

Celestial Shadows – Eclipses of the Sun

**Presentation to
Lake Kashagawigamog Organization**

March 14, 2024

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**A total eclipse of the Sun is
coming to Canada on April 8, 2024**

**Previous one in Canada: February 26, 1979
(Manitoba)**

**Next one in Canada: August 23, 2044
(BC and Alberta)**

By a coincidence of nature, the Sun is 400 times larger than the Moon, but is also 400 times farther away!

Moon



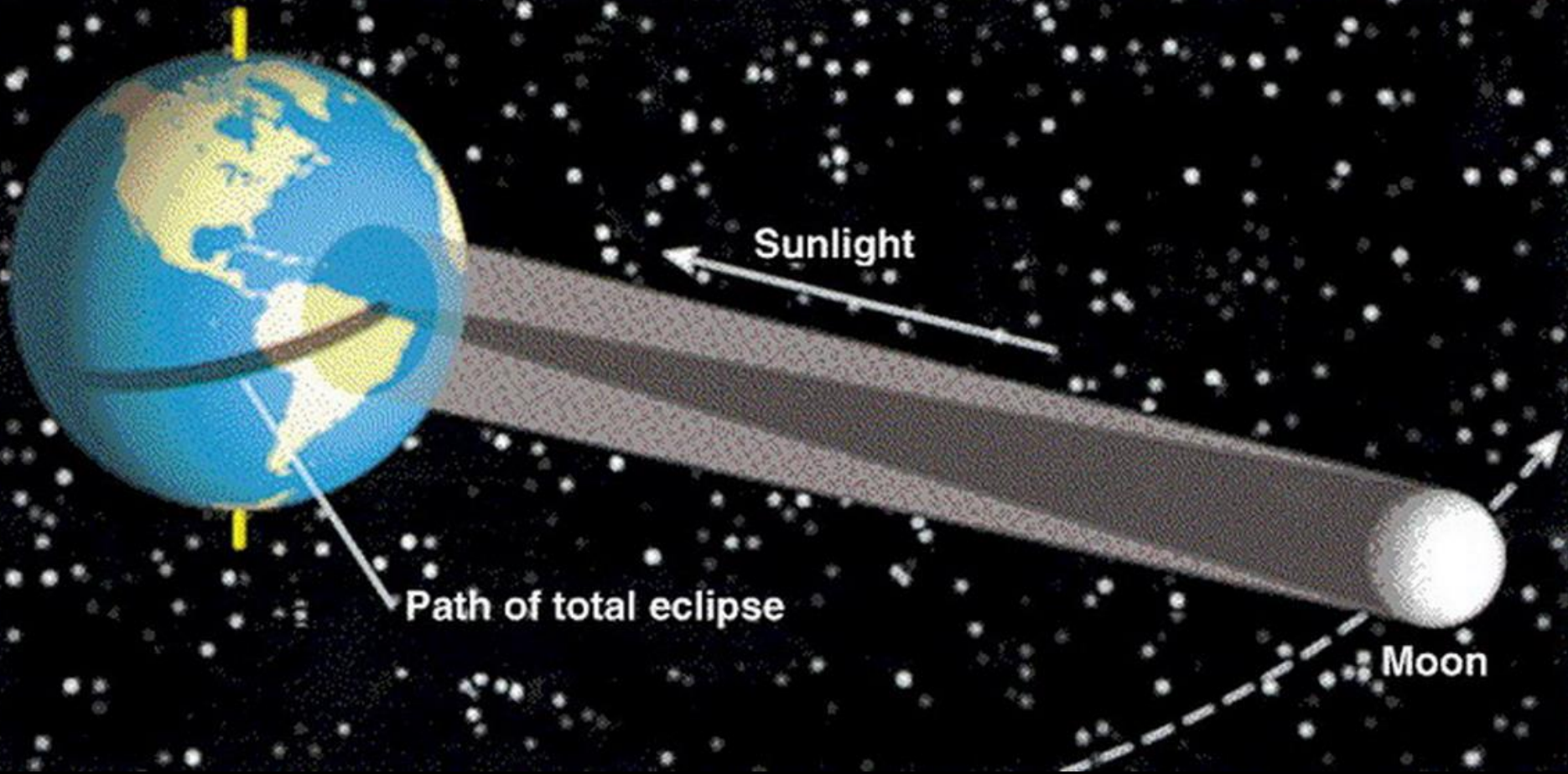
Sun



Therefore, in the sky they appear to be almost exactly the same size!

This means if the alignment is just right, the Moon can BARELY cover up the Sun.





