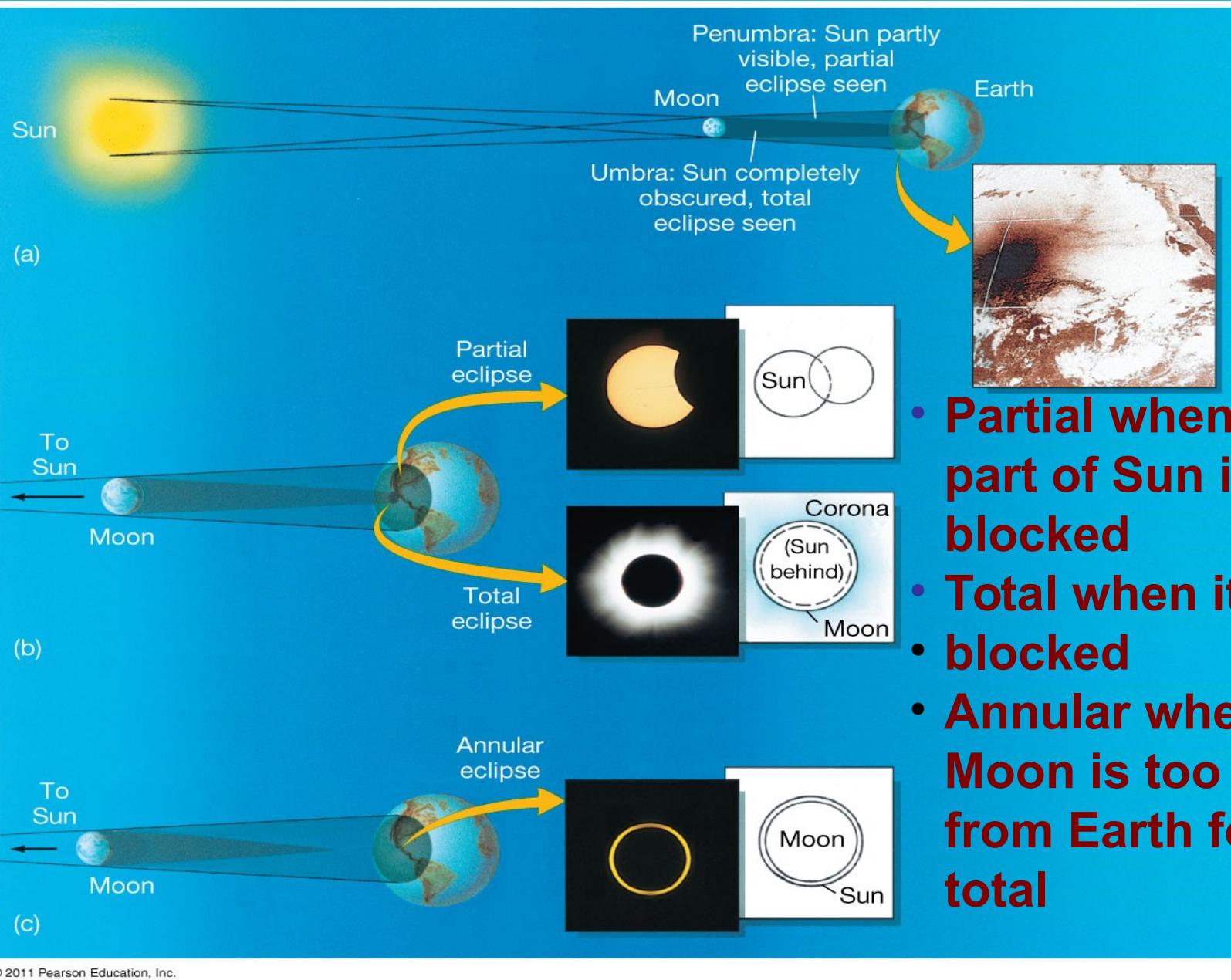
Ohio's next solar eclipses:
Aug 21, 2017 – Total Solar
June 10, 2021 – Annular Solar
Apr 8, 2024 – Total Solar

