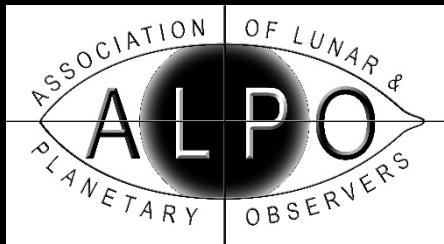


The Great American Solar Eclipse



Dr. Mike Reynolds

Florida State College at Jacksonville

Association of Lunar & Planetary Observers



T-minus

27

21

6

Days

Hours

Minutes

But who's counting?

THE GREAT AMERICAN TOTAL SOLAR ECLIPSE



Nature's Grandest Spectacle,
a TOTAL ECLIPSE OF THE SUN
comes on
AUGUST 21, 2017 - Don't miss it!

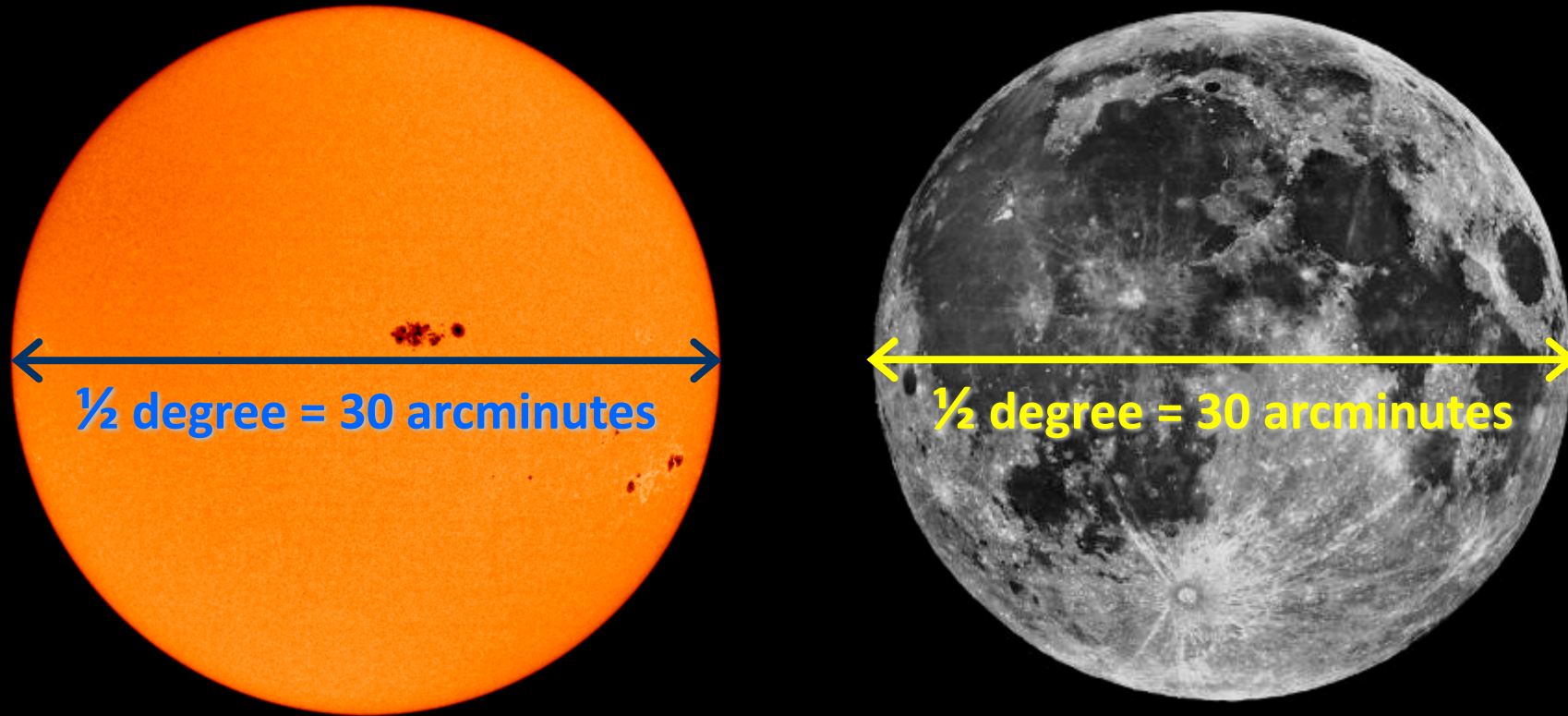
ECLIPSE



1.a : the total or partial obscuring of one celestial body by another

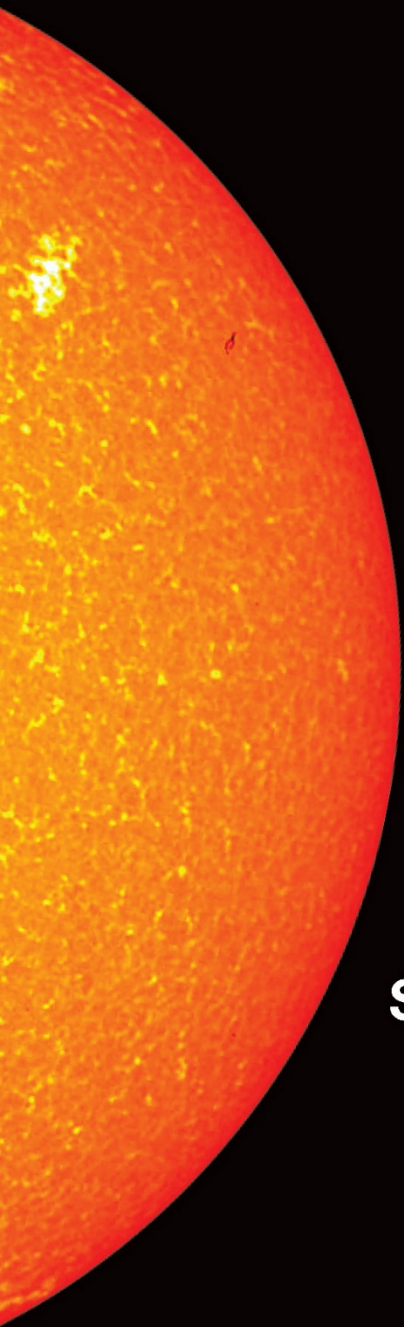
2.a : the passing into the shadow of a celestial body

How the **Sun** and Moon Appear to Us in the Sky...



*In the "Real Universe" the **Sun** is 400 times bigger than the Moon...
and the Moon is 400 times closer than the **Sun***

Solar Eclipses...



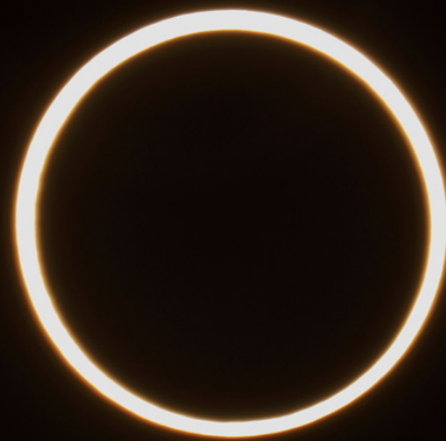
Sun



Moon



Earth



Partial Solar Eclipses

*UK Daily Express
Trendchasers*

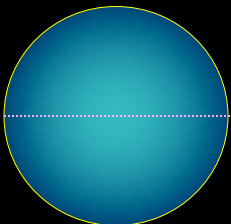
Annular Solar Eclipses

*Stan Honda
Earth Chronicles – Space*

Total Solar Eclipses

Luc Viatour

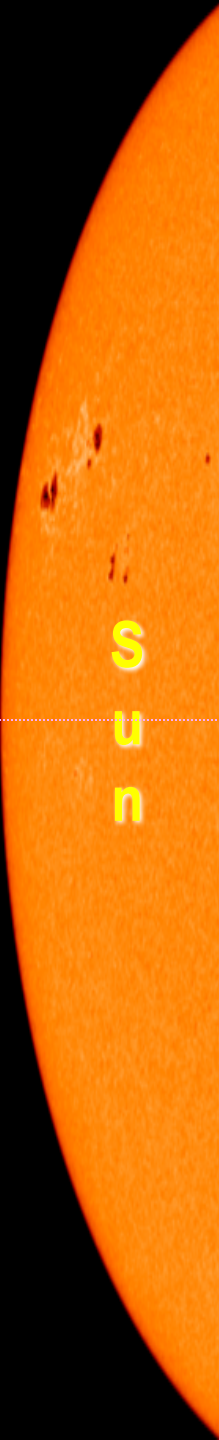
Earth-Moon-Sun Relationship



Earth

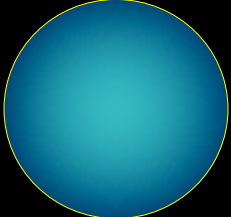


Moon



Drawing not to scale

Earth-Moon-Sun Relationship



Earth



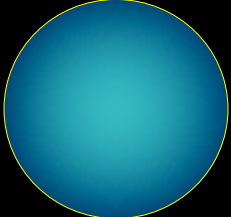
Moon



S
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Drawing not to scale

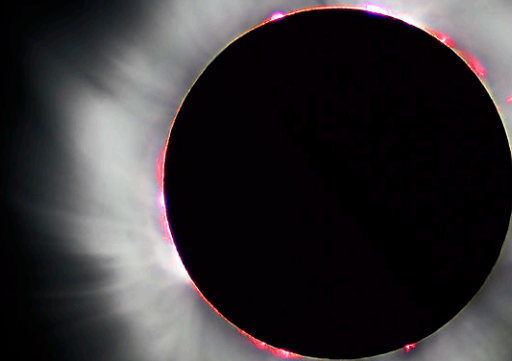
Earth-Moon-Sun Relationship



Earth



Moon



S
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n

Drawing not to scale



Super Moon
05.05.2012

MOON CLOSEST TO EARTH – Perigee



Micro Moon
28.11.2012

MOON CLOSEST TO EARTH – Apogee

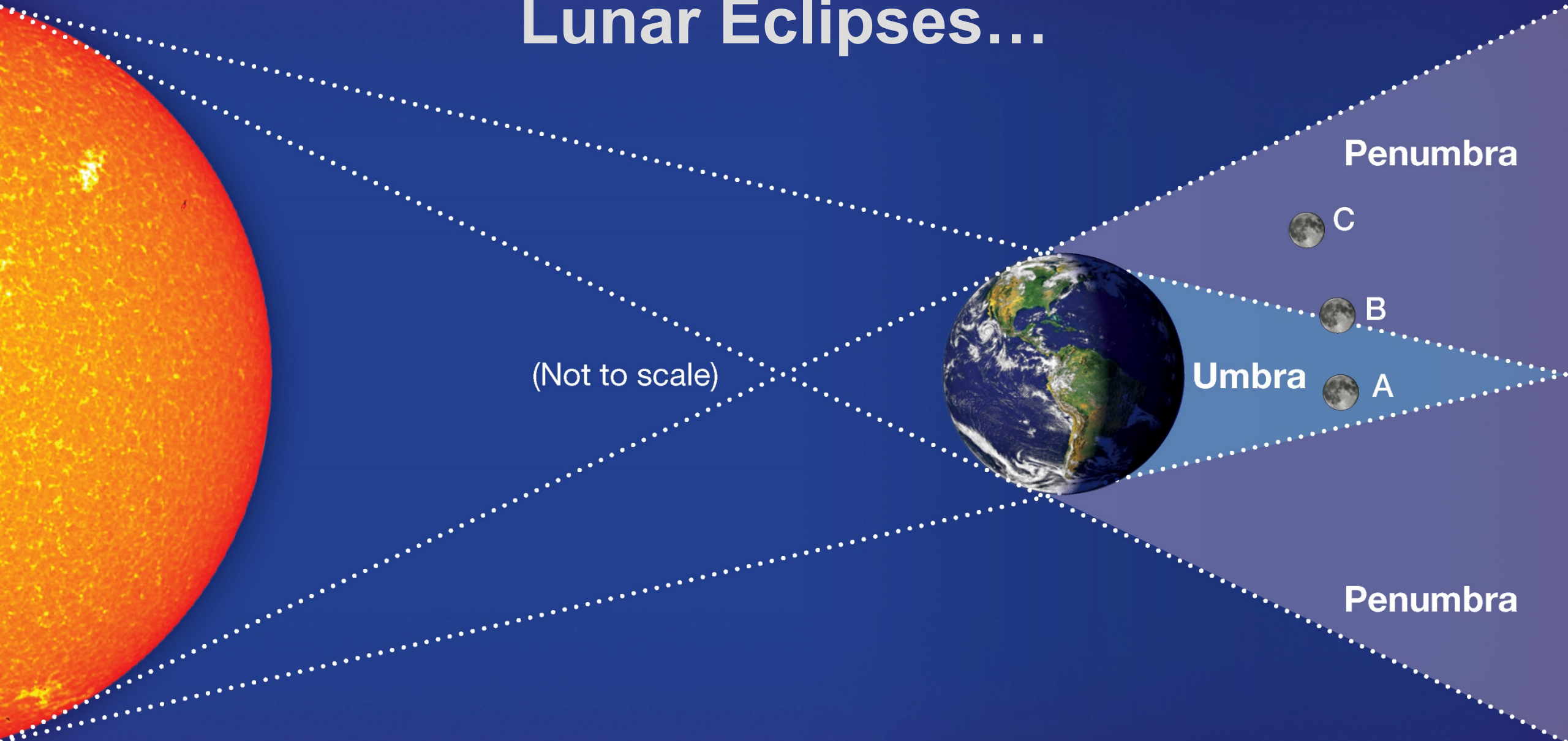


Total Solar Eclipse

March 9, 2016

NASA Earth Observatory

Lunar Eclipses...