Sunlight

Path of total eclipse

Moon

August 11, 1999



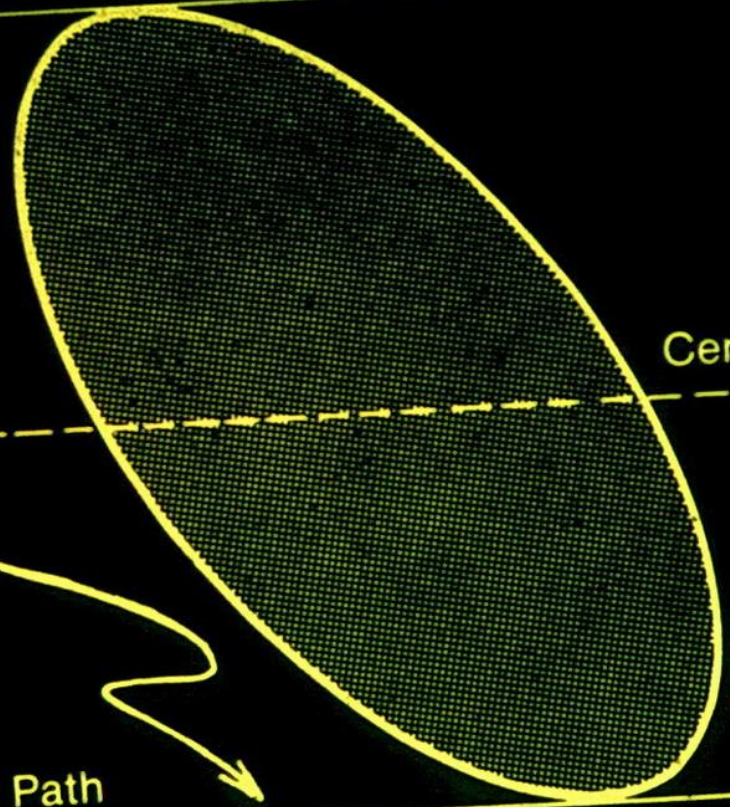
Northern Limit of Eclipse Path

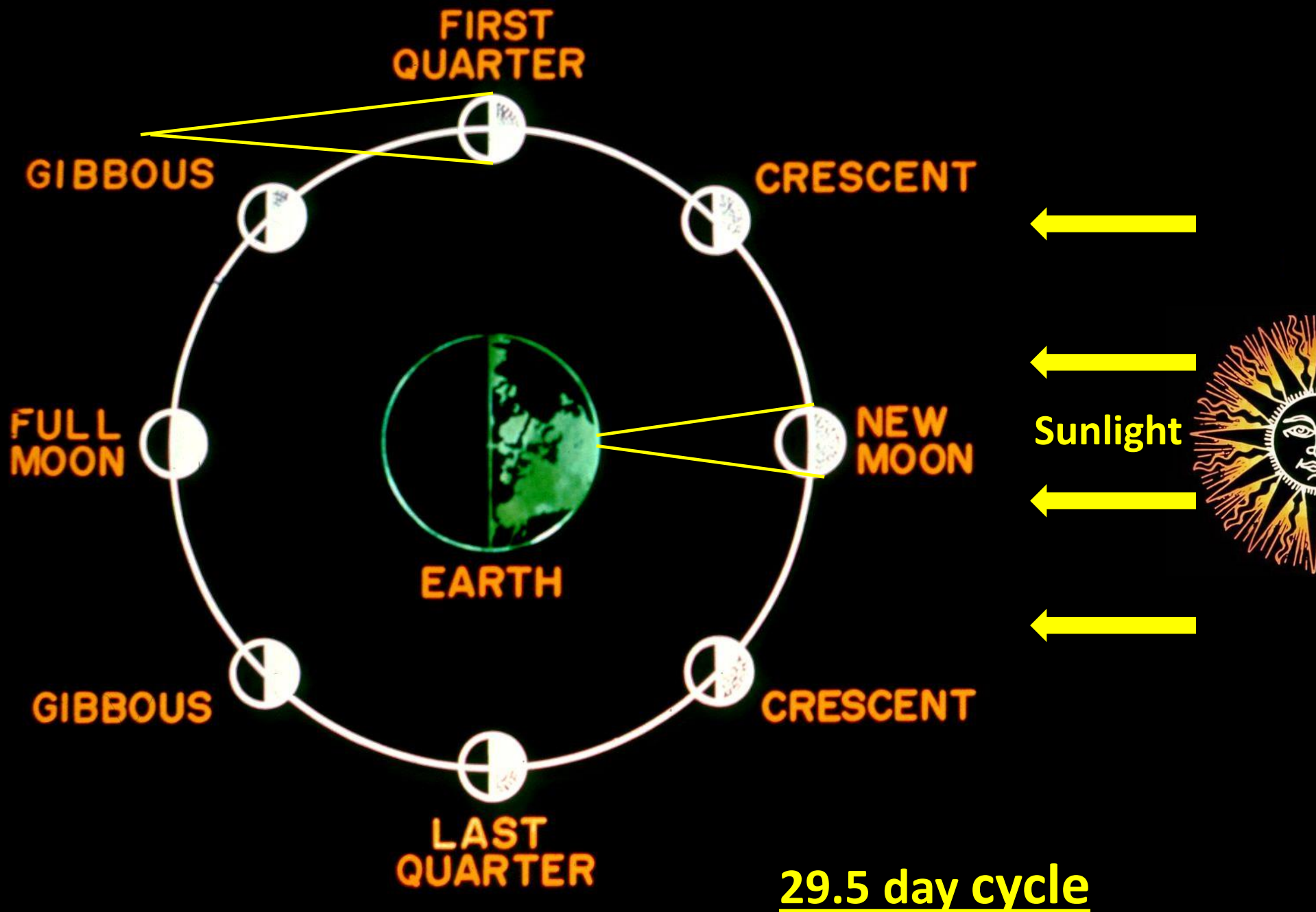
TOTALITY IS LONGER NEAR CENTRAL LINE

SHORTER DURATION NEAR EDGE OF SHADOW

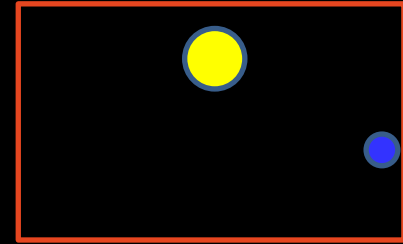
Central Line of Eclipse Path

Southern Limit of Eclipse Path

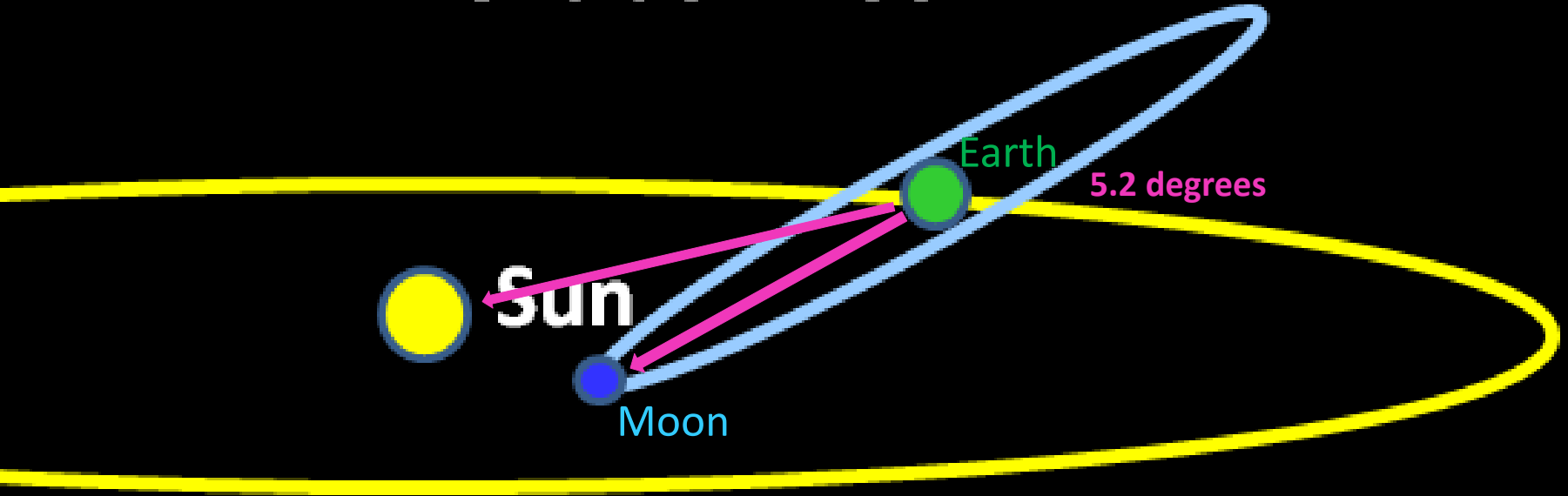




Example: Moon passes below the Sun



Orbit of Moon



Orbit of Earth

The Sun and Moon appear to move in a repeating pattern in the sky

The pattern repeats in 18 years, 11 days and 8 hours

This period is called the “saros”

