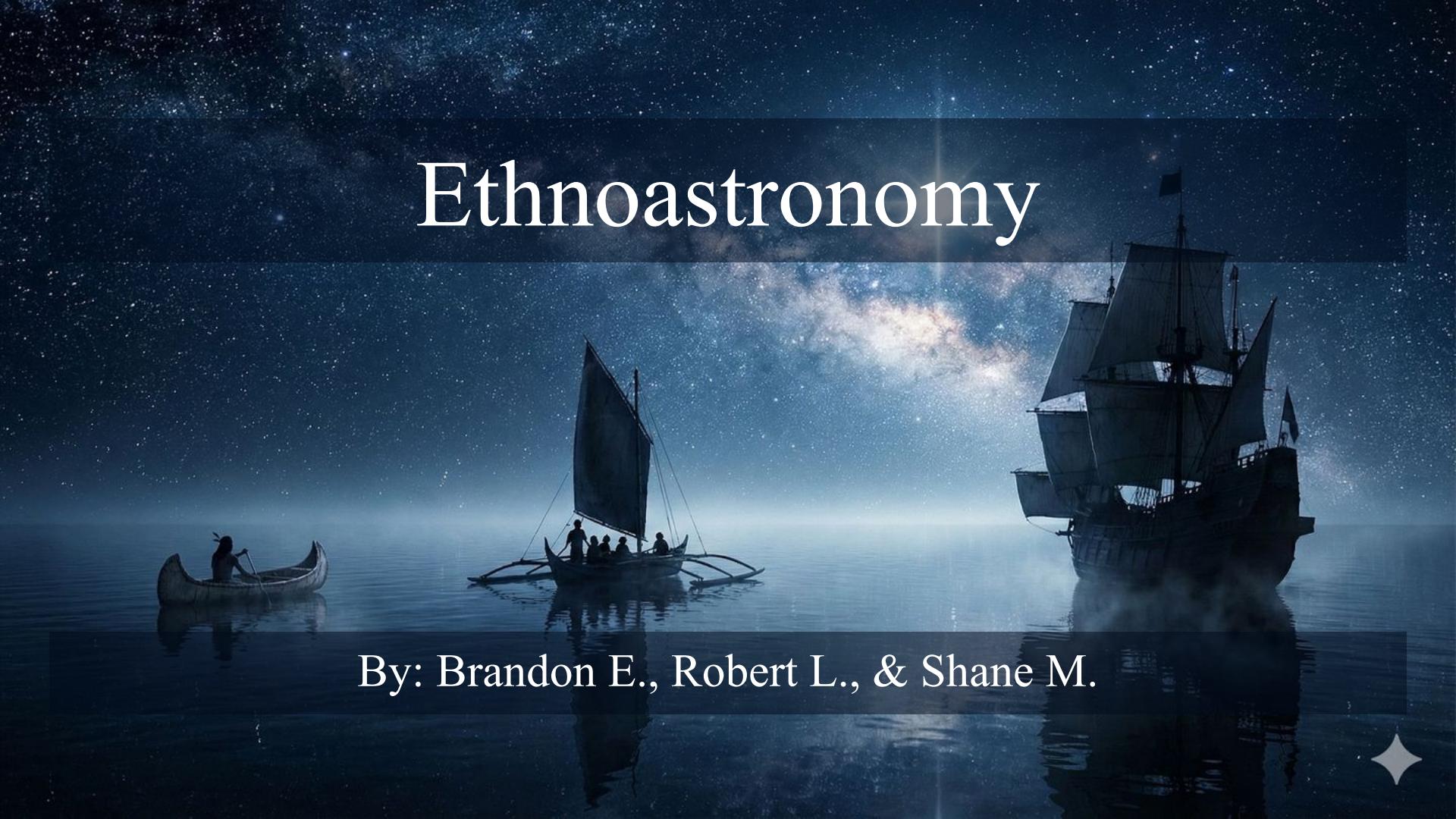


Ethnoastronomy



By: Brandon E., Robert L., & Shane M.