(Not to scale)

Penumbra



C



B



A

Umbra

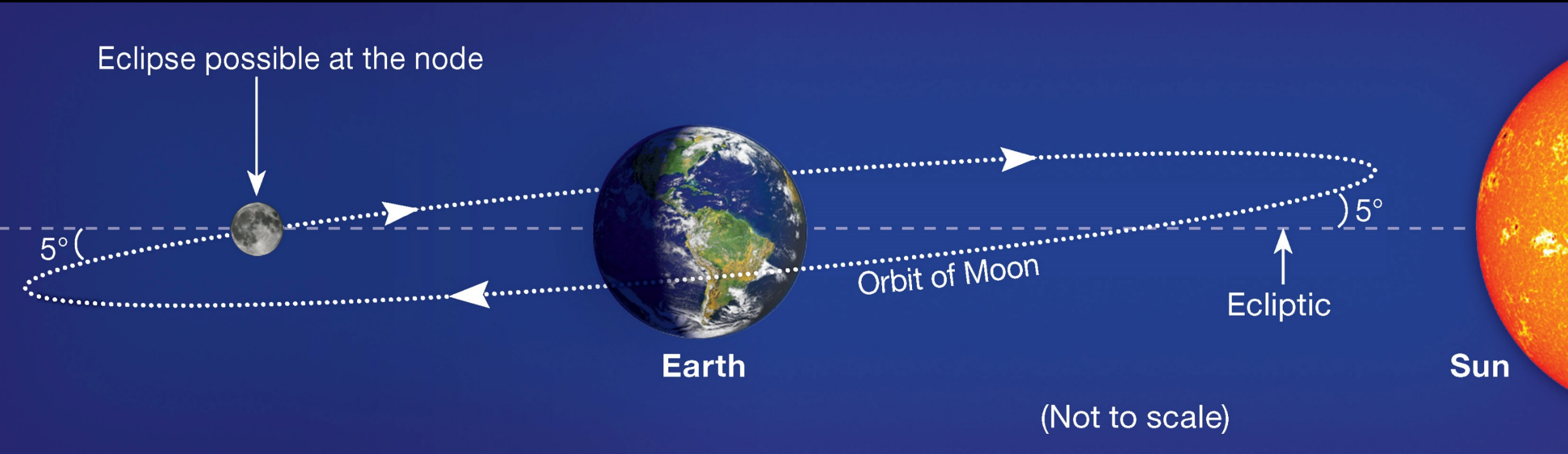
Penumbra



**Total Lunar Eclipse
February 21, 2008**

Earth-Moon vs Sun-Earth Orbital Tilts

Why we don't see a solar & lunar eclipse each month

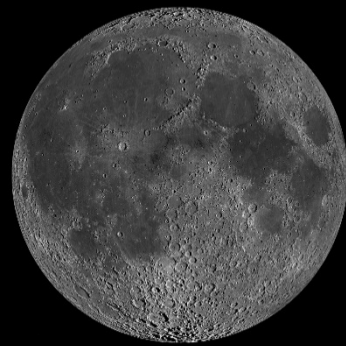
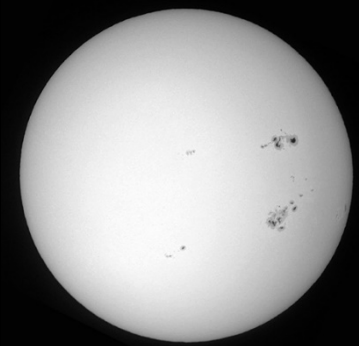
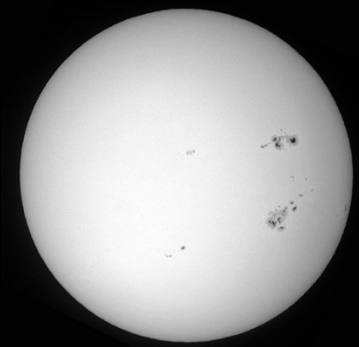
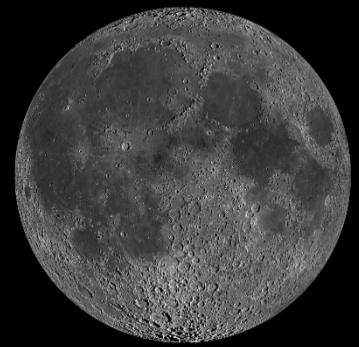


**As an eclipse comparison: *Earth, Sun,*
& *Moon* positions relative to each other**

Solar Eclipse

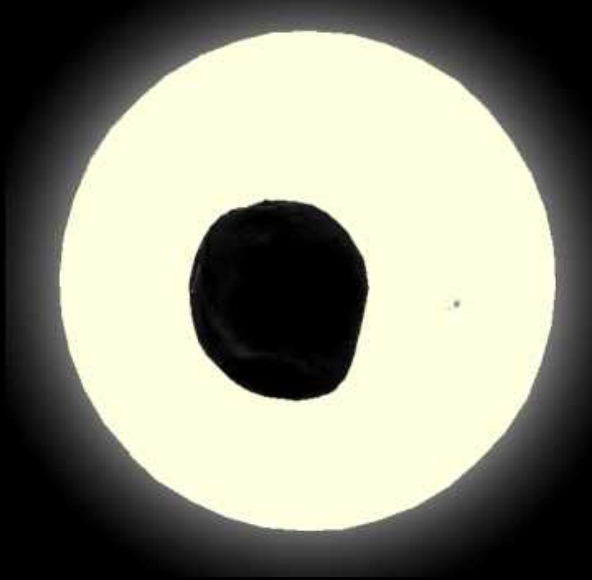
Apocalypse

Lunar Eclipse



● *Eclipses on other planets?*

- Mercury, Venus – no moons...



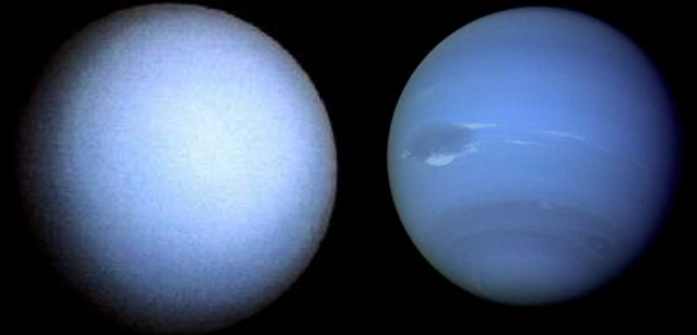
Mars

- Farther from the Sun ●
- Phobos and Deimos too small, irregular



Jupiter

- Even farther from the Sun ●
- Galilean moons small

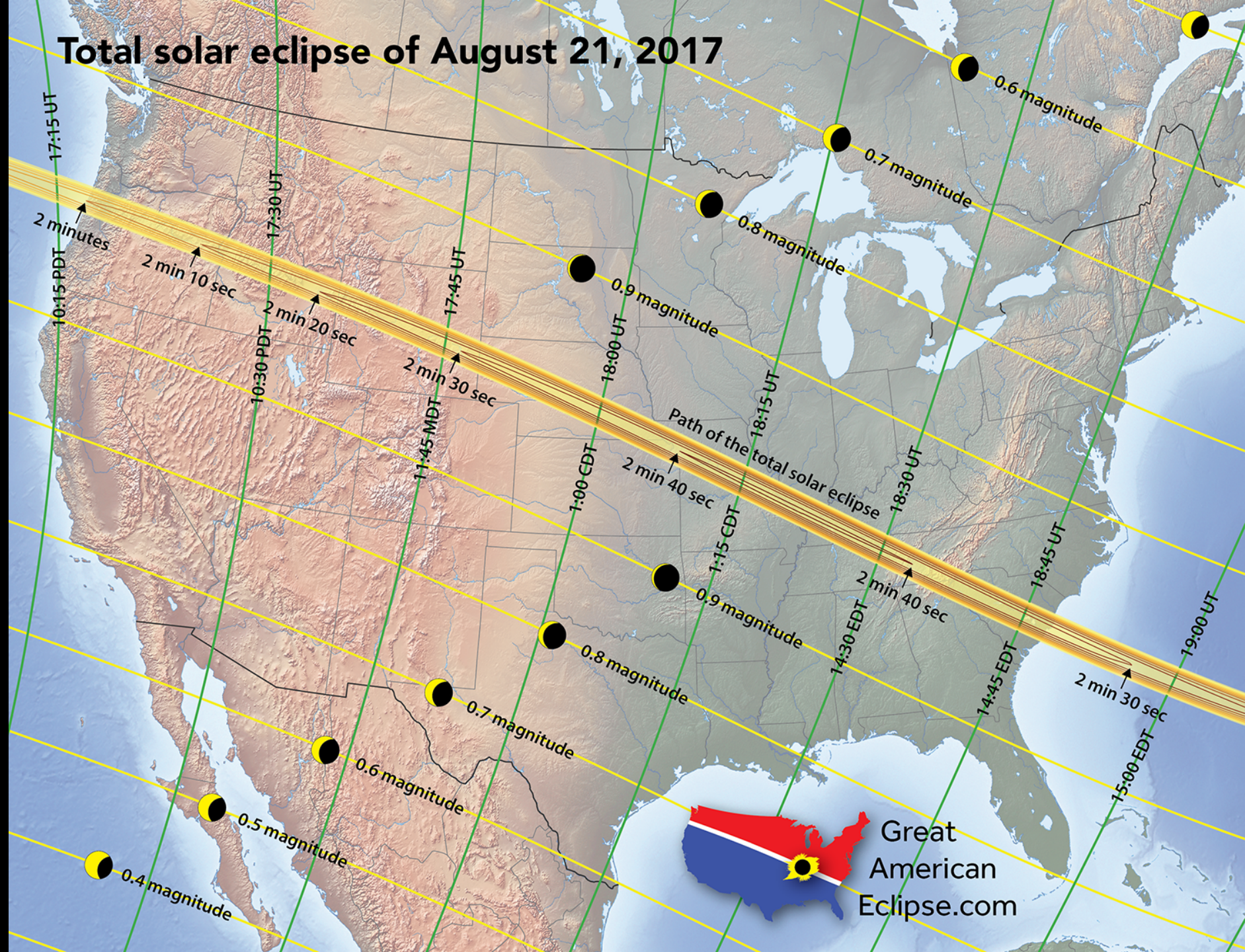


Saturn, Uranus, Neptune

- Still even farther from the Sun; Sun too small



Total solar eclipse of August 21, 2017



SOLARTM
ECLIPSE
HOPKINSVILLE, KY
AUGUST 21, 2017

Lander Eclipse
8.21 2017

08.21.2017

I blacked out...