Successive eclipses in a saros are shifted $\frac{1}{3}$ of the way around the Earth

Saros #139

- 71 eclipses
- May 17, 1501 – July 3, 2763
(1,262 years)

4 Successive Eclipses in Saros #139

March 7, 1970 - Mexico, US, Nova Scotia

March 18, 1988 – Philippines, Indonesia

March 29, 2006 – Egypt, Libya, Turkey

April 8, 2024 - Mexico, US, Eastern Canada

Here is a summary of the concepts:

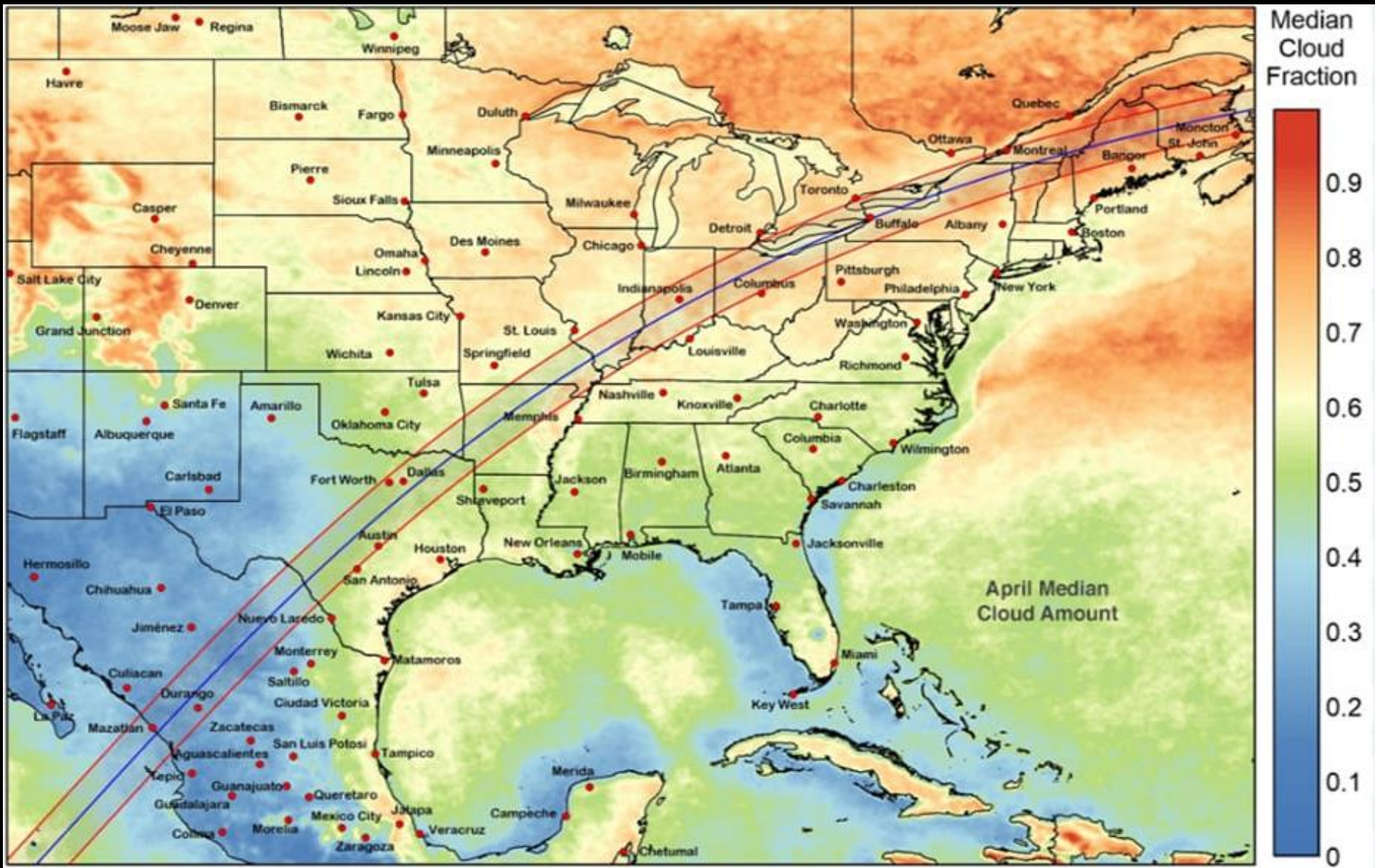
- a solar eclipse can only happen at New Moon
- tilt of Moon's orbit causes the Moon to miss the Sun at most New Moons
- solar eclipses repeat in the 'saros' cycle of 18 years, 11 days and 8 hours
- successive eclipses in a saros are shifted $\frac{1}{3}$ of the way around the Earth, towards the West
- many saros cycles (around 45) are occurring at the same time
- we get a total eclipse somewhere on the Earth about every 18 months