Solar eclipses - Moon is between Earth and Sun

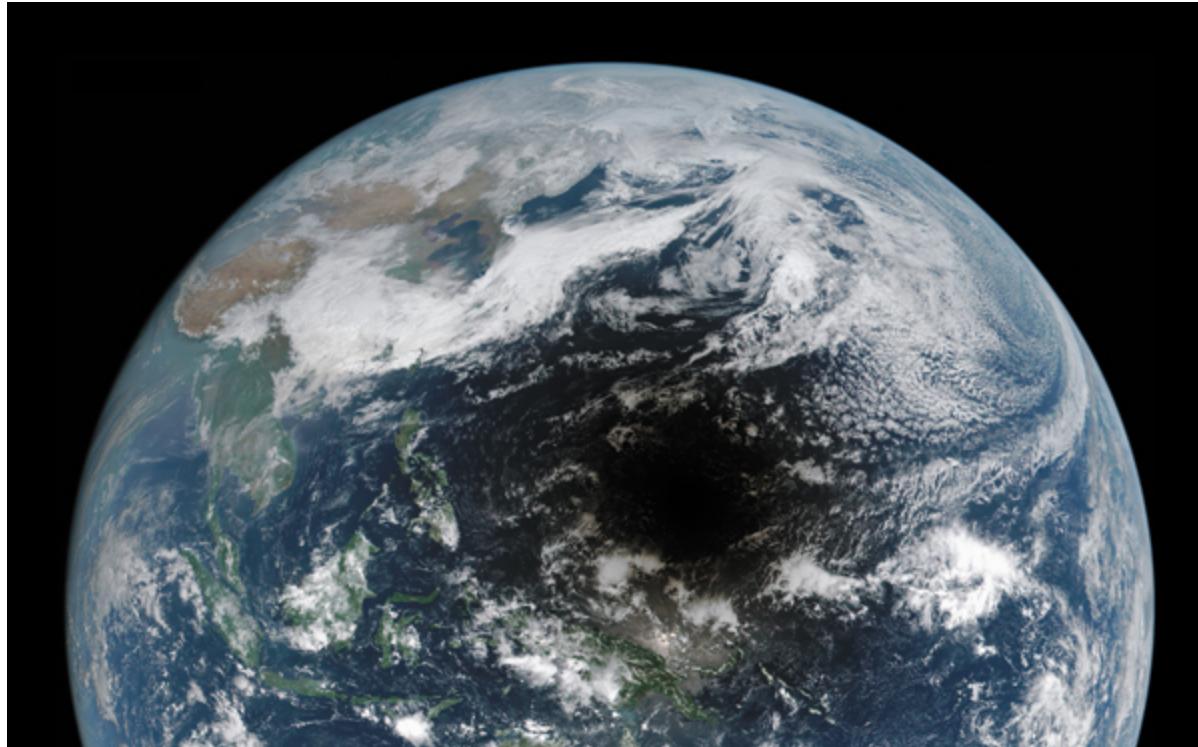
A-E = possible positions of the Earth



Solar eclipses - Moon is between Earth and Sun