SOLAR ...in Perry County, Missouri
Eclipse 2017 WWW.VISITPERRYCOUNTY.COM

SEE ONE OF NATURE'S RAREST WONDERS
AUGUST 21, 2017
TOTAL ECLIPSE
OF THE
SUN



GRAND TETON NATIONAL PARK
Copyright Tyler Nordgren



AUGUST 18TH-21ST | CARTERVILLE, IL

Moonstock 2017

Music Festival

*Ozzy Osbourne will headline this year's edition of the **Moonstock**, a four-day music festival celebrating the total solar eclipse. The event will take place August 18-21 at Walker's Bluff, a picturesque vineyard located in Carterville, Illinois.*

*On August 21, people from all across the country will flock to southern Illinois to witness a total solar eclipse, something that hasn't been visible in nearly forty years. On that day, at 1:20 p.m., at the exact time the solar eclipse will take full effect, **Ozzy** will play his classic song "**Bark At The Moon.**"*

www.moonstock2017.com



So... where's the best place to observe the 2017 Solar Eclipse?

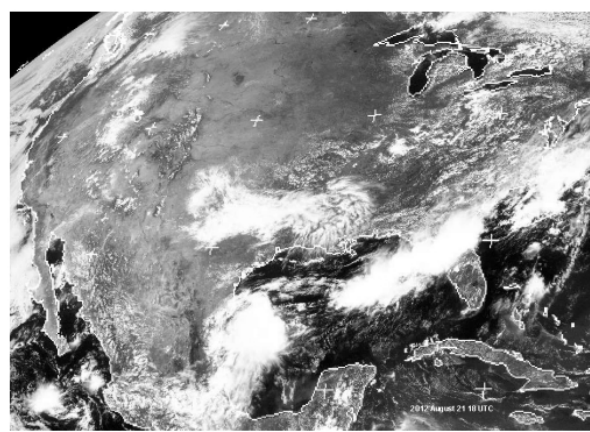
Where it's clear!

August 21 Cloud Cover for the past 6 years

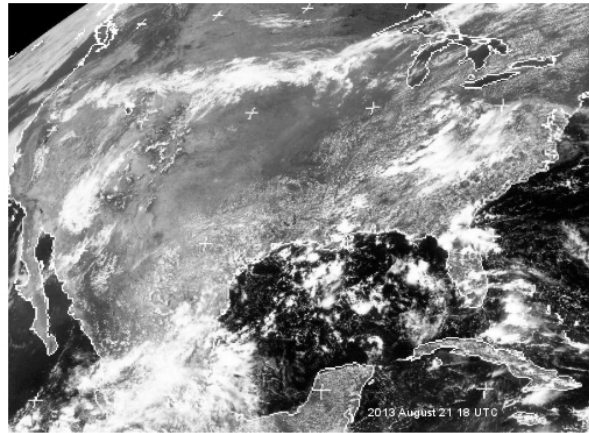
← GOES Weather Satellite Data



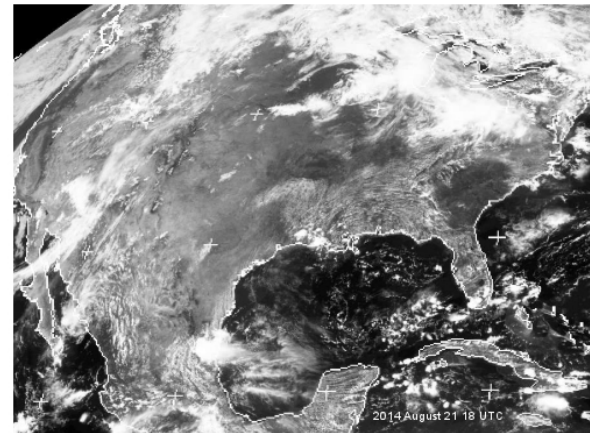
2011 August 21



2012 August 21



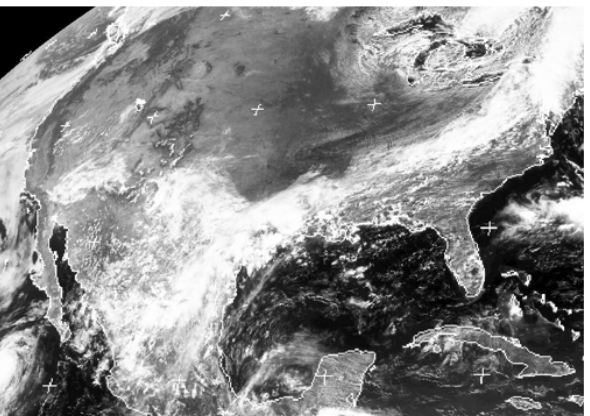
2013 August 21



2014 August 21

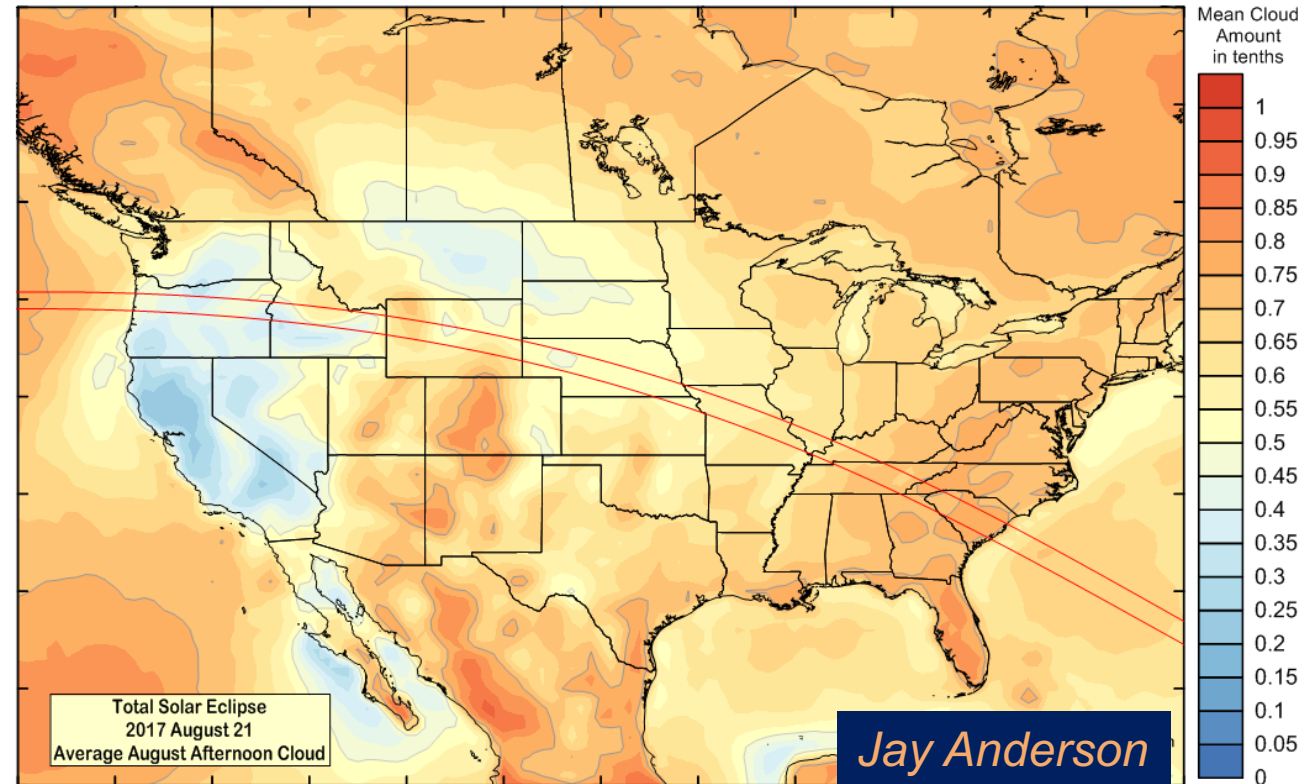


2015 August 21



2016 August 21

Historical mean cloud cover



October 22, 2136 BC

*The story of Is and Ho, the
Emperor's Astronomers*

As seen from China, a hungry
dragon tried to eat the sun!

LOOKING BACK IN TIME...

SOME INTERESTING TOTAL

SOLAR ECLIPSES



Jeanne Pusateri

Eclipse Lore and Legend...

- ☉ **Stonehenge:** was it a system to predict lunar eclipses?
- ☉ The **Chinese** term for an eclipse is *chih*, which also means *to eat!*
- ☉ The ancient **Chaldeans** believed that an eclipse was a display of the Moon's anger
- ☉ The **Babylonians** determined the eclipse's "quadrant;" geographical indicator of who would suffer the worst disasters as a result of the eclipse

St. Benedict's Eclipse

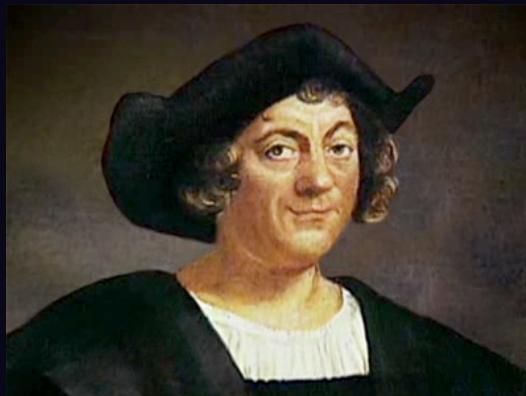
Many have been profoundly affected by a total solar eclipse...

- A total solar eclipse so impacted St. Benedict that he started his still-famous work, *the Benedictine Society*



Eclipse Lore and Legend...

- 🌑 The **Peloponnesian War** (5th century BC) was won on the heels of a lunar eclipse...the Athenians failed to retreat and the Syracusians routed them!
- 🌑 **Columbus** used a total lunar eclipse in 1504 to convince the Jamaican natives to supply him and his crew food – he threatened to *keep the Moon dark* unless the natives met his demands...



Eclipse Lore and Legend... Today!

- In much of the world it is still common practice to make noise to frighten away whatever is attacking the Sun or Moon
- ***Diseases caused by an eclipse?***
 - ◆ Some wells are covered in Japan to prevent *celestial poisoning*
 - ◆ Some Eskimos turn over utensils to avoid *contamination*
 - ◆ In India some people lock themselves in their homes to avoid *evil rays*
- In many parts of the world pregnant women are not allowed outside during an eclipse!

Eclipse Lore and Legend... U.S.

- Prior to the 1979 total solar eclipse, a man called a radio station to see if they needed eclipse glasses to watch video of the eclipse on television
- A doctor had a patient visit him after the 1979 total solar eclipse crossed the Northwest United States – the man wanted to know if his girlfriend was pregnant due to the total solar eclipse
- Right after the 1994 Annular Eclipse, a woman called her local planetarium to see if it was okay to now allow her dog to go outside... *she didn't want Fido to go blind looking at the eclipse!*