The Next Total Solar Eclipse for North America

Monday - April 8, 2024



Expected Cloudiness along the Path



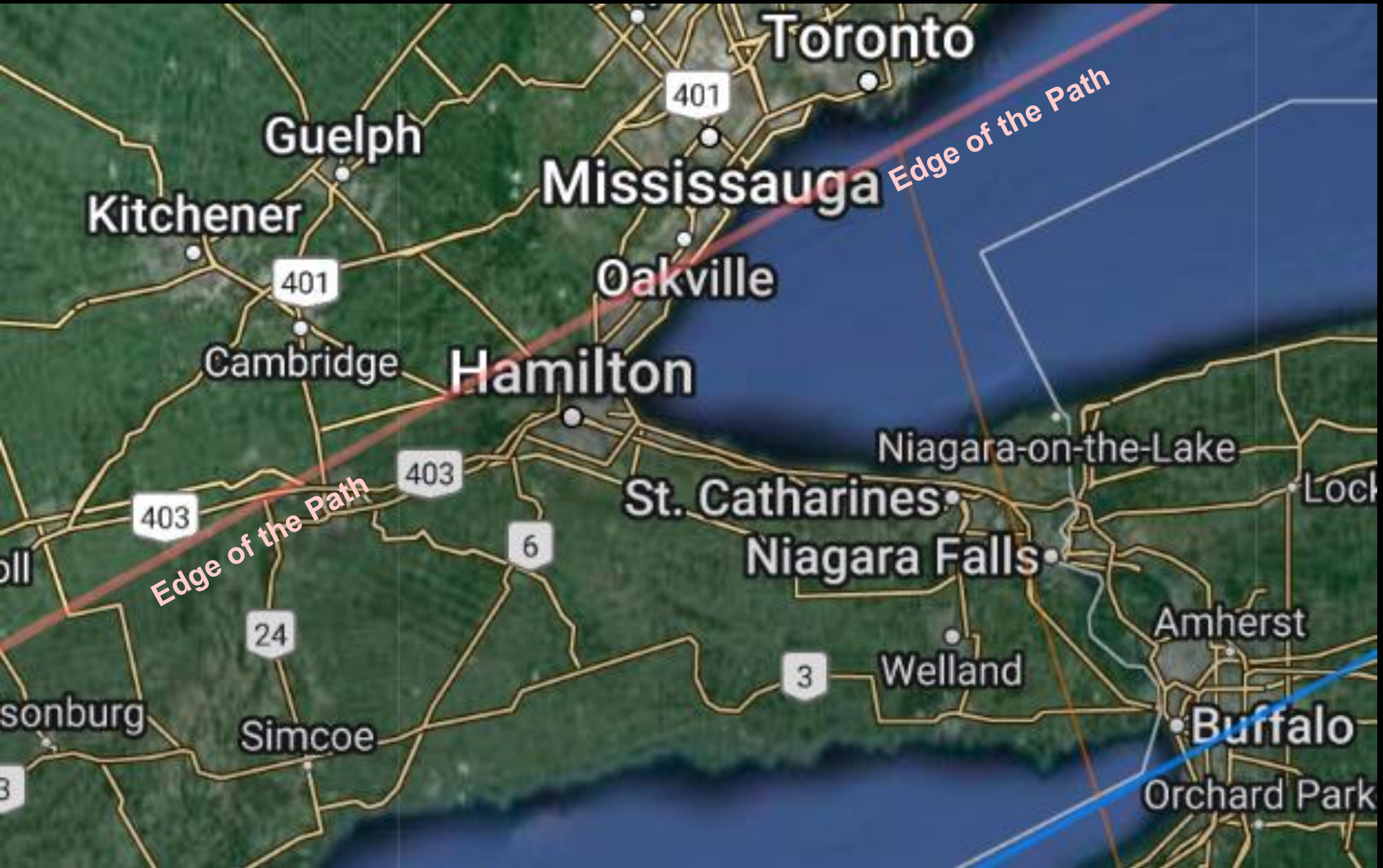
Monday, April 8, 2024



The path in Ontario

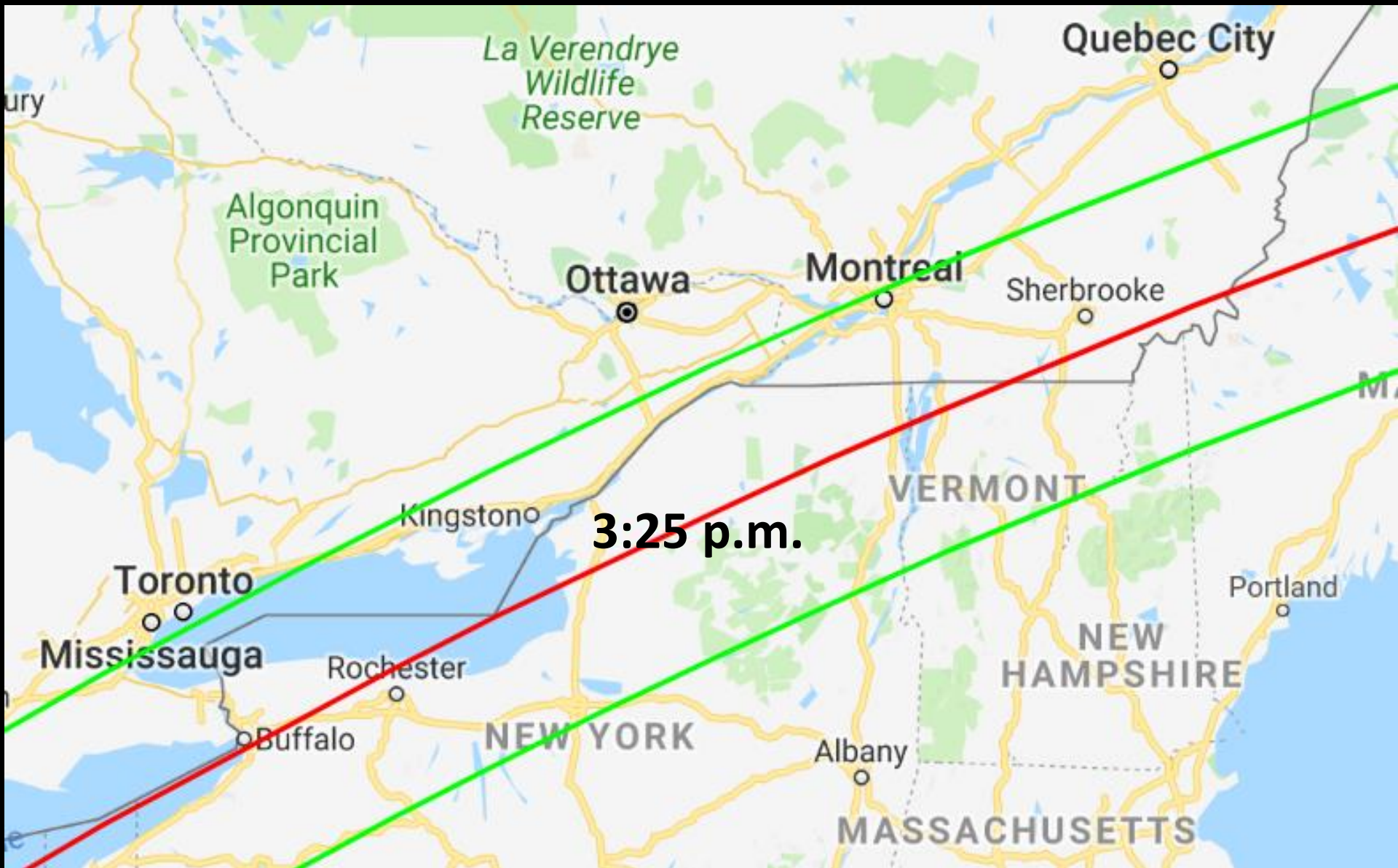


The path south of Toronto



Close-up: The path south of Toronto





3:25 p.m.