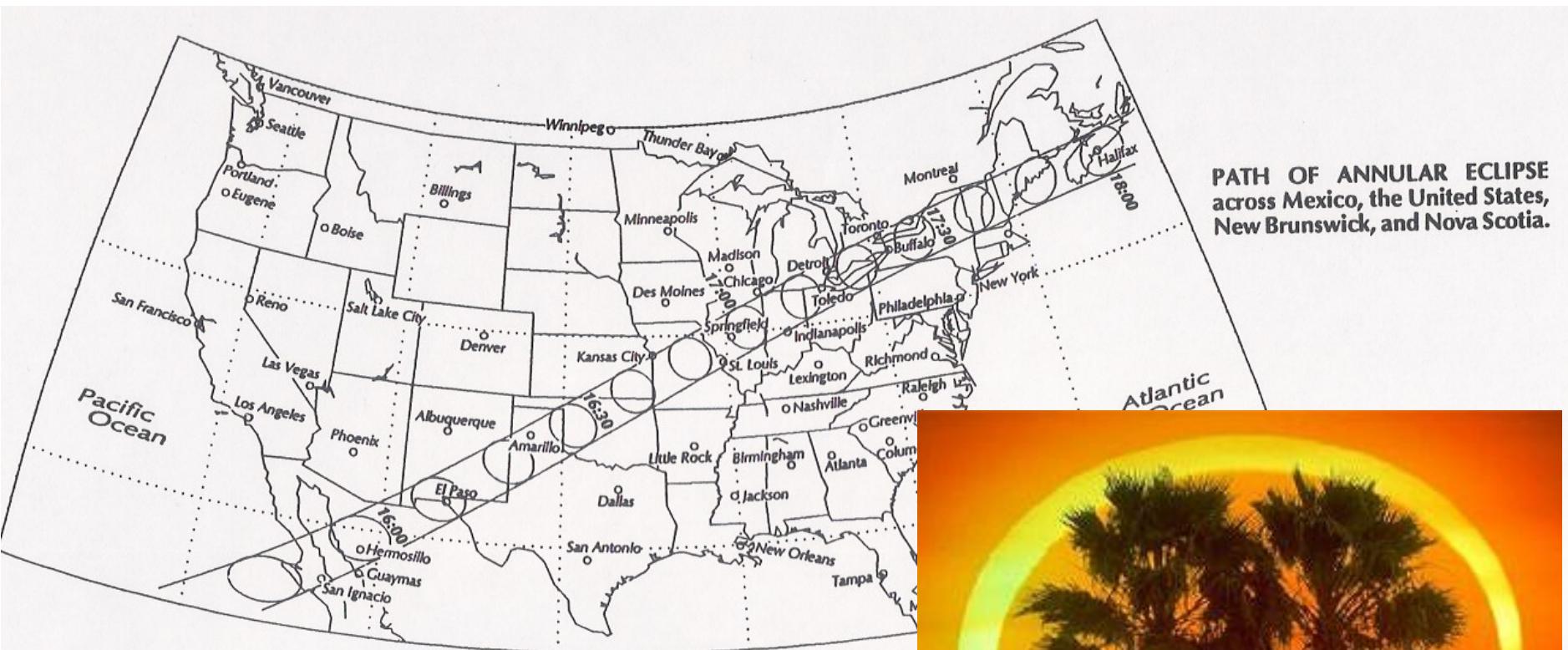


- **Partial when only part of Sun is blocked**
- **Total when it is all blocked**
- **Annular when Moon is too far from Earth for total**