**Safe Solar
Viewing is
always a must!**



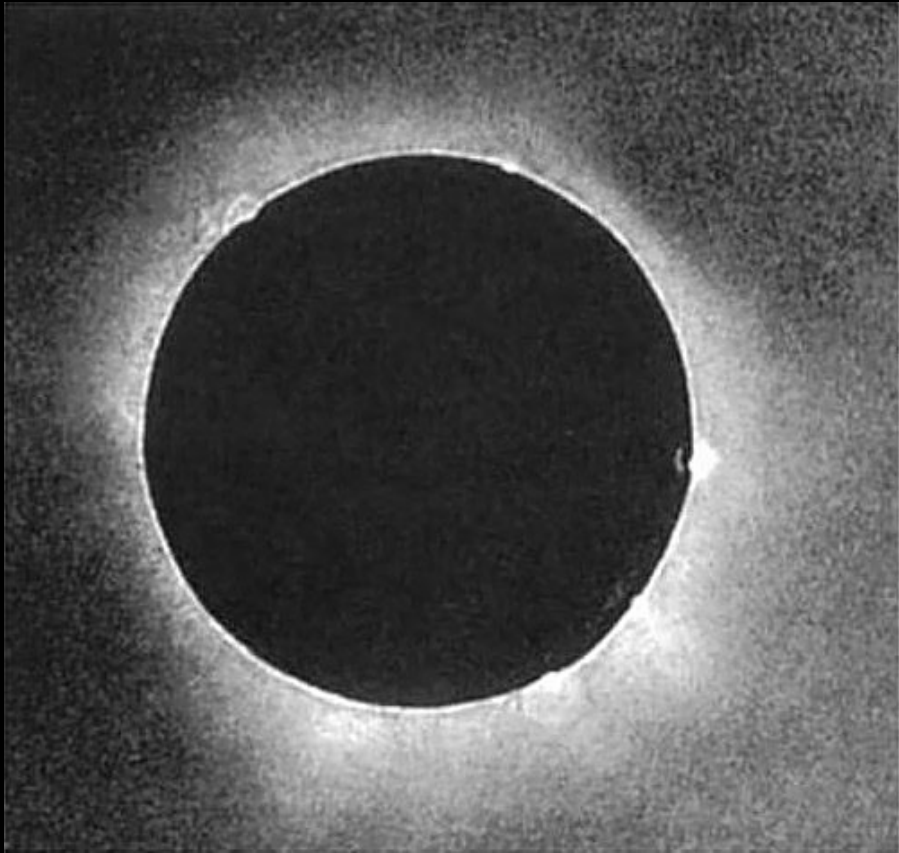
Observe Eclipses

**British Eclipse Expedition
*Celebrating after a successfully-
observed total solar eclipse***



Michael D. Reynolds
Richard A. Sweetsir

Early Total Solar Eclipse Photos



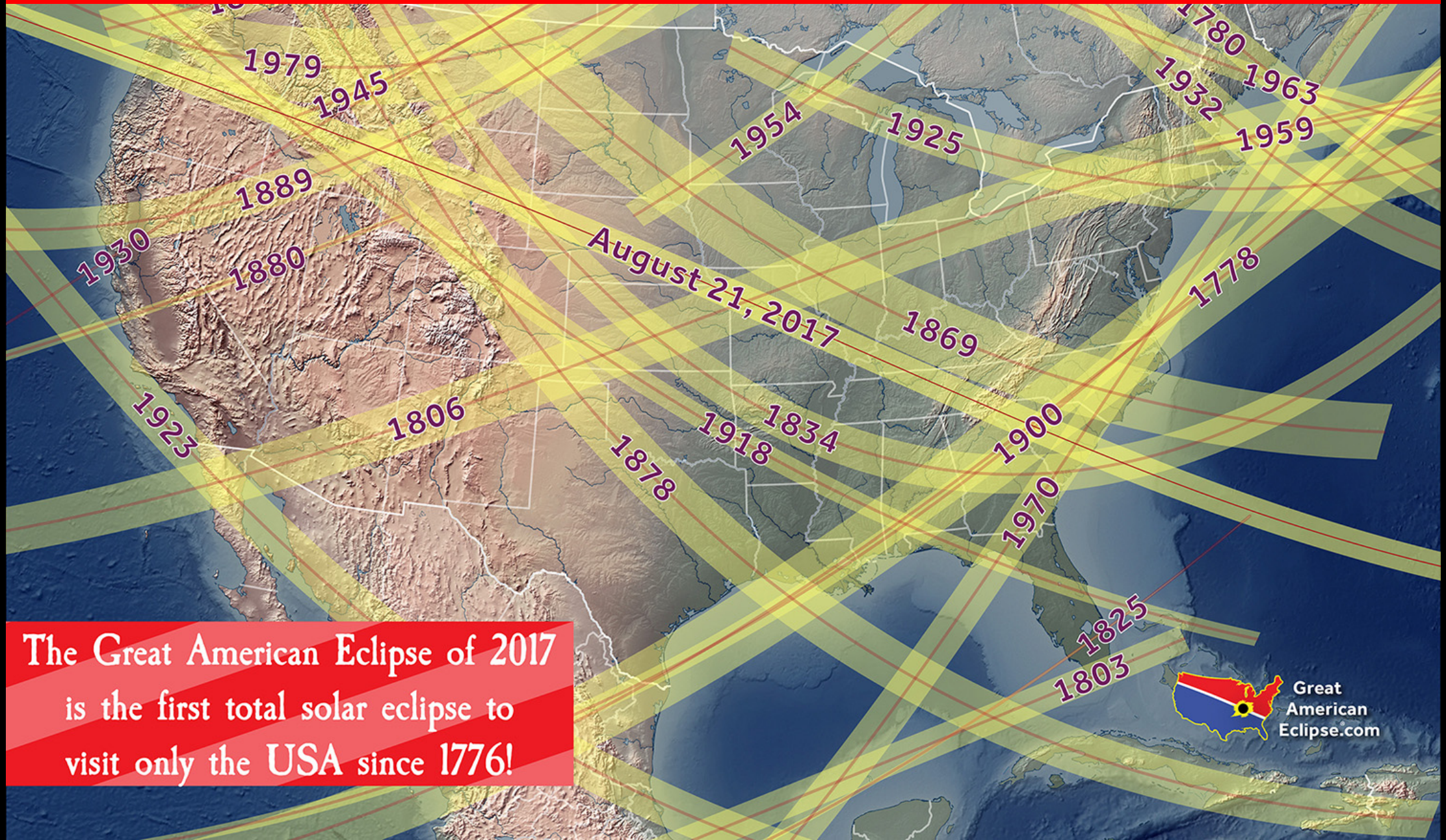
84 second exposure
July 28, 1851
P. Berkowski

2 second exposure
January 1, 1889
Charles Burckhalter



TOTAL · SOLAR · ECLIPSE
JANUARY 1, 1889.
Pacific Coast Amateur Photographic Eclipse Expedition to Cloverdale, Cal.
PHOTOGRAPHED BY CHAS. BURCKHALTER,
Of Chabot Observatory,
Member of P. C. A. P. A. and in Charge of Party,
Newtonian Reflecting Telescope of 10 $\frac{1}{2}$ inches aperture, 84 $\frac{1}{2}$ inches focus

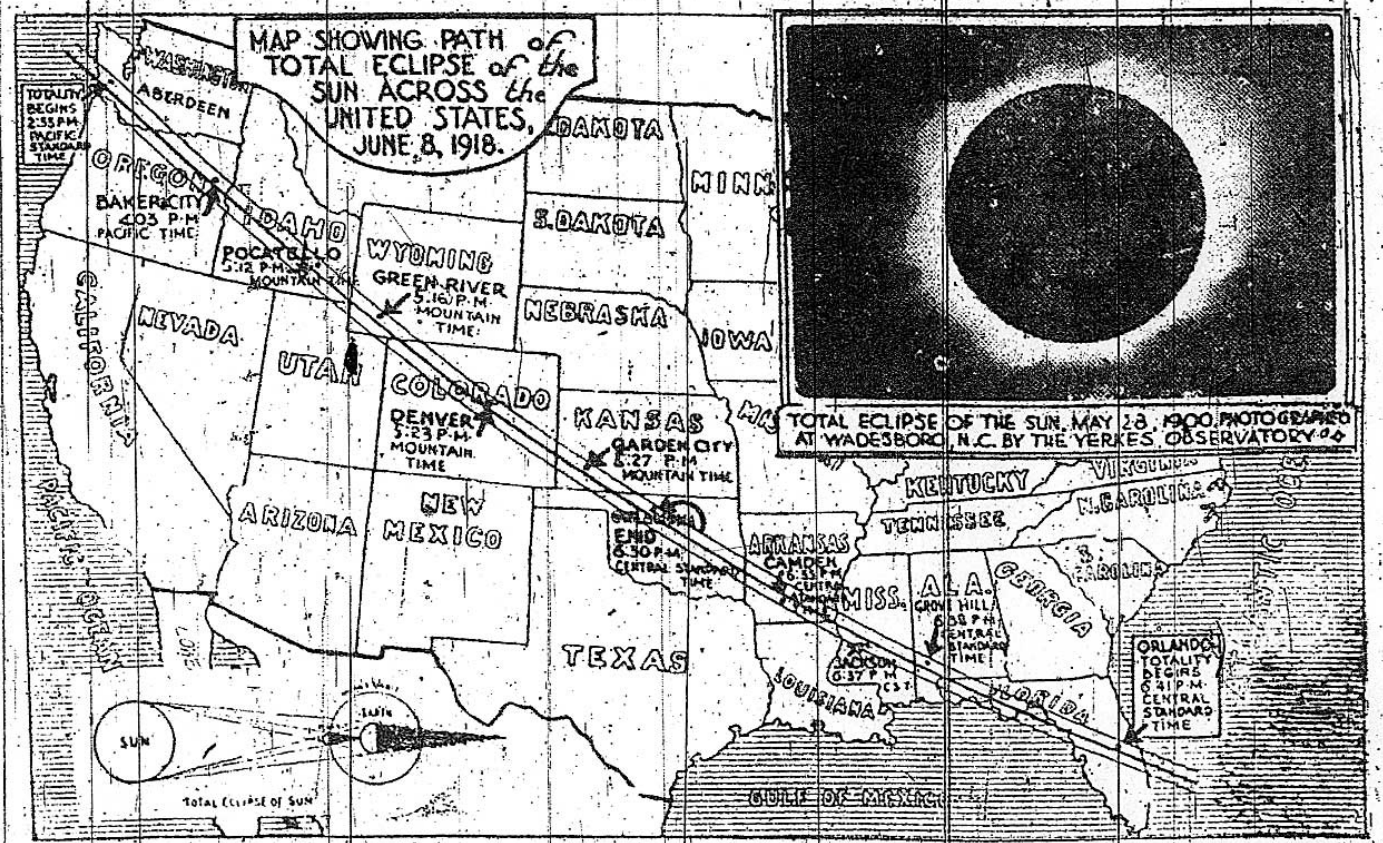
US Eclipses – 1776 to 2017



The Great American Eclipse of 2017 is the first total solar eclipse to visit only the USA since 1776!

THOUSANDS POINT GLASSES AT SUN TO WATCH ECLIPSE

June 8, 1918...
The last time totality passed from the US west to east coast



Police Enforce Quiet So Astronomers at University May Make Priceless Observations—Movies to Be Taken—Throngs Seek Vantage Points.

AMERICANS PUSH GERMANS BACK IN

VOL. LXXIV...No. 24,473.

NEW YORK, SUNDAY, JANUARY 25, 1925.

Includes Telegrams, Picture Stories in the fifth—FIVE CENTS. In Manhattan, elsewhere, News and Brooklyn, TEN CENTS.

PRESIDENT URGES THE WORLD COURT AS OUR PEACE STEP

He Warns Delegates to Women's Conference Anti-War Spirit Must Be Perpetuated.

CITES CONSTRUCTIVE FORCES

Holds Intelligence of People and Community's Moral Opinion Are Greater.

WOMEN PLAN CAMPAIGN

Nine Organizations to Combine in Educational Movement—Want Peace Secretary in Government.

Special to The New York Times.
WASHINGTON, Jan. 24.—President Coolidge reiterated today his belief that the United States should adhere to the Permanent Court of International Justice, speaking before the women attending the Conference on the Cause and Cure of War, which adjourned tonight. They were received by the President and Mrs. Coolidge at the White House at 12:20 o'clock.

The President made it clear that he regarded use of physical force unnecessary to the successful accomplishment of the work of the court.

"I wish a tribunal," he declared, "would rely for the enforcement of decrees, not upon armies and fleets and all the related means of destruction, but rather upon the two most constructive forces of the world." These forces, he said, were "intelligence of the mass of individuals and the moral opinion of the community."

Speaks Was Must Be Perpetuated.
In receiving the delegates, President Coolidge said:

Your conference has been brought together to consider the cause and cure of war. In our generation, which has seen the supreme demonstration of the utility and the horrors of war, we ought to be able to count upon an overwhelming sentiment for measures which give reasonable promise of preventing or limiting wars. But if we fail today by the past this

Wide-Bottom College Trousers Are Frowned On by Coolidge

Special to The New York Times.
WASHINGTON, Jan. 24.—President Coolidge does not approve the wide-bottom trousers affected by many college students.

This was learned today when the President received three Princeton students, members of the American Whig Society, who came to invite him to speak before the society next Spring. During the conversation the President gazed down toward the feet of his callers and much to their embarrassment asked if they did not wear the regulation cut of trousers. The young men replied that they did not. The President then remarked that his boy came back from college with wide trousers that appeared to be falling off and he made him wear suspenders. His callers replied that the style of trousers they wore were the thing among college men.

The visitors were Lawrence Hunt of New York, President of the society; Richard Sater of Ohio and Joseph Prendergast of Illinois.