Quebec City

La Verendrye
Wildlife
Reserve

Algonquin
Provincial
Park

Ottawa

Montreal

Sherbrooke

Kingston

VERMONT

Toronto

Mississauga

Rochester

Buffalo

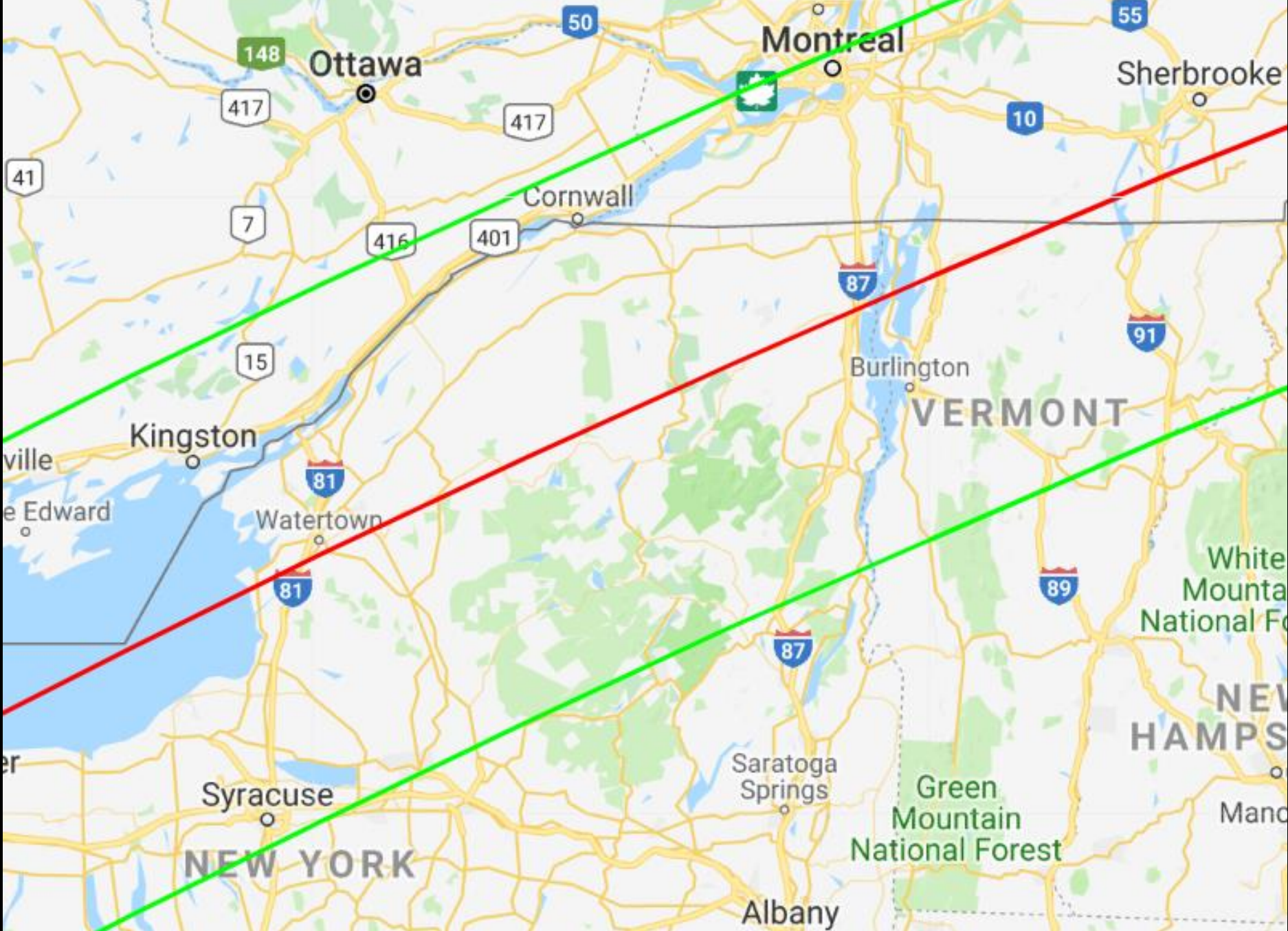
NEW YORK

Albany

NEW
HAMPSHIRE

Portland

MASSACHUSETTS



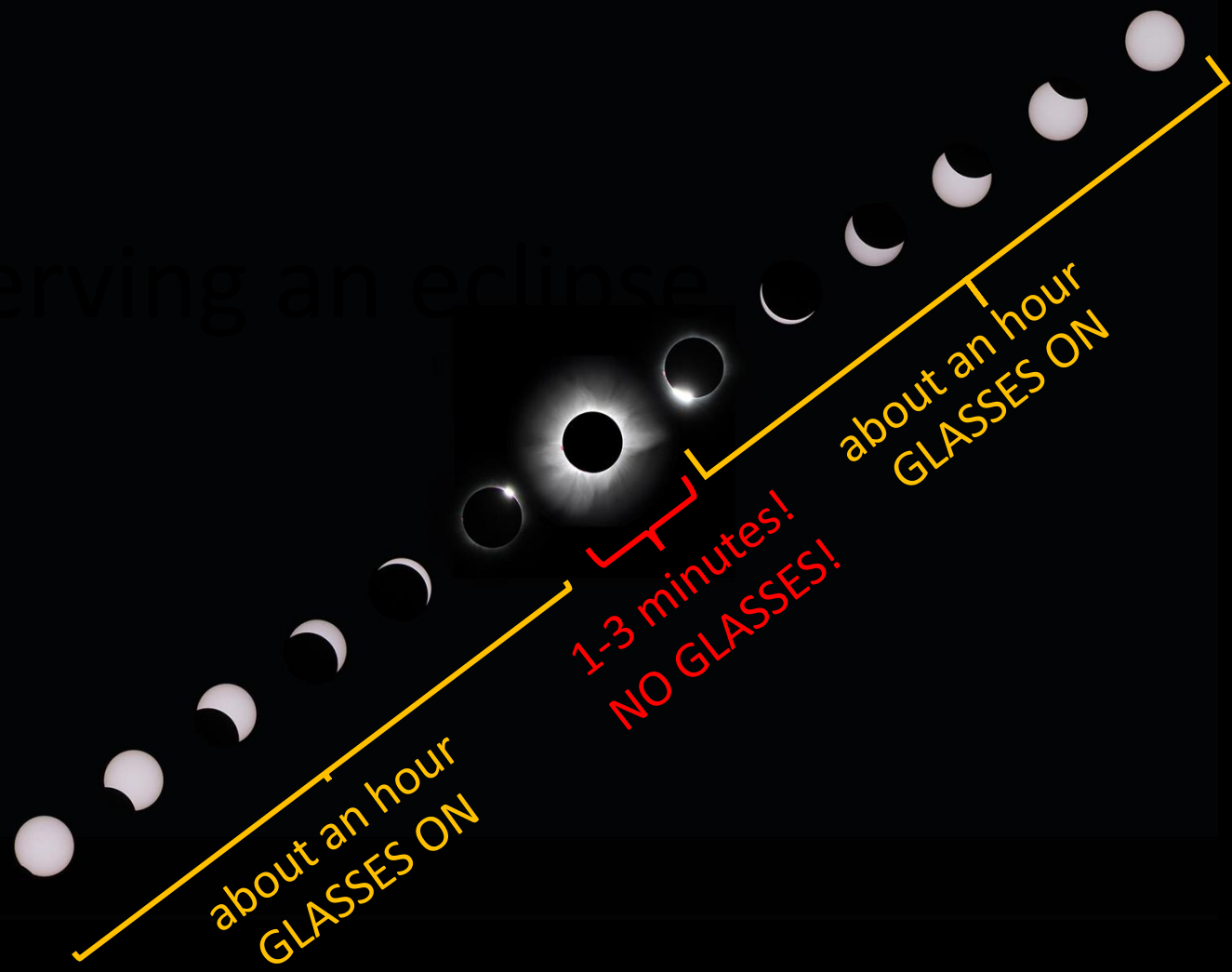
Travelling to the path south of Ottawa



Length of Totality at various locations

Royal Botanical Gardens	1 min 20 sec
Grimsby Beach	2 min 47 sec
Niagara Falls	3 min 29 sec
Welland	3 min 31 sec
Kingston	3 min 1 sec
Brockville	2 min 46 sec
Prescott	2 min 30 sec

erving an eclipse



It is **critical** to obtain safe “eclipse glasses” that meet the ISO standard

The Royal Astronomical Society of Canada is already sold out!