Our Ethnic Origins

New Zealander

Robert

French Canadian

Spanish

Brandon



Danish

Scottish

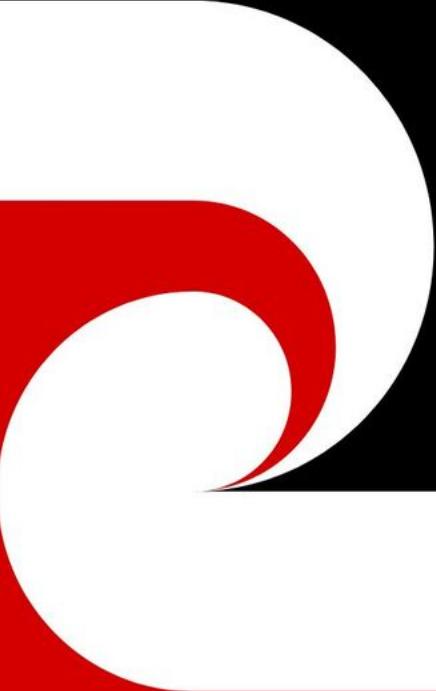
Shane

German

Irish



Filipino

A large, stylized circular logo is positioned on the left side of the slide. It features a thick red outer ring and a white inner ring. The white ring is partially cut off on the right side, creating a dynamic, swirling effect that suggests movement or a path.

New Zealand Māori/Polynesian (1200 - 1800 CE)

Polynesians Explore the Pacific - How?

- Polynesians explored the Pacific via sailing. Almost all of the islands in the Pacific are visited by the time New Zealand is found.¹
- How did they travel the Pacific so effectively? The sky and stars!²



Figure nz1: Map and timeline of Polynesian exploration

Māori - Using the Stars

- Traveling the Pacific was not easy, especially for large open distances with no (is)lands in sight.
Need something to help orientate oneself.
- For example, you can find your northerly latitude by checking Polaris' altitude using your fingers as a ruler after placing your thumb on the horizon.³

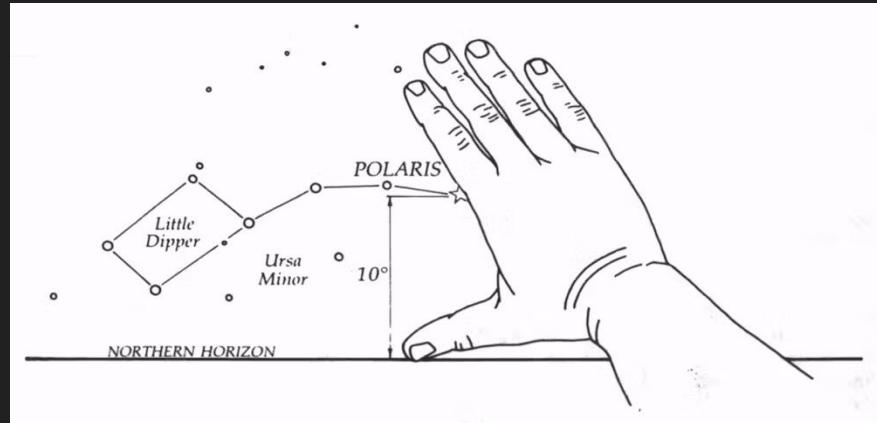


Figure nz2(top): Visual guide for how Polynesians would wayfind by hand

Figure nz3 (bottom): The nighttime wayfinding scene from Disney's Moana



Māori - Using the Moon

- The Māori accurately tracked the phases of the moon. Each phase was named to align specifically with a story or figure from myth as a timekeeping tool.²
- Phases corresponded with tides as well, letting explorers know when shallow passages between islands would open for travel and trade.⁴