Despite his disdain for his trousers, the President posed with his callers for a photograph.

4 SLAIN IN HERRIN; GLENN YOUNG VICTIM

Klan "Dry" Raider and "Man-Killer" Shot Down by Deputy Sheriff Thomas.

LATTER KILLED IN TURN

Six Are Wounded When Factions Renew Battle Ended by Armistice Last Fall.

Special to The New York Times.
HERRIN, Ill., Jan. 24.—S. Glenn Young, Ku Klux Klan "dry raider" and central figure in the series of bloody battles that have marked the feud between the Klan and its foes in Williamson County, was slain tonight by machine-gun fire. Deputy Sheriff Ora Thomas, who has been shot in the past, was also wounded. The other five were wounded.

The fighting tonight was the result of a meeting of two men, described as "handy with the gun," determined to settle the matter in their own way.

The man who formerly was deputy sheriff John Gallagher, left Williamson County last fall when an armistice ended between the two factions

ECLIPSE FOUR SECONDS LATE HERE, BUT A BRILLIANT SHOW; SEEN FROM LAND, SEA AND AIR, IT THRILLS MILLIONS; CITY HALTS TO GAZE; SCIENTISTS NOW STUDY THE DATA

CORONA DIVINELY BEAUTIFUL

Dr. Luyten, The Times Observer, Describes the Scene From Airplane.

MOON BLACK IN TOTALITY

Its Brownish Tinge and the Shadow Bands Absent Above Dense Atmosphere.

SHADOW'S SPEED TERRIFIC

Rushed on Airplane Unheralded—Perfect Observing Conditions Yield Valuable Records.

By W. J. LUYTEN, Ph. D.,
Astronomer in the Observatory of Harvard University.

Thanks to the efficiency of the United States Air Service and the courtesy of Major William N. Hestley, commandant of Mitchell Field, and of Major Davenport Johnson, who piloted me, I was able to obtain a perfect view of the total eclipse of the sun from a position 15,000 feet above the ground. In the whole zone of totality there could not have been a better observing point, nor a point where one could realize better the grandeur of this overwhelmingly impressive phenomenon.

Never before have I been so conscious that I was in infinite space, free from all connections with the earth, watching an event taking place between three celestial bodies and feeling myself, as it were, on the same footing with them. All four of us were sailing through space with nothing to hinder us, nothing to stop our path, completely free and separate entities in the universe.

Observing Conditions Perfect.

But let us begin at the beginning: When the eventful morning of the twenty-fourth of January arrived Mitchell Field began to stir at 8 A. M., for every one had to be up in the air by 9 o'clock at the latest.

The sky was marvellously clear, probably the clearest day of the year, and perfect in every respect for the eclipse, shortly before 9 o'clock Venus, Mercury and Jupiter, rising in the southeast.

SUN AFFECTS RADIO, OBSERVATIONS SHOW

Short Waves From Schenectady Become Inaudible and Long Waves Steadied in Eclipse.

EXPERTS DIFFER IN VIEWS

One Sees Theories of the Influence of Light Confirmed, but Others Deny It.

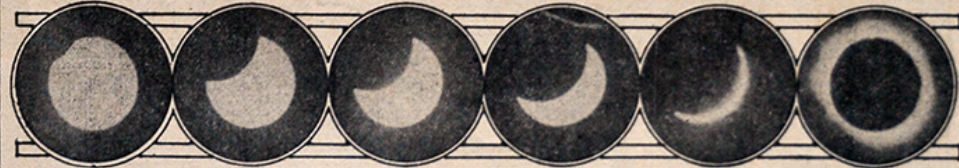
Observations designed to determine the effect of the eclipse of the sun on radio-made by Dr. Alfred N. Goldsmith, chief broadcast engineer of the Radio Corporation of America, at the company's technical laboratory at Van Cortlandt Park, appeared to show that the 7-meter waves were entirely dependent upon sunlight and that the shadow of totality stopped the fading of the 330-meter wave signals in their 100-mile trip from station WGY, Schenectady, to this city. Static diminished on both the 7 and 330 meter waves as the sunlight gradually weakened.

WGY, the General Electric Company's station at Schenectady, began to broadcast on its regular 330-meter wave at 7:30 and 330 meter waves at 8 o'clock and for a good half-hour thereafter was not a bit like its usual self. The broadcast station had the appearance of a Sunday afternoon in December, although groups of sticks strained their necks from seaward-facing windows of lined to catch glimpses of the sky apportioned from the usual view space between the tall buildings.

Several hundred persons viewed the picture from the Woodworth tower, where had a clear view of the hemisphere.

SCIENTISTS ON LOS ANGELES PRAISE FIRST DIRIGIBLE ECLIPSE FLIGHT

Photograph Spectacle at 8,000 Feet Up Off Montauk Point, L. I.
—Discovery of New Element Held Possible—Airship Back in Hangar After Perilous Start.



PROGRESS OF THE ECLIPSE. ← Moon Moves From West to East. Photographs taken in the path of totality from the climax to the end.



THE GLORY OF THE ECLIPSE. The corona as it was photographed during totality.

Scientists on Los Angeles Praise First Dirigible Eclipse Flight

Photograph Spectacle at 8,000 Feet Up Off Montauk Point, L. I.
—Discovery of New Element Held Possible—Airship Back in Hangar After Perilous Start.

MULTITUDE ON WATCH HERE

Awed by Jewel of Light Hanging From Luminous Ring.

THE MOON IS BEHIND TIME

Changes Southern Eclipse Boundary to Between 96th and 97th Streets.

CITY MIGRATES TO NORTH

Perfect Weather Allows Young and Old, Indoors and Out, to See Spectacle.

A thin, luminous ring, set with a spray of soft-burning light, hung in the eastern sky yesterday morning at 9:11 while most of New York's population of six millions gazed at it.

For several seconds the jewel sparkled with a pure and wild radiance, then trembled and melted into the circle of the light which crowned the holy disk of the moon. The total eclipse had begun.

Before the spectator could recover from his breathless wonder at the scene and try to realize its detail in the city and on the earth, the amazing spectacle was ended.

The lovely jewel of white light reappeared again, this time on another part of the thin, luminous ring, as it rose and all prevailing lustre quivered the corona and then put out the light of the stars.

Genes of Light Thrills Watchers.

This ring, with its gorgeous outline, drew attention from the occasion and wherever the sun was visible, it made a deep impression on New York crowds that had never before of the spectacle.

The observation of this night, completed by most of the watchers, was the only one of the kind which has ever been made in this city. The effect was extraordinary in the fact that every observer had the thrill of a discovery.

Several hundred persons viewed the picture from the Woodworth tower, where had a clear view of the hemisphere.

SKYSCRAPERS BLINK IN EMPTY STREETS

Downtown Like Sunday—Roofs Outside Totality Zone Are Crowded With Gazers.

EARLY MORN LIKE TWILIGHT

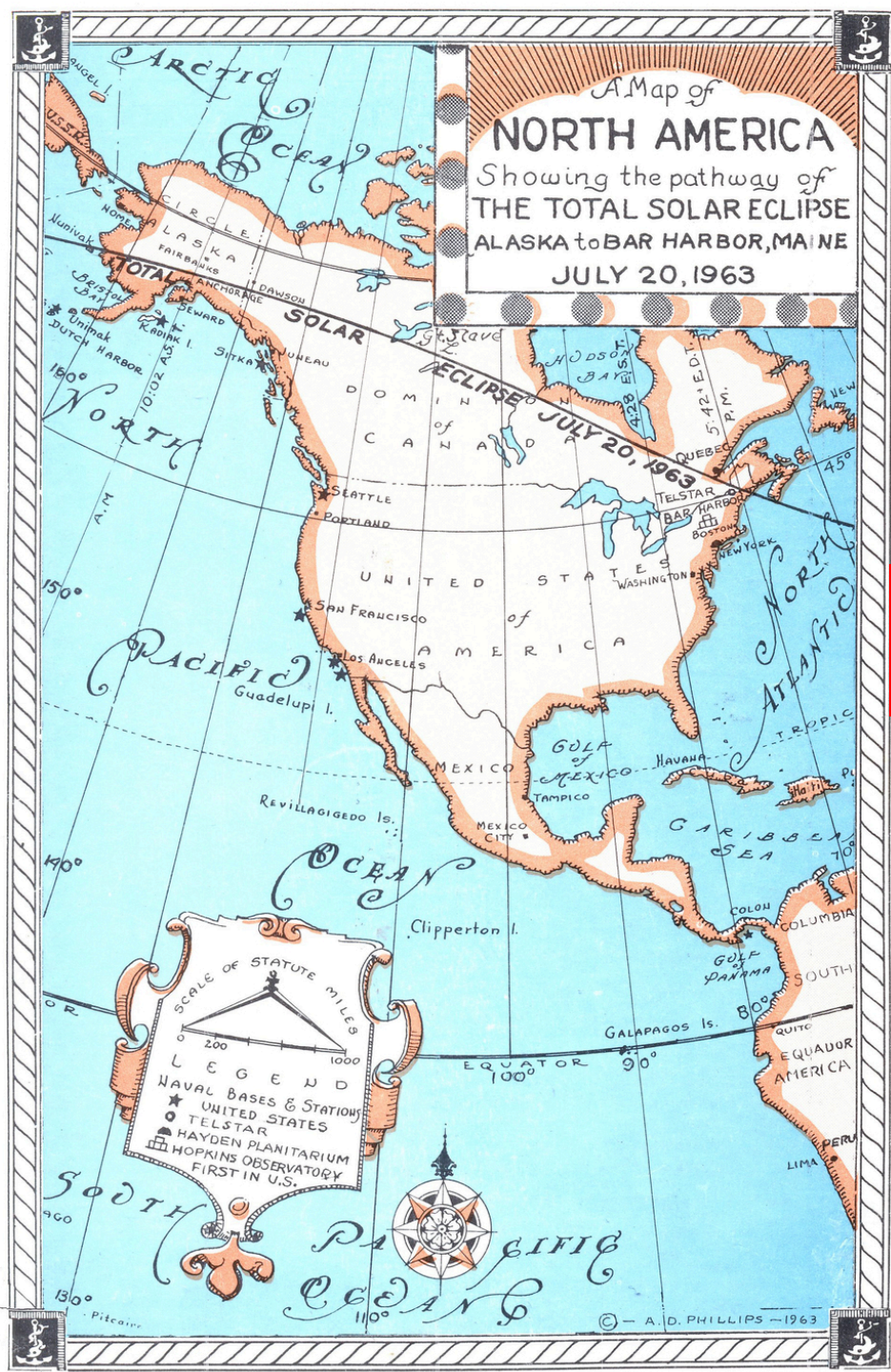
Mayor Views Spectacle From City Hall Steps—Thousands Gather at Battery Park.

Mayor Hylan saw the eclipse from the front steps of the City Hall yesterday and lightened the darkness with several characteristic axioms and a prediction, between peeps through smoked glass and a telescope. The Mayor, of course, was outside the belt of totality, but like the thousands who were forced to stay in lower Manhattan, parts of Brooklyn and Staten Island, he saw what there was to be seen.