**Satellite photo of Earth during Mar 9, 2016
Eclipse (total for Indonesia).**

Solar Eclipse Paths

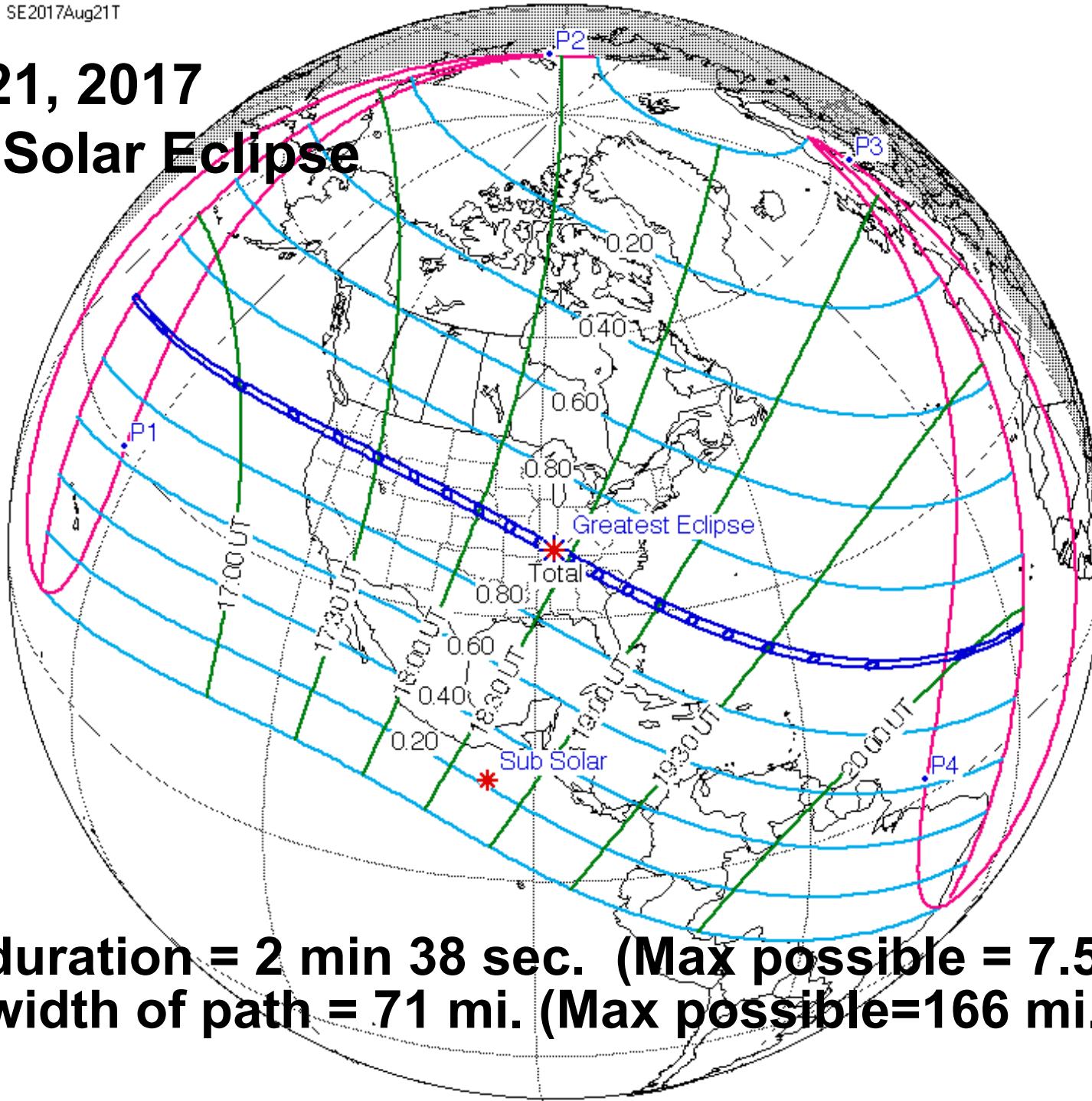


PATH OF ANNULAR ECLIPSE
across Mexico, the United States,
New Brunswick, and Nova Scotia.