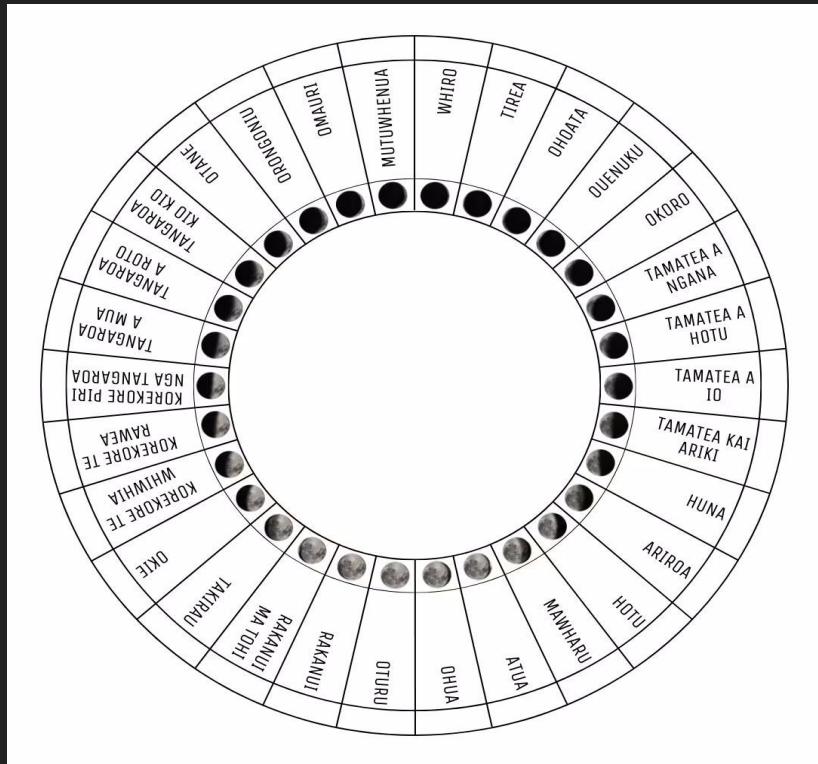


Figure nz4: Maramataka (The Moon) and her phases

Denmark

(1500-1900 CE)

Pre-Christian Denmark - Before Common Era

Nordic astrological beliefs grew across Scandinavia:

- Mythology not focused primarily on the night sky, though the stars and Sun were used for navigation lightly (North Star).
- Most of the origins and stories are lost for specific Danish folklore. Sources are rooted in 1400 CE texts after Christianization, so Modern Danish traditions are almost completely influenced by Christianity rather than Norse traditions.⁵



Figure d1: Various Norse Constellations

Ole Rømer (1644 - 1710)

- Born in Denmark, studied at the University of Copenhagen, then worked at the Royal Observatory of Paris.
- Invented the Alt-Azimuth mount for telescopes, still used today!⁶
- His largest contribution to astronomy was the breakthrough discovery that light travels at a finite speed.⁷

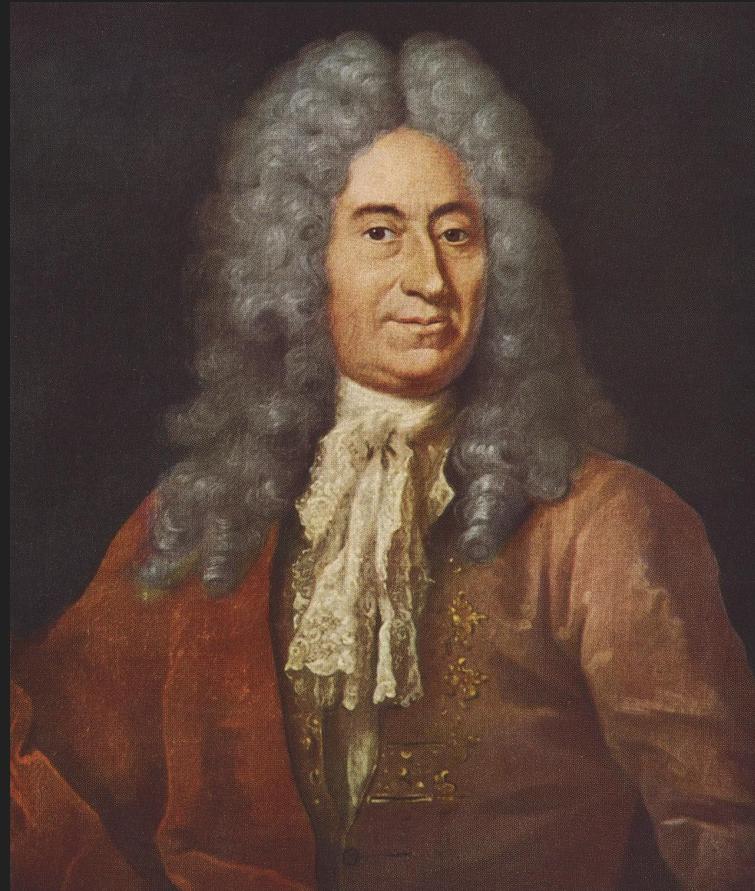


Figure d2: Ole Rømer, 1700 CE

His work on the eclipses of Io

- Rømer was timing eclipses of Jupiter's moon Io to help navigators.⁷
- Io was calculated to have an orbital period of 42.5 hours.⁷

Timing of eclipses should be consistent if the speed of light is infinite.