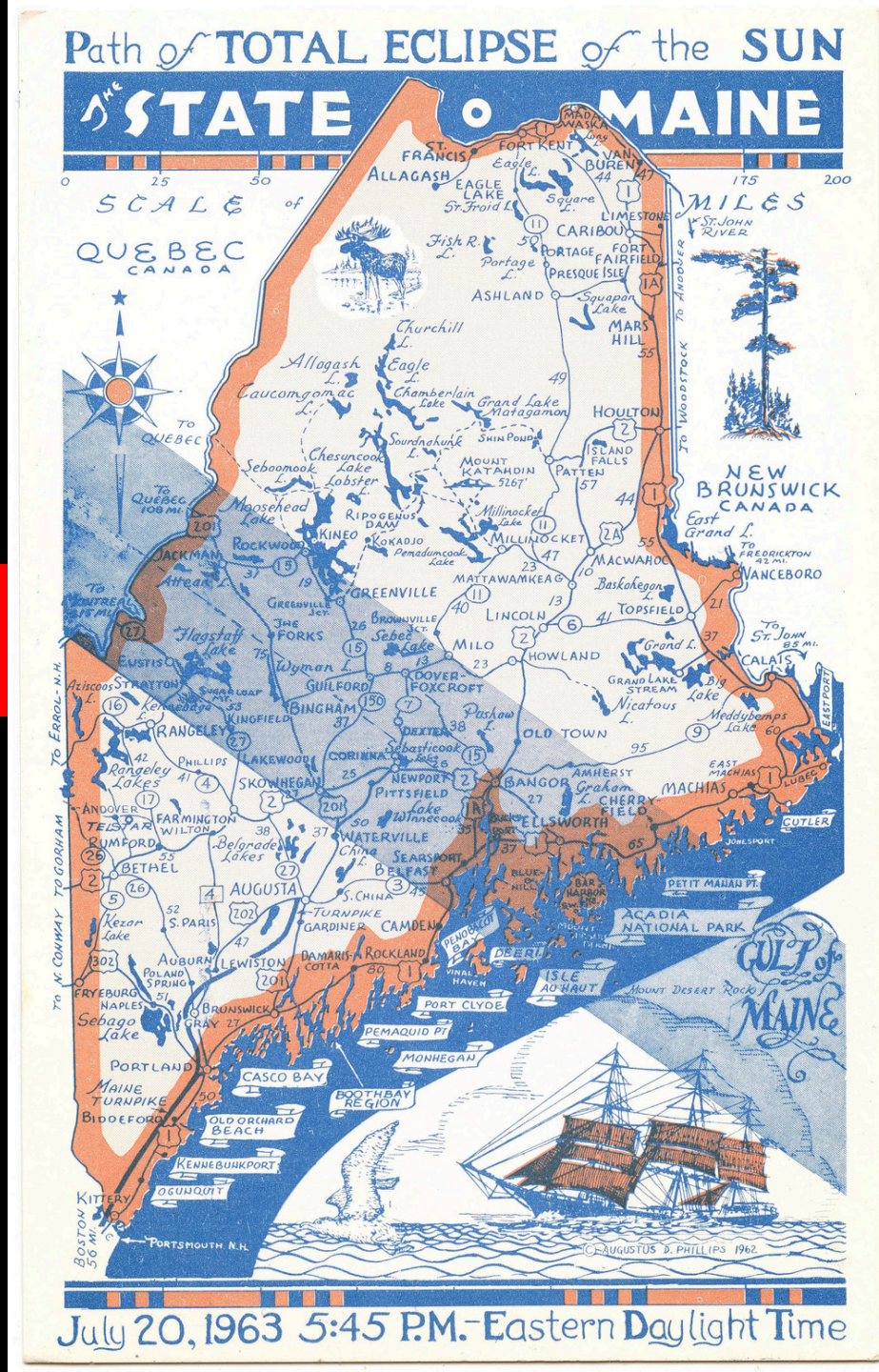
First announcements that the only place in which to see the total eclipse would be in the area north of Eighty-third Street, and the further north the better, was effective. Downtown Manhattan at 8 o'clock—seven at 9 o'clock and for a good half-hour thereafter—was not a bit like its usual self. The financial district had the appearance of a Sunday afternoon in December, although groups of sticks strained their necks from seaward-facing windows of lined to catch glimpses of the sky apportioned from the usual view space between the tall buildings.

Several hundred persons viewed the picture from the Woodworth tower, where had a clear view of the hemisphere.

January 24, 1925



July 20, 1963



March 7, 1970

LEGEND

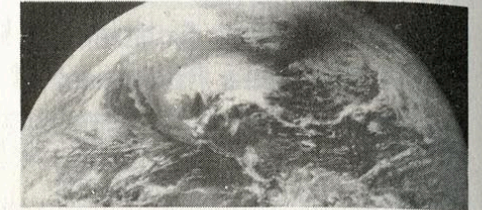
STATIONS	PERCENT OF DAYS			
	CLEAR	CLOUDY	RAINY	CLOUD COVER*
GANDER, NFLD. INTL. AP	19	70	—	75
ARGENTIA, NFLD.	14	68	55	76
ST. ANDREWS, NFLD.	13	75	—	79
SYDNEY, N.S.	20	64	50	71
SHEARWATER, N.S.	26	58	—	65
GREENWOOD, N.S.	23	65	—	73
YARMOUTH, N.S.	22	67	53	72
PROVIDENCE, R.I.	30	45	38	67
NEWARK, N.J.	25	46	37	63
NORFOLK, VA.	29	50	36	62
RALEIGH, N.C.	32	46	35	60
COLUMBIA, S.C.	31	46	38	59
CHARLESTON, S.C.	29	46	33	61
SAVANNAH, GA.	29	45	34	61
JACKSONVILLE, FLA.	29	42	28	59
TALLAHASSEE, FLA.	23	48	31	63
MINATITLAN	26	58	17	68
OAXACA DE JUAREZ	—	—	—	24
SALINA CRUZ	—	—	—	20

* PROBABILITY SUN IS COVERED

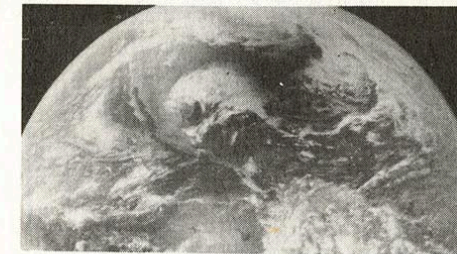
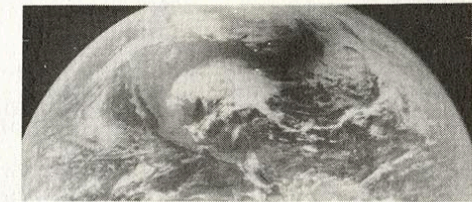
ALL PERCENTAGES ADJUSTED TO
7 MARCH, 1970



NASA ATLAS-3 SATELLITE 7 MARCH 1970 ECLIPSE



1:50 pm

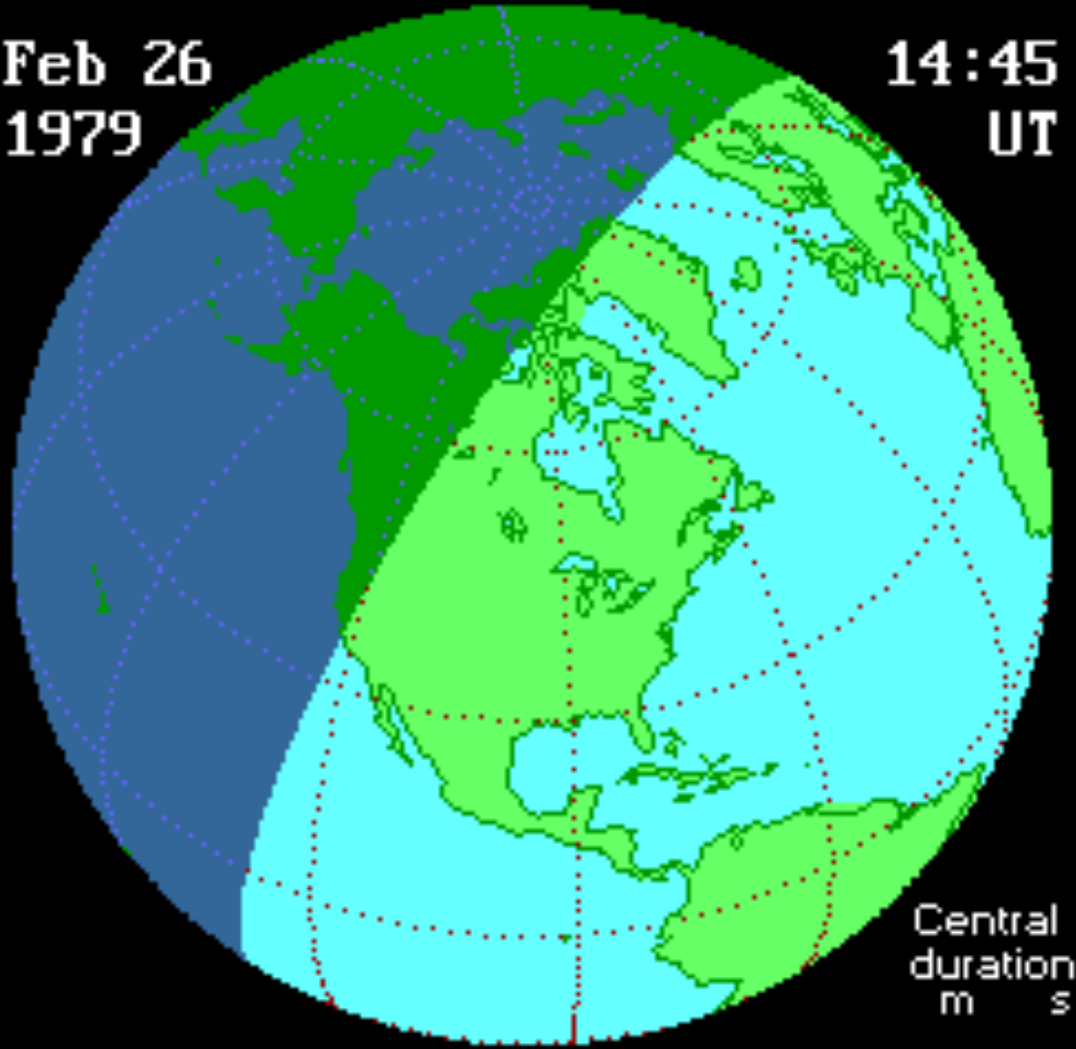


1:10 pm

**ATLAS-3 FOLLOWS THE SHADOW
OF THE MOON FROM FLORIDA
TO THE NORTH ATLANTIC.**

Feb 26
1979

14:45
UT

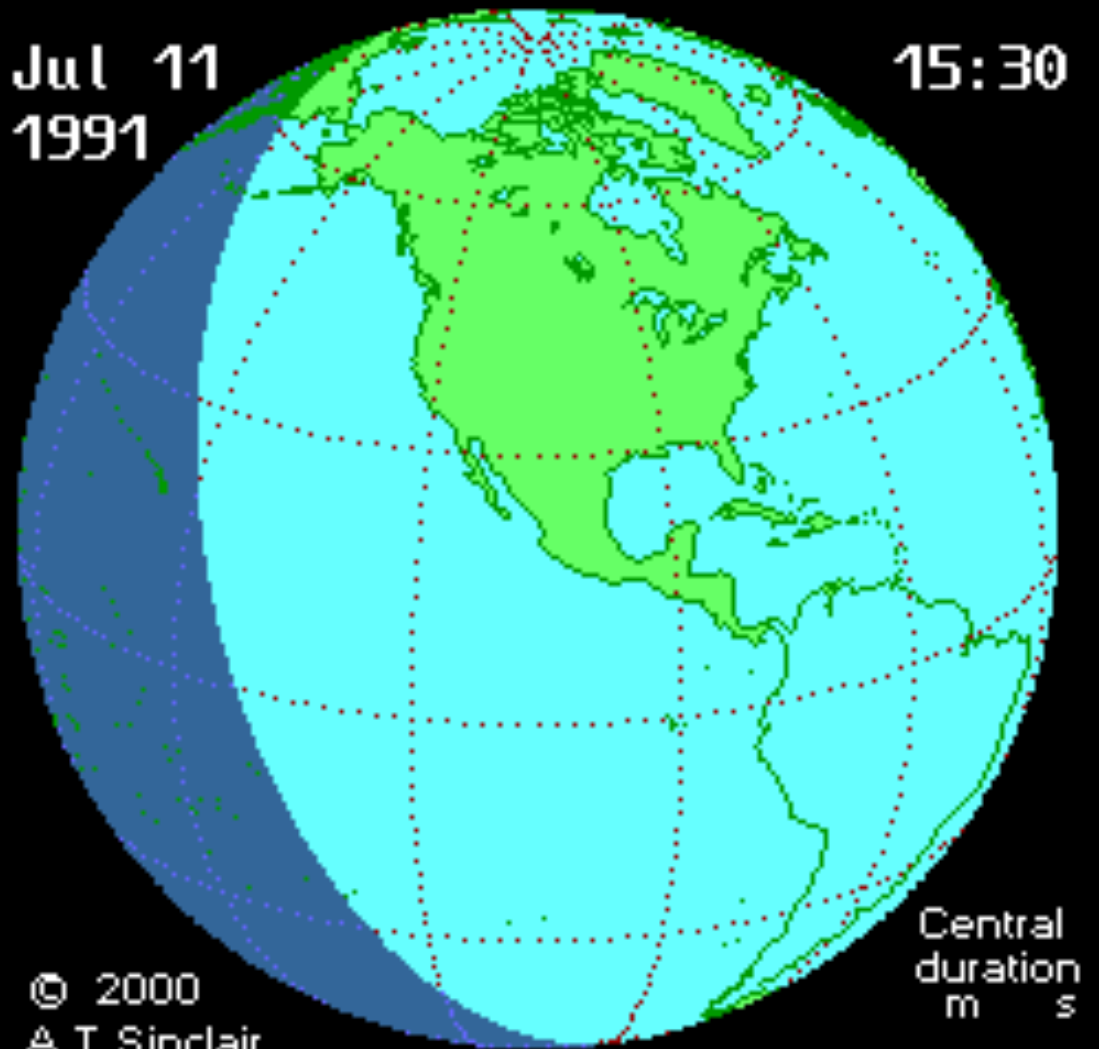


Central
duration
m s

February 26, 1979

Jul 11
1991

15:30



© 2000
A.T.Sinclair

Central
duration
m s

July 11, 1991

Total Solar Eclipse



Forever/USA

2017

Total Solar Eclipse



Forever/USA

2017

What to see...