But there are other good, safe sources:

[Our Solar Eclipse Glasses \(monarchbutterflyeclipse.com\)](https://monarchbutterflyeclipse.com)

[The Great 2024 Eclipse Guide \(International\) – ShopAtSky.Com](https://shopatsky.com)

[Baader NASA-Approved Solar Eclipse Glasses - Pack of 10 \(khanscope.com\)](https://khanscope.com)

They may be available at SOME Home Hardware stores!

TOTAL SOLAR ECLIPSE • APRIL 8TH 2024

SOLAR ECLIPSE GLASSES

\$2.99

SKU# 74903

NOW SOLD AT
Orillia
Home
hardware
building centre

100% of the profit will go to The Monarch Butterfly Eclipse Foundation

THE MONARCH BUTTERFLY ECLIPSE PROJECT

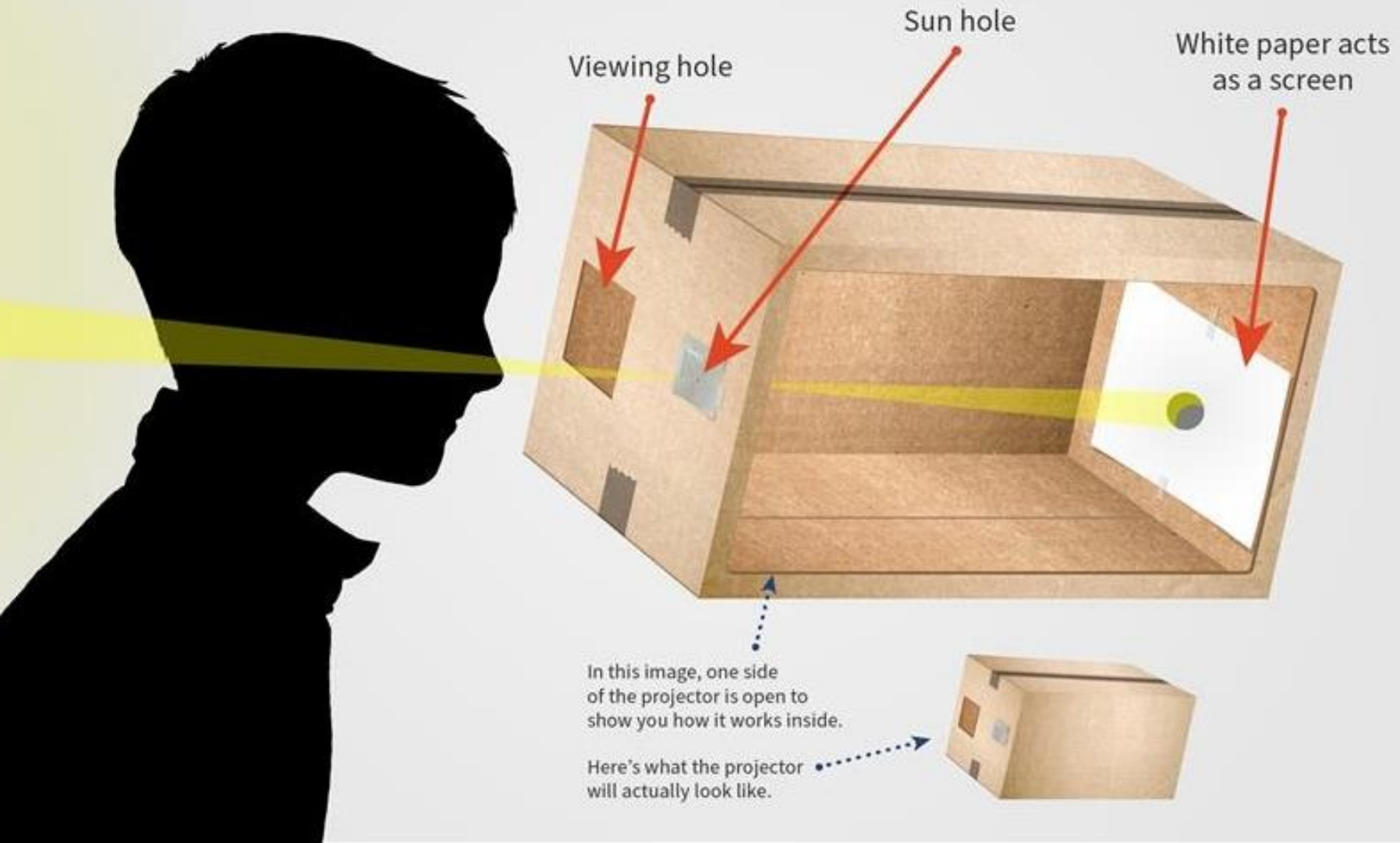
FOR MORE INFORMATION, CONTACT:
info@monarchbutterfyeclipse.com
www.monarchbutterfyeclipse.com