- However, Io emerged from Jupiter's shadow sooner or later than predicted depending on the time of year, up to 12 minutes!



Figure d3: Io as it transits Jupiter

Why would Io's emergence be faster or slower than expected?

- A. Kepler's Laws did not account for the gravity of the outer planets pulling on Io, greatly changing its position.
- B. Rømer did not know the real distance of the AU to correct his calculations, leading to a misuse of Kepler's Laws.
- C. The time it takes for light to travel is not instant, and thus depends the distance between the Earth and Io which varies as the Earth orbits the Sun.
- D. All of the above.

Answer: C

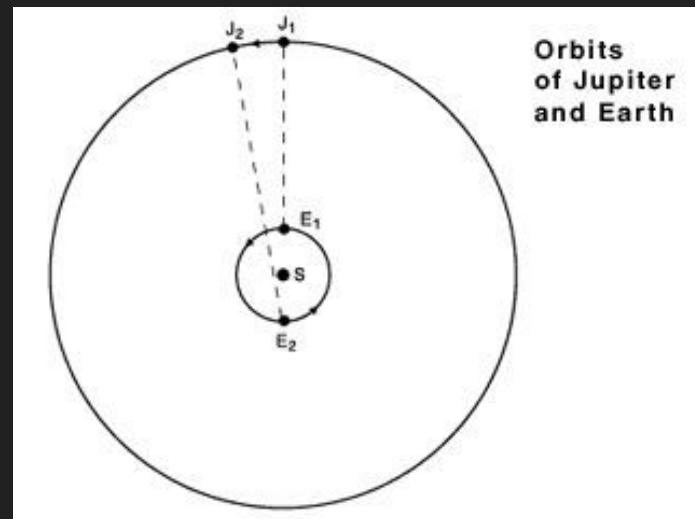


Figure d4: Diagram visualizing different distances between Earth and Jupiter based on their orbits



Neolithic Ireland (3300 BCE)

Newgrange

- rediscovered in 1699, approximately 5000 years old (3200 BCE)^[8]
- astronomically aligned with winter solstice sunrise, illuminating inner chamber^{[8][9]}
- part of Brú na Bóinne complex, containing astronomically aligned tombs like Knowth and Dowth



Figure i1: Newgrange, Brú na Bóinne, County Meath, Ireland

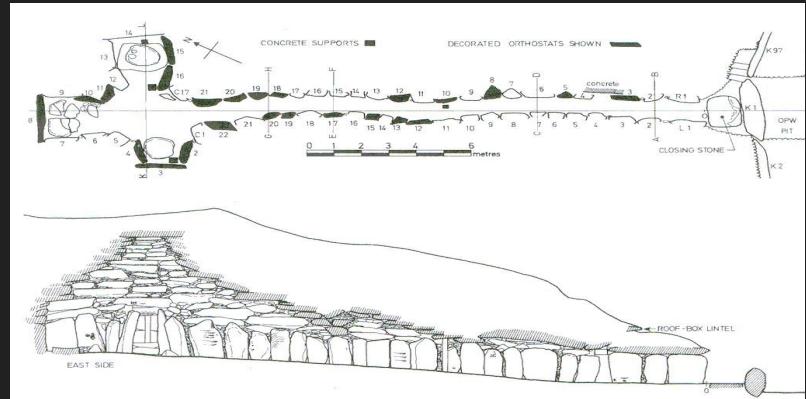


Figure i2: Newgrange Interior Diagram

Clicker: What is the purpose of the winter solstice alignment?

- a) mark the rebirth of the sun and start of a new year
- b) bring honor to ancestors
- c) signal the timing of seasonal rituals or feasts
- d) track agricultural cycles
- e) embody the relationship between the heavens and earth
- f) pure coincidence