There are many wondrous things to look for!

- The partial eclipse; from the diminishing sun to pinhole eclipses – *yet this is just the appetizer!*
- Changes in light as the eclipse progresses; diminished light and sharpening shadows
- Changes in the environment; temperature, wind
 - Look for planets, bright stars, shadow, horizon colors
 - Those elusive shadow bands

AND THEN: *TOTALITY!*

2nd Contact, Totality

- Visible planets and stars
- Second Contact: Baily's beads and Diamond Ring
- Chromosphere
- Corona: structure and features
- Prominences
- Apparent darkness
- Reactions to totality; animals, humans



THREE BLINDMICE: THE EARLY DAYS

**For the Partial
Eclipse: Eye
Safety is a MUST!**
*It's not the eclipse
that will blind you,
it's the SUN...*

The Partial Eclipse

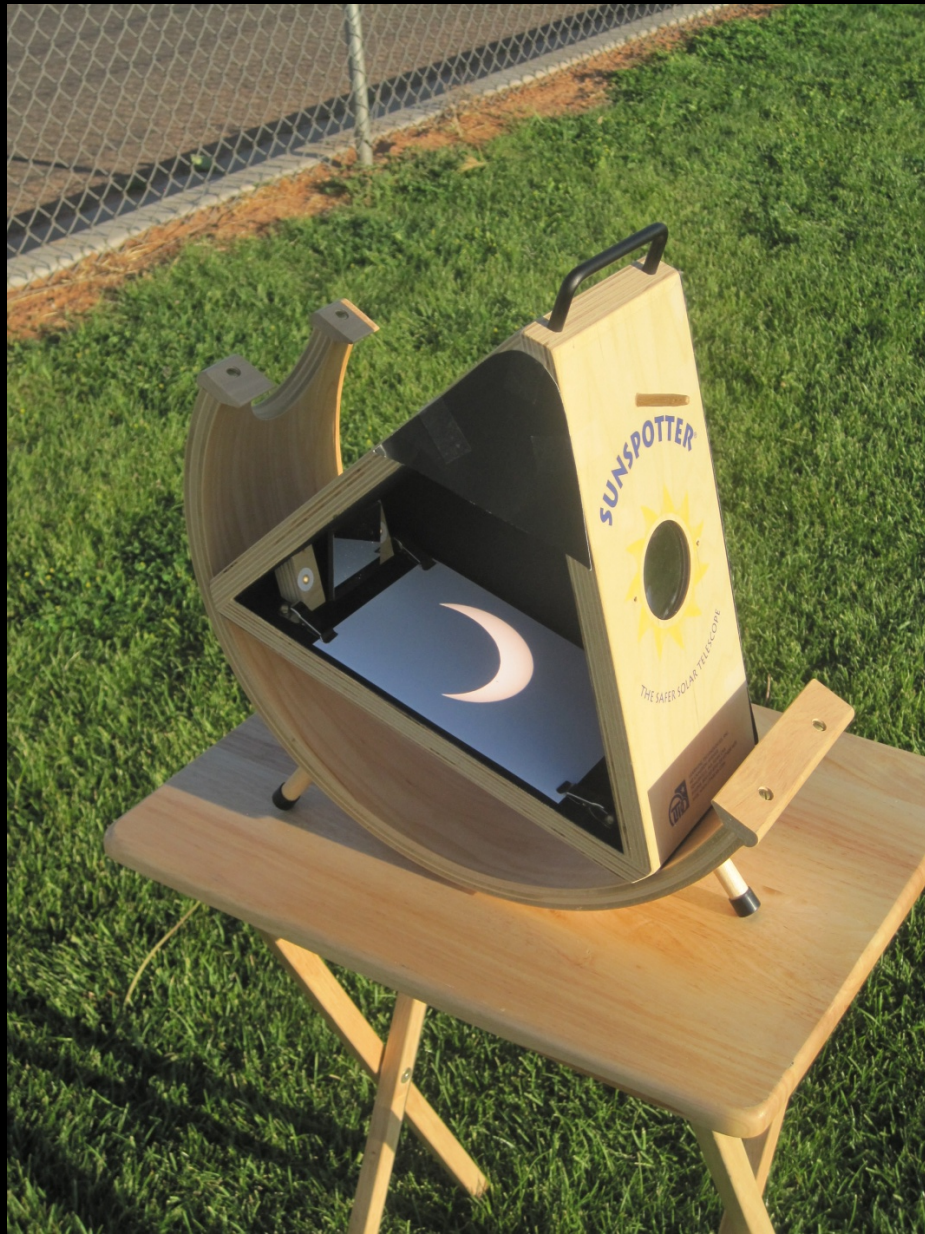
It's not necessary to use a telescope to get a great view



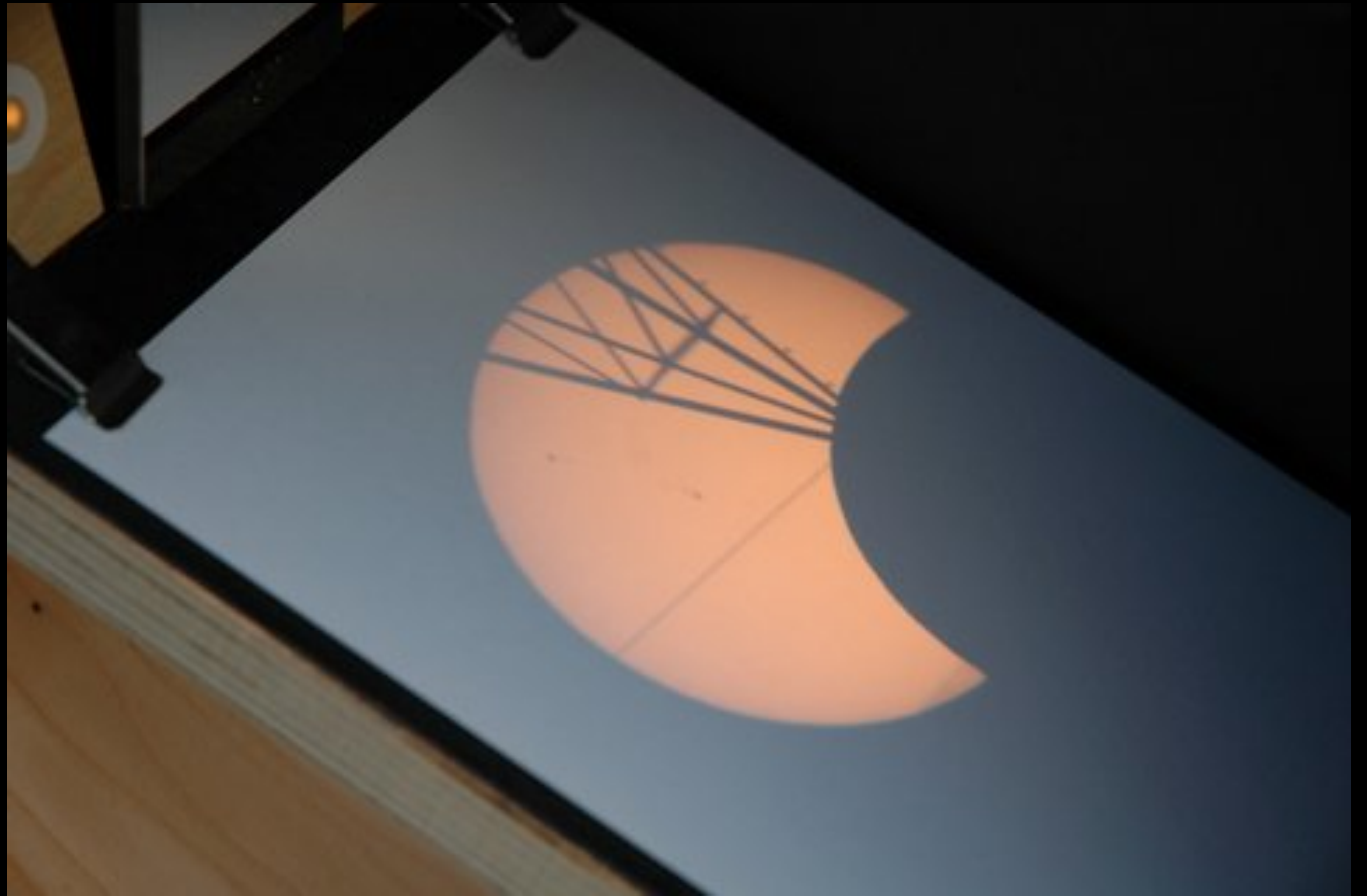
Annual Solar Eclipse
May 20, 2012



Brocken Inaglory



Partial Eclipse Projections *Great for group viewing*



The Partial Eclipse Stage through a Telescope and Solar Filter



**Partial Phase
before Totality
July 22, 2009**



**Partial Phase
after Totality
July 11, 2010**



A Partial Solar Eclipse through a Narrow Band Filter

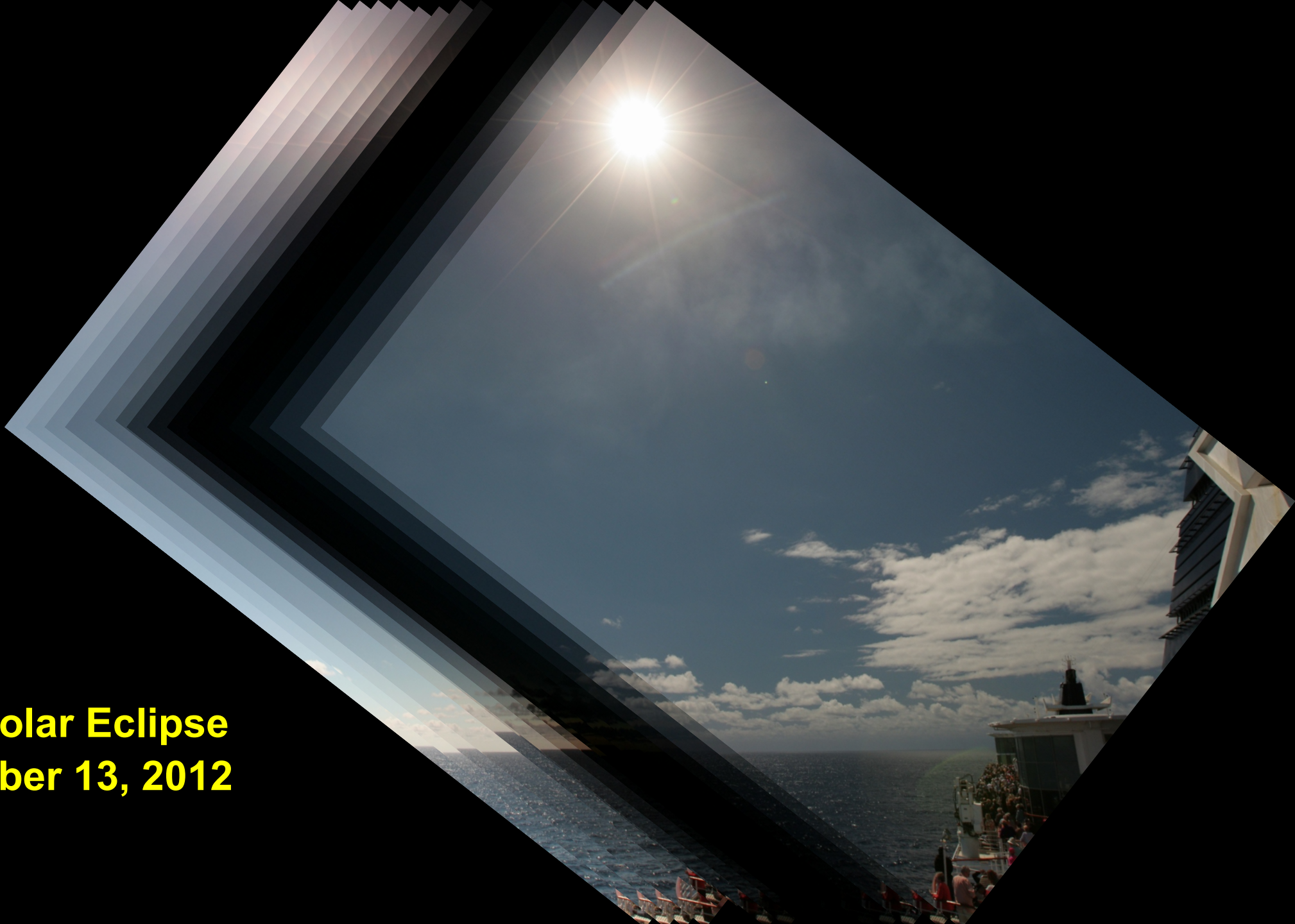
→ Narrow band filters, such as hydrogen-alpha, provide terrific partial eclipse views