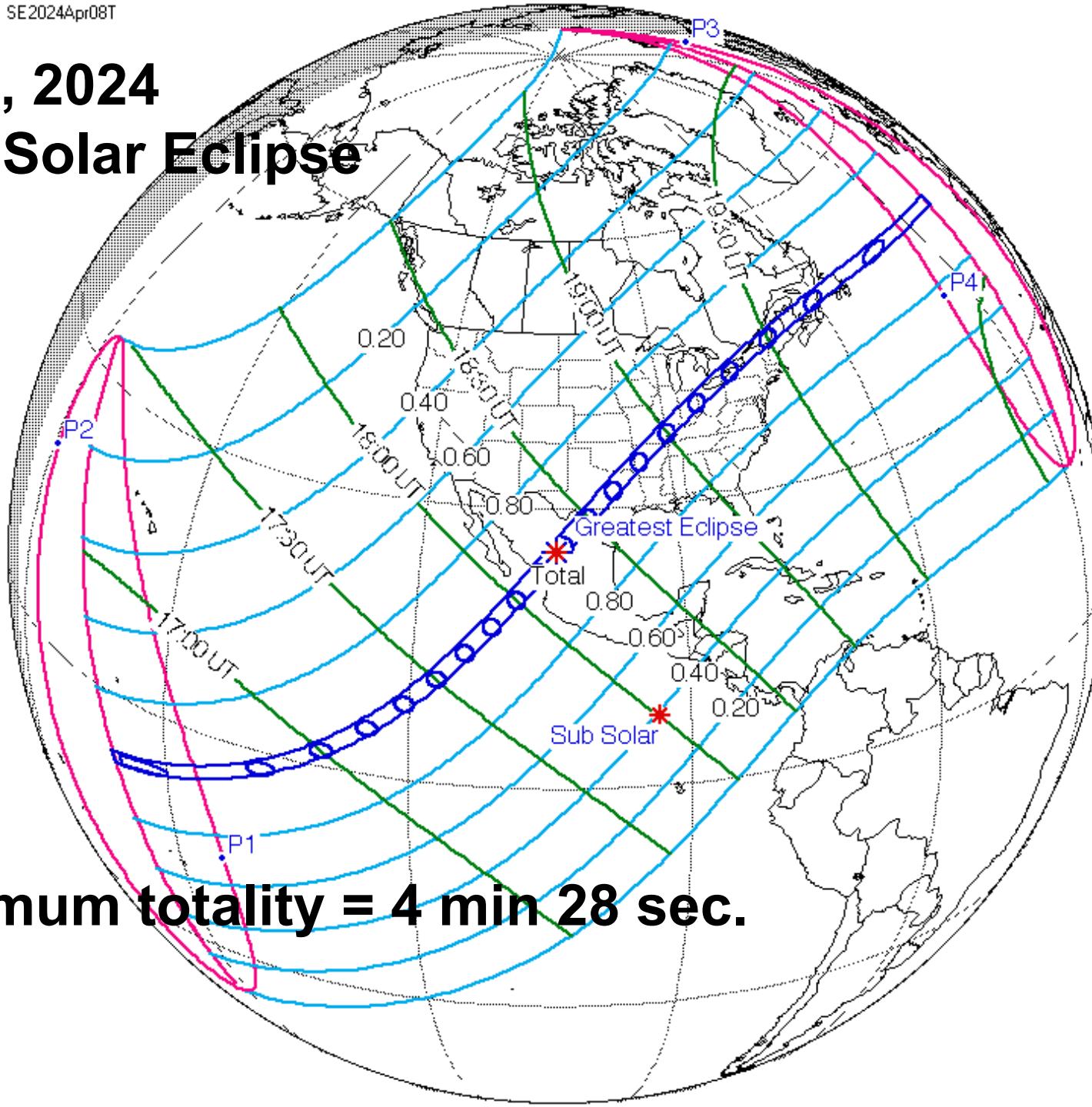
May, 1994

Aug 21, 2017 Total Solar Eclipse



Max duration = 2 min 38 sec. (Max possible = 7.5 min)
Max width of path = 71 mi. (Max possible=166 mi.)

Apr 8, 2024 Total Solar Eclipse



Maximum totality = 4 min 28 sec.

Observing a Solar Eclipse

Don't look directly at it without eclipse shades or solar filter.

* Exception: during totality

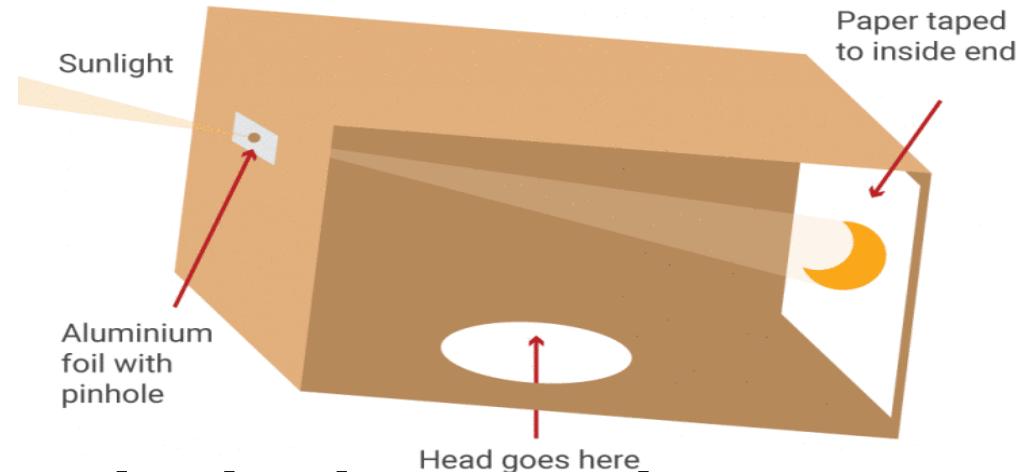


Use a “pinhole projector” card and white surfaces.