Figure i3: Newgrange inner chamber during winter solstice

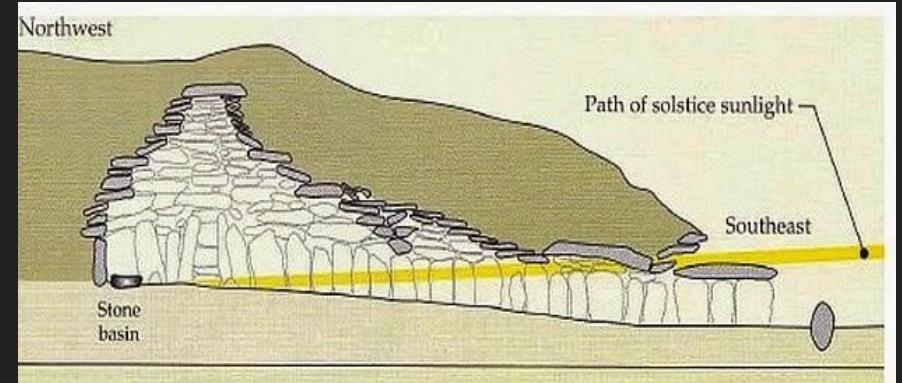


Figure i4: Diagram of solstice sunlight

Kerbstones

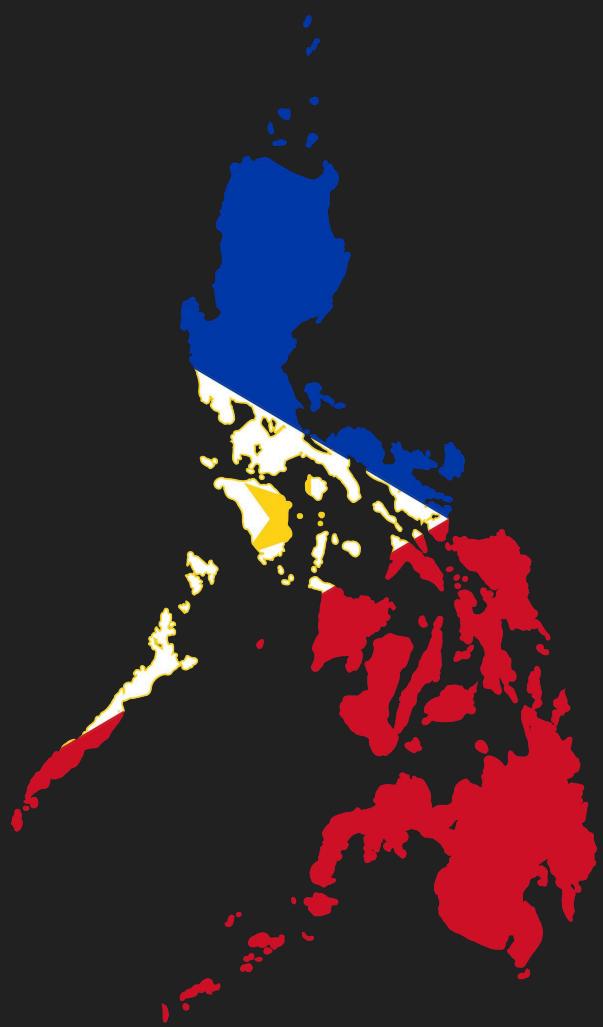
- Knowth contains more than 200 stone carvings - some astronomical^{[8][10]}



Figure i5: Knowth Kerbstone K52 'Calendar Stone'



Figure i6: Knowth Kerbstone K15 'Sundial Stone'



Pre-Colonial Philippines (900-1560 CE)

Significance of the Sky

- aware of influence of Buwan (the Moon) on tides, believed it also affected all biological life^[11]
- heliacal rising of Moroporo (Pleiades) star cluster marked the beginning of planting and harvesting seasons for rice and other crops^[12]
- most regions believed the sky was the home to deities, celestial phenomena seen as bad omens^[13]



Figure p1: Pleiades star cluster 'seven little goats'

The Bakunawa, Moon-eating Serpent

- ancient belief of the existence of 7 moons
- Bakunawa, a massive serpent, consumed 6 of the 7 moons
- bamboo planted on remaining moon - dark “stains”
- lunar eclipses were attempts to consume the final moon^{[11][14]}

Clicker: As an early Filipino, how would you stop Bakunawa from eating the Moon?