October 23, 2014

The Sky at Totality on August 21



Larry A. Stevens



**Total Solar Eclipse
November 13, 2012**



July 22, 2009

Debbie Reynolds



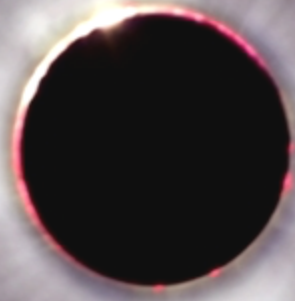
July 22, 2009
Total Solar Eclipse

The Diamond Ring – Second Contact



July 11, 2010

April 8, 2005 Total Solar Eclipse
4 stacked images



Fred Bruenjues, Mike Reynolds, Jen Winter, and Vic Winter



June 21, 2001 Total Solar Eclipse
10 stacked images



March 29, 2006 Total Solar Eclipse
5 stacked images



**11 July 11, 2010 Total Solar Eclipse
Third Contact – Shadow Bands**

Another Series of Eclipse Photos



People



Debbie Reynolds



YOU DUM DUM
GIVE ME GUM GUM

After the
Eclipse!

Jerry Armstrong
July 11, 2010

Planning your eclipse experience

Do NOT wait until the last minute!

- Do not wait to purchase eclipse glasses
- Do not wait to purchase solar filters

Use only CE and ISO certified eclipse glasses!





Planning your Eclipse Expedition

Do NOT wait until the last minute!

- Do not wait to purchase eclipse glasses
- Do not wait to purchase your solar filters
 - Do not wait to choose your site or book your hotel/campground/house
 - Do not wait to test your binoculars, telescope, or camera



No advanced planning?



No advanced planning?



HOTEL!

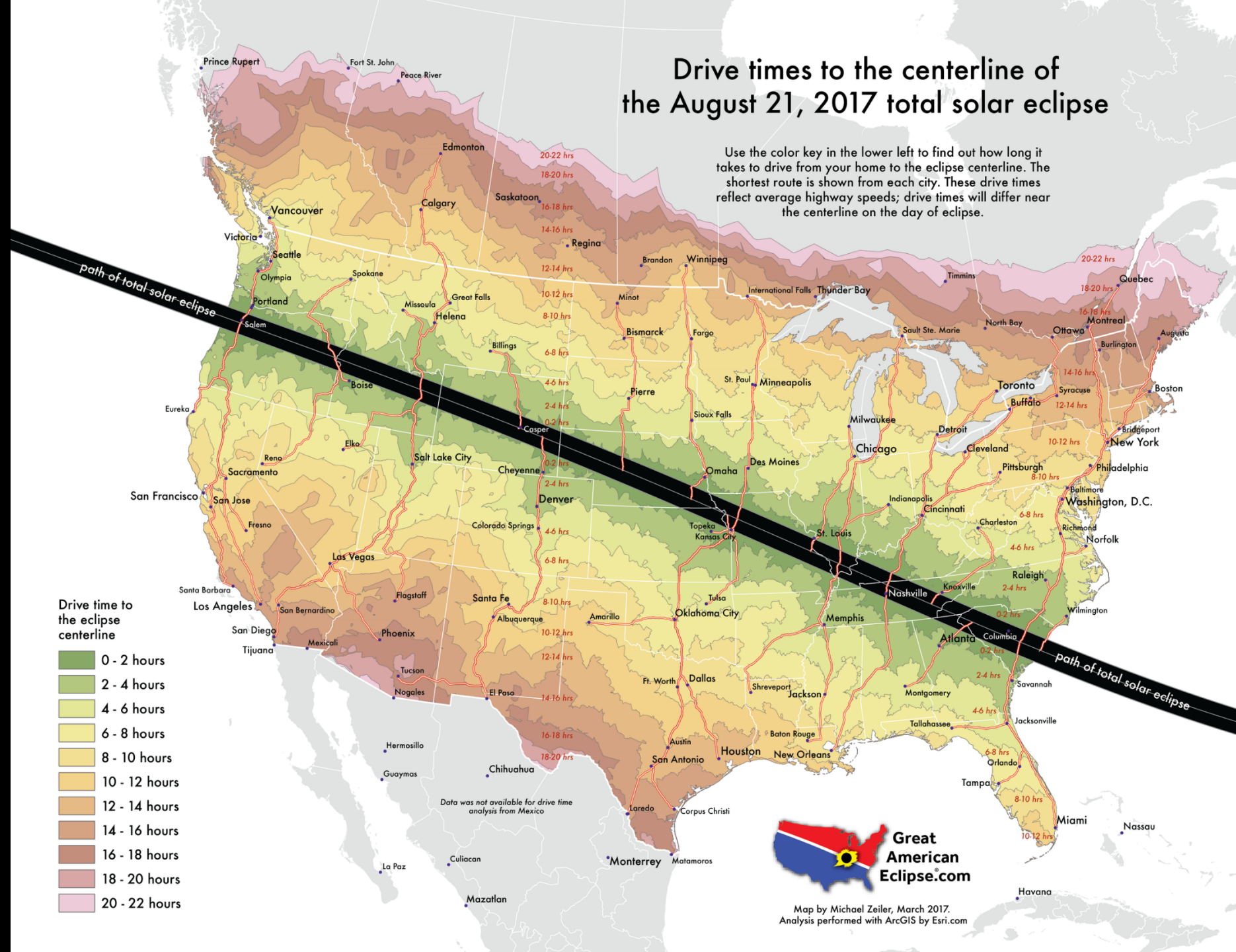


No advanced planning?



Drive times to the centerline of the August 21, 2017 total solar eclipse

Use the color key in the lower left to find out how long it takes to drive from your home to the eclipse centerline. The shortest route is shown from each city. These drive times reflect average highway speeds; drive times will differ near the centerline on the day of eclipse.



Drive time to the eclipse centerline

- 0 - 2 hours
- 2 - 4 hours
- 4 - 6 hours
- 6 - 8 hours
- 8 - 10 hours
- 10 - 12 hours
- 12 - 14 hours
- 14 - 16 hours
- 16 - 18 hours
- 18 - 20 hours
- 20 - 22 hours



Map by Michael Zeiler, March 2017. Analysis performed with ArcGIS by Esri.com

Never quit looking!



8 April 2005 Hybrid Solar Eclipse

Photo by Dr. Mike Reynolds – Canon EOS 10D and a Meade 80mm APO

WARNING!

**DO NOT GET STUCK BEHIND A
TELESCOPE OR CAMERA DURING THE
ENTIRE TOTALITY!**

***Take time to look around before, during, and
after totality***

**Look at the Moon's shadow, horizon and colors,
visible stars and planets, coronal shape, etc.**

Then an instantaneous darkness leaped upon the world. Unearthly night enveloped all.

With an indescribable out-flashing at the same instant the corona burst forth in mysterious radiance. But dimly seen through thin cloud, it was nevertheless beautiful beyond description, a celestial flame from some unimaginable heaven. Simultaneously the whole northwestern sky, nearly to the zenith, was flooded with lurid and startlingly brilliant orange, across which drifted clouds slightly darker, like flecks of liquid flame, or huge ejecta from some vast volcanic Hades. The west and southwest gleamed in shining lemon yellow.

Least like a sunset, it was too somber and terrible. The pale, broken circle of coronal light still glowed on with thrilling peacefulness, while nature held her breath for another stage in this majestic spectacle.

Corona and Coronet: Being a narrative of the Amherst Eclipse Expedition to Japan, in Mr. James's schooner-yacht Coronet, to observe the Sun's total obscuration 9th August, 1896

Mabel Loomis Todd



*Clear Skies in the
Shadow!*



Acknowledgements

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- **Mike Reynolds and Michael Bakich, *A Laboratory Guide for Astronomy***
- **Mike Reynolds and Richard Sweetsir, *Observe Eclipses***
 - The Royal Astronomical Society
 - Larry A. Stevens
- **Mabel Loomis Todd, *Corona and Coronet***
 - *Trendchasers*
 - *UK Daily Express*
 - United States Postal Service
 - Luc Viatour
- **Michael Zeiler, *Great American Eclipse***

SEE ONE OF NATURE'S RAREST OF WONDERS
AUGUST 21, 2017
TOTAL ECLIPSE
 OF THE **SUN**
 ACROSS AMERICA

STAND IN THE SHADOW OF THE MOON
 ON THE MIDLINE OF TOTALITY —
 THE FIRST U.S. TOTAL SOLAR ECLIPSE
 IN A QUARTER CENTURY.
 OVER TWO MINUTES OF
 DARKNESS NEAR NOON.
 THE GHOSTLY
 SOLAR CORONA.

**GRAND TETON
 NATIONAL PARK**
 CONTACT YOUR LOCAL ASTRONOMY CLUB OR VISIT WWW.ECLIPSE.AAS.ORG FOR MORE DETAILS.

**SOLAR
 ECLIPSE**
 CROSSROADS
 OF
 AMERICA

AUG. 21, 2017
 APR. 8, 2024

SOUTHERN ILLINOIS
 UNIVERSITY

SOUTHERN ILLINOIS

FOR MORE INFORMATION VISIT ECLIPSE.SIU.EDU

See The **GREAT
 AMERICAN**

**FIRST TOTAL SOLAR
 ECLIPSE OVER U.S.
 IN 38 YEARS!**

TOTALITY CROSSES:
 OREGON
 IDAHO
 WYOMING
 MISSOURI NEBRASKA
 ILLINOIS KANSAS
 KENTUCKY
 TENNESSEE
 GEORGIA
 NORTH & SOUTH CAROLINA

"From Sea to
 Shining Sea."

**TOTAL SOLAR
 ECLIPSE**
AUGUST 21, 2017

CONTACT YOUR LOCAL ASTRONOMY CLUB OR VISIT WWW.ECLIPSE.AAS.ORG FOR MORE INFORMATION.

SEE THE GREAT AMERICAN
**TOTAL SOLAR
 ECLIPSE**
 St. Joseph, MO
 Rosecrans Memorial Airport
 "HOME OF THE
 139TH AIRLIFT WING"

AUGUST 21, 2017

FOR THE FIRST TIME SINCE 1979
 SEE THE
 ALL-AMERICAN...

TOTAL ECLIPSE OF THE SUN
AUGUST 21, 2017
**GREAT SMOKY MOUNTAINS
 NATIONAL PARK**
 TENNESSEE & NORTH CAROLINA

CONTACT YOUR LOCAL ASTRONOMY CLUB OR VISIT WWW.ECLIPSE.AAS.ORG FOR MORE INFORMATION.

Tyler
 Nordgren