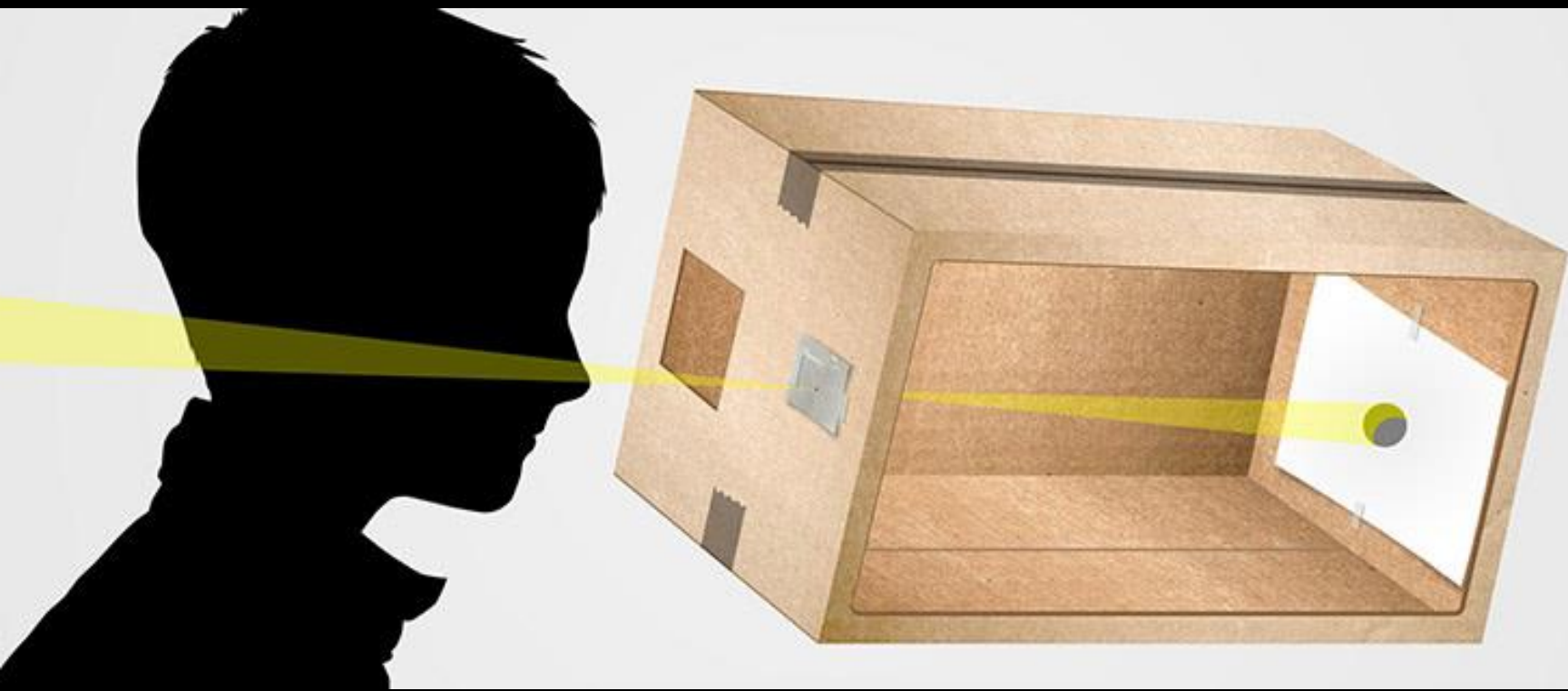
...Also at SOME Canadian Tire stores

...AND at branches of the various Public Libraries in Ontario



SOLAR ECLIPSE PROJECTOR





[Website:](#)

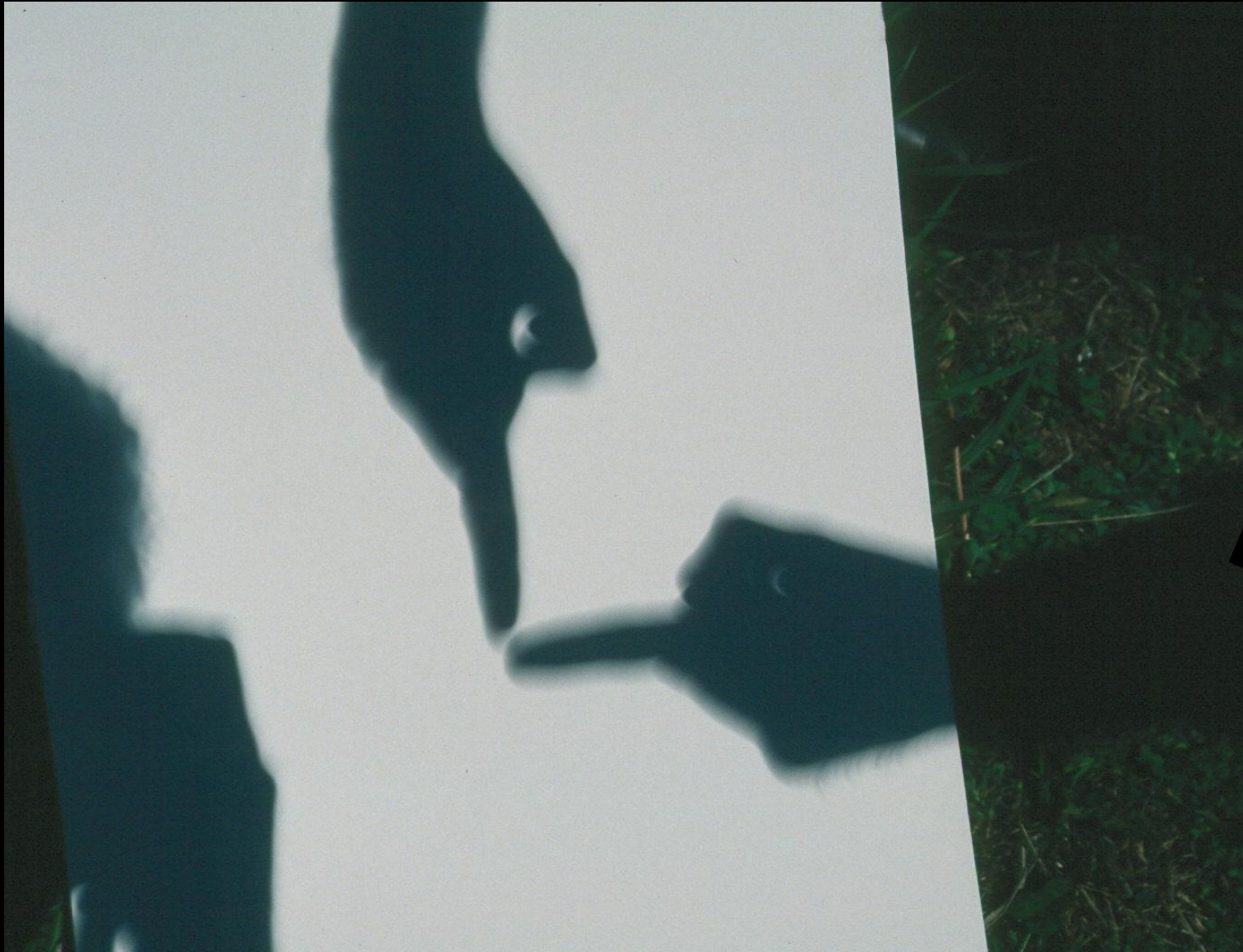
[How to make your pinhole projector for eclipse viewing
Canadian Space Agency \(asc-csa.gc.ca\)](#)

Some interesting things you can do....





Look at the way shadows change as the Sun is covered....