- a) lighting bright lights to blind the beast
- b) make noise by banging pots, drums, and other objects
- c) throwing stones at the creature
- d) pray for divine intervention

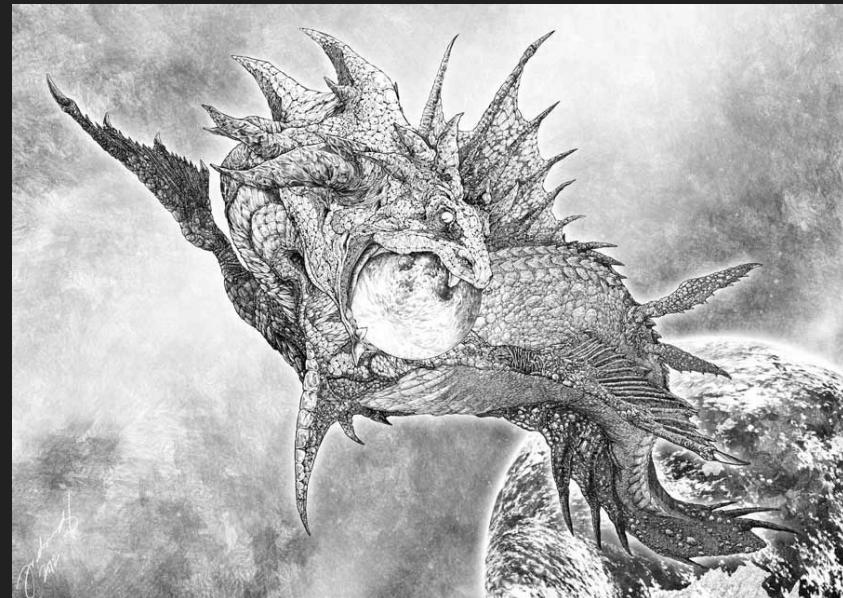


Figure p2: Artist's illustration of Bakunawa



The Spaniards 

(1500 - 1850 CE)

The Mathematical Sky

- South of the Equator, **Polaris** is invisible.

(Day): Solar Observation.

- Measured the Sun's altitude at Local Noon using an **Astrolabe** or **Cross-staff**.^{15,17}
- Calculated latitude using declination tables.¹⁵

(Night): The Southern Cross

- **Early Method:** Extending the Cross's axis 4.5 times.¹⁶
- **Refined Method:** Using pointer stars (**Alpha/Beta Centauri**) for intersection and verification.¹⁶



Figure s1: A digital rendering depicting an Astrolabe and a Cross-staff.

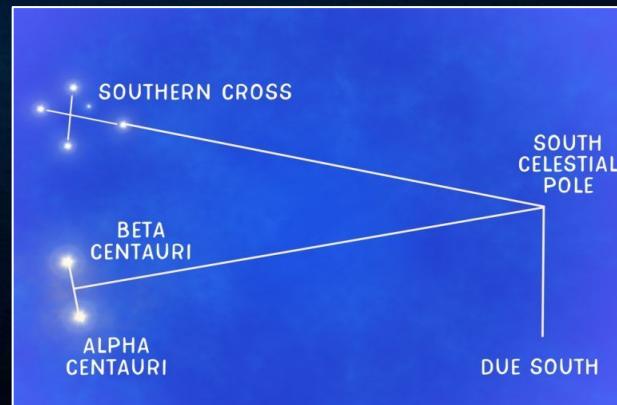


Figure s2: Illustration of the refined method for locating the South Celestial Pole using the Southern Cross and its pointer stars.



La Canícula

- "Heliacal Rising" of **Sirius** (rising with the Sun).¹⁸

In Spanish folklore, what was the canícula believed to cause?

- A. Wine spoiling or fermenting too quickly
- B. Dogs and people going mad from the heat
- C. Bad luck for marriages
- D. Fish disappearing from rivers

Answer: B



Figure s3: An artistic depiction of the heliacal rising of Sirius (the Dog Star) with the Sun

“Dog Days” = hottest summer weeks

From Sirius, the “Dog Star” in Canis Major.¹⁸

Sirius heat + Sun heat → madness



The Voyageurs



(1600 - 1850 CE)



The Voyageur's Sky

- Early French Canadians traveled a 5,000 km 'Voyageurs' Highway'.¹⁹
- Relied on *L'Étoile du Nord* (Polaris) on inland seas.²⁰

What do you think they called the Big Dipper?

- A. The Great Bear (L'Ours)
- B. The Beaver (Le Castor)
- C. The Canoe (Le Canot)
- D. The Saucepan (La Casserole)

Ans: D



Figure f2: Roberto under the Big Dipper. Mt. Cokely



Figure f1: Stars around Polaris. Buttle Lake

The Stargazer

David Thompson (1770–1857), known to Indigenous peoples as *Koo-Koo-Sint* ("The Man Who Looks at Stars").²¹

- Surveyed **80,000 km** by canoe and foot (equivalent to circling the globe twice).²²
- Mapped **3.9 million km²** (one-sixth of North America).²²

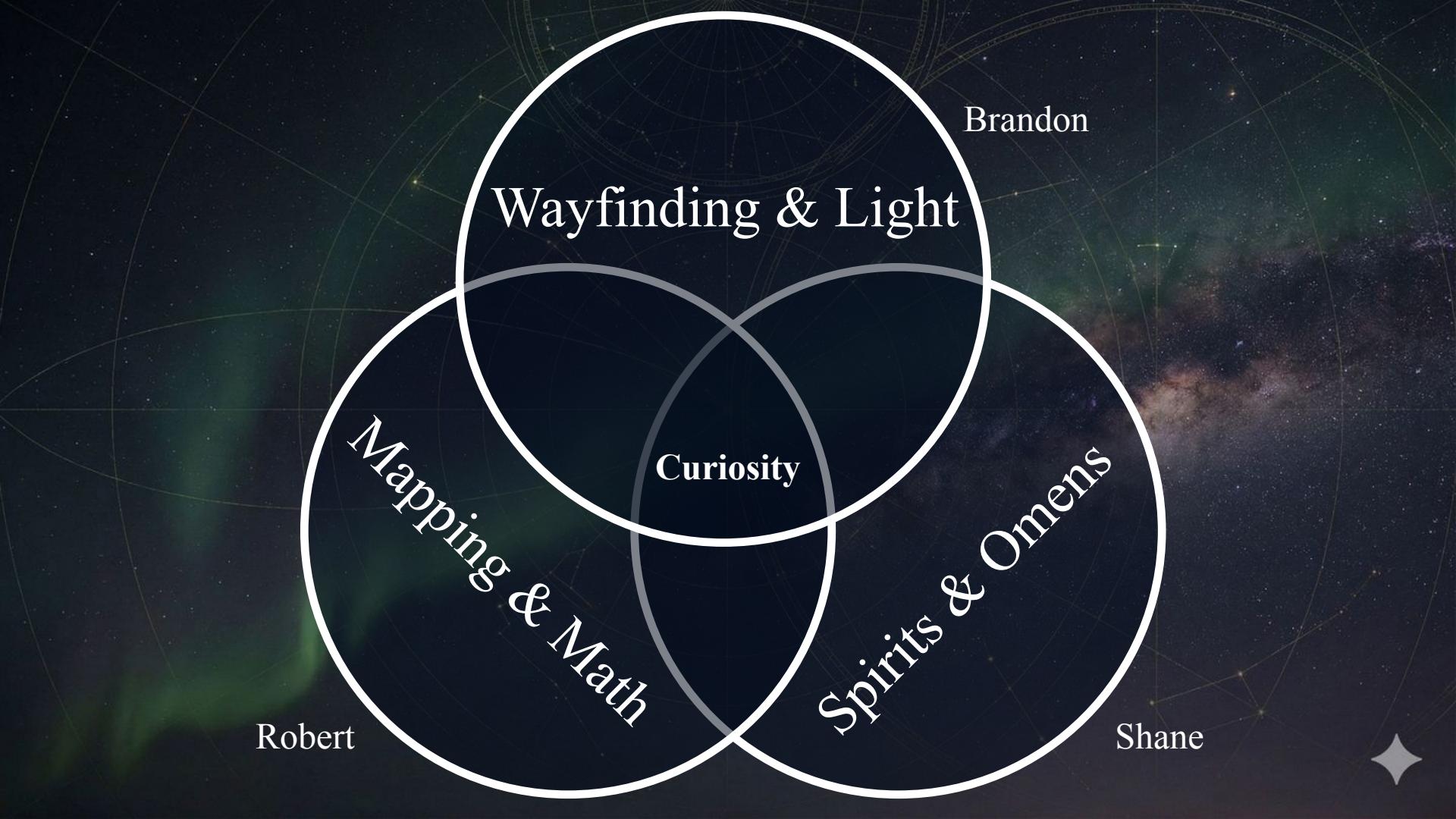
- Sextant & Artificial Horizon:** Used a pan of liquid **mercury** to create a reflection of the stars for measuring latitude.²³
- Chronometer (Watch):** Kept **Greenwich Mean Time** to calculate longitude.²⁴



Figure f3: David Thompson's 1814 map of the North-West Territory.



Figure f4: Illustration of a Sextant and the Artificial Horizon used by surveyors.



Brandon

Wayfinding & Light