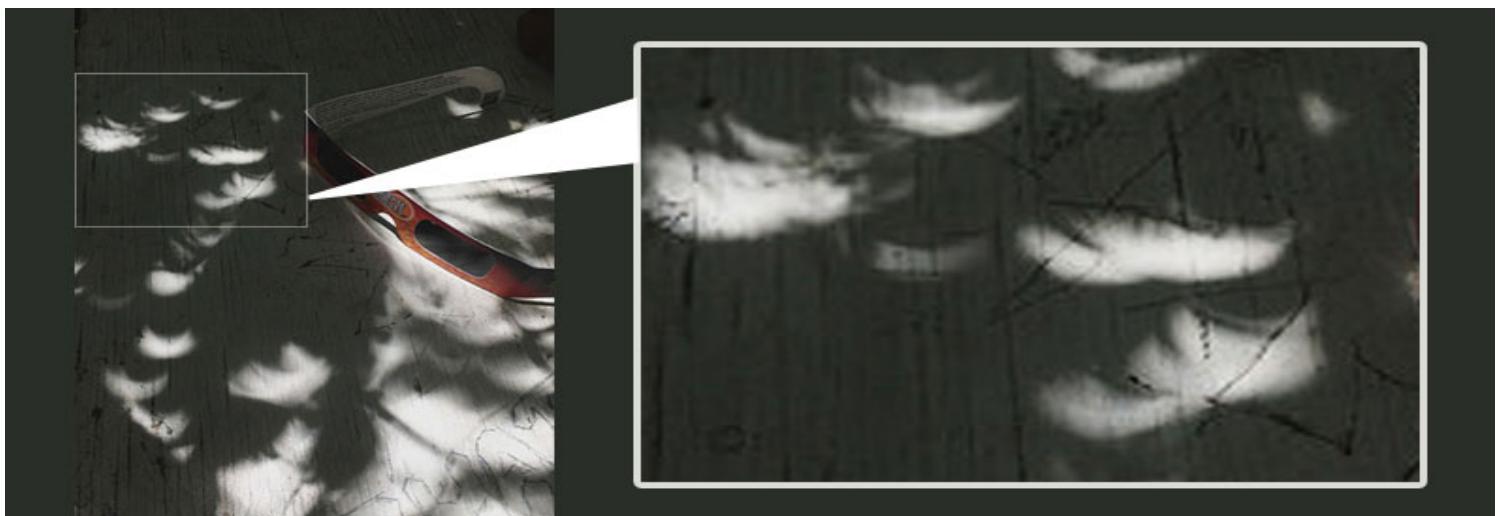
Observing a Solar Eclipse

Build a pinhole projector



Or just watch shadows under a tree.

©Invisibleidiot.com



Observing a Solar Eclipse

Telescope with continuum solar filter.

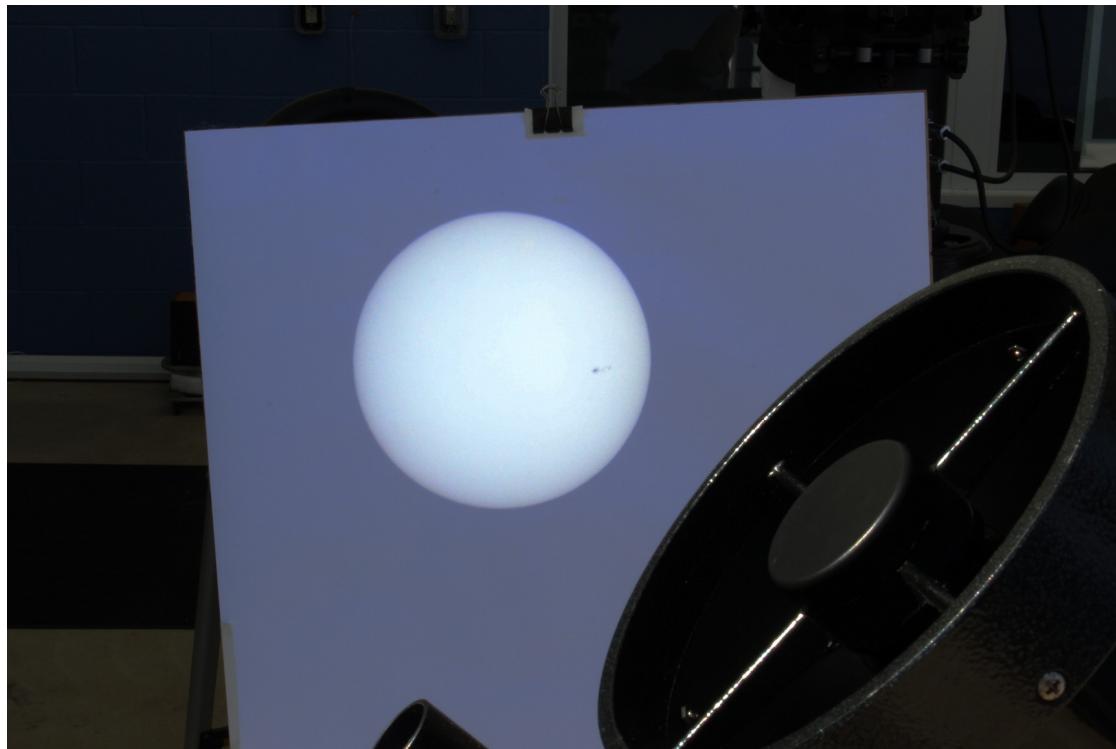
**Telescope with narrow
band solar filter.**



Telescope projected onto screen

Observing a Solar Eclipse

Telescope projected onto screen



Observing a Solar Eclipse

Telescope projected onto “sun funnel”.