May 10, 1994



Look at the sky during totality
(March 29, 2006 – Libya)



Look for planets during totality

Jupiter



Moon



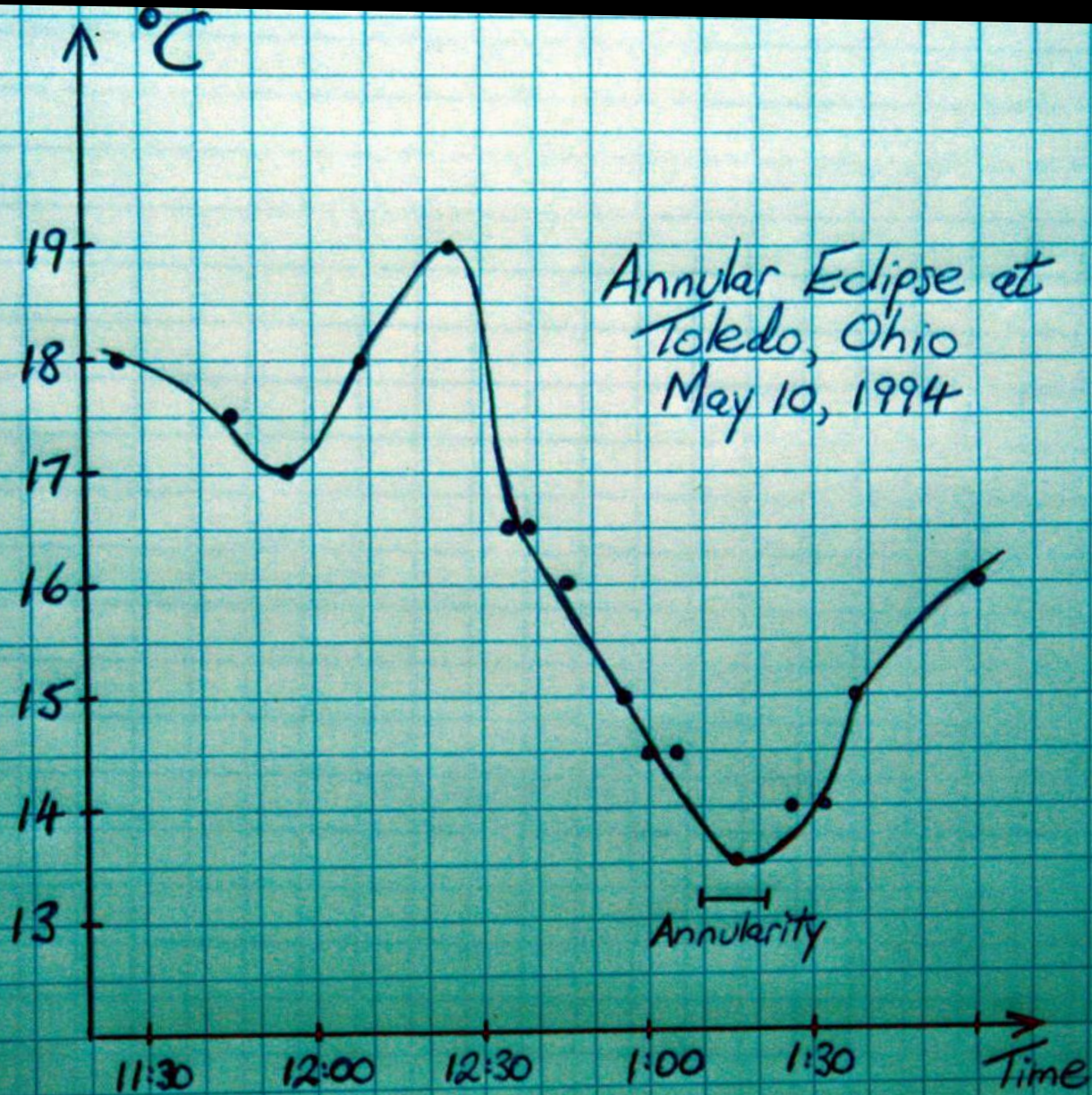
Venus



Observe animals during totality



Measure the change in temperature



You want to take pictures?

Absolutely, but **please** don't spend most of totality taking pictures!

Instead - look around, gaze at the stunning sight of the corona, EXPERIENCE and REMEMBER your 1 or 2 minutes in the shadow of the Moon!

An excellent website with advice about how to photograph the eclipse:

[How to Photograph a Total Solar Eclipse \(mreclipse.com\)](http://mreclipse.com)

A very useful website about the eclipse

<https://www.theweathernetwork.com/en/news/science/space/how-to-prepare-for-the-april-8-total-solar-eclipse-across-eastern-canada>

What can you do to plan for April 8, 2024?

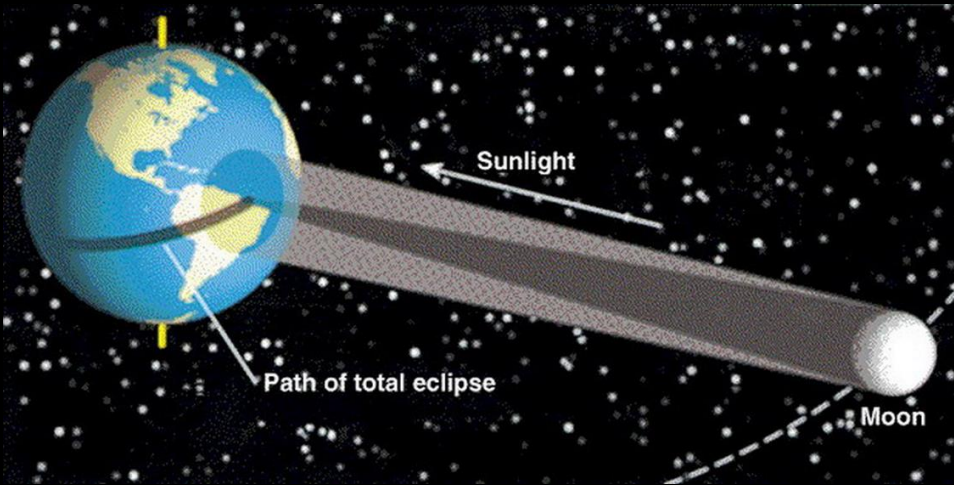
Totality in Southern Ontario will occur around 3:20 p.m. and south of Ottawa around 3:25 p.m.

- Obtain a safe solar filter for the partial phases; **don't** wait, act NOW!
- Decide where you plan to be; please do **NOT** stay in Toronto or Ottawa - arrange to travel inside the path of totality
- Do **NOT** try to travel to the path at 1 p.m. on Eclipse Day!
- Do **NOT** try to cross the border to Upstate New York on Eclipse Day!
- Consider booking a hotel for a place inside the path for the nights of April 7th or April 8th
- Watch the weather websites carefully, and adjust your plans as needed
- **Mobility** is the key!

Good luck!

Thank-you!

It's been a pleasure to spend this time with you tonight!



Note: Key items from this presentation will be provided to LKO, for posting on the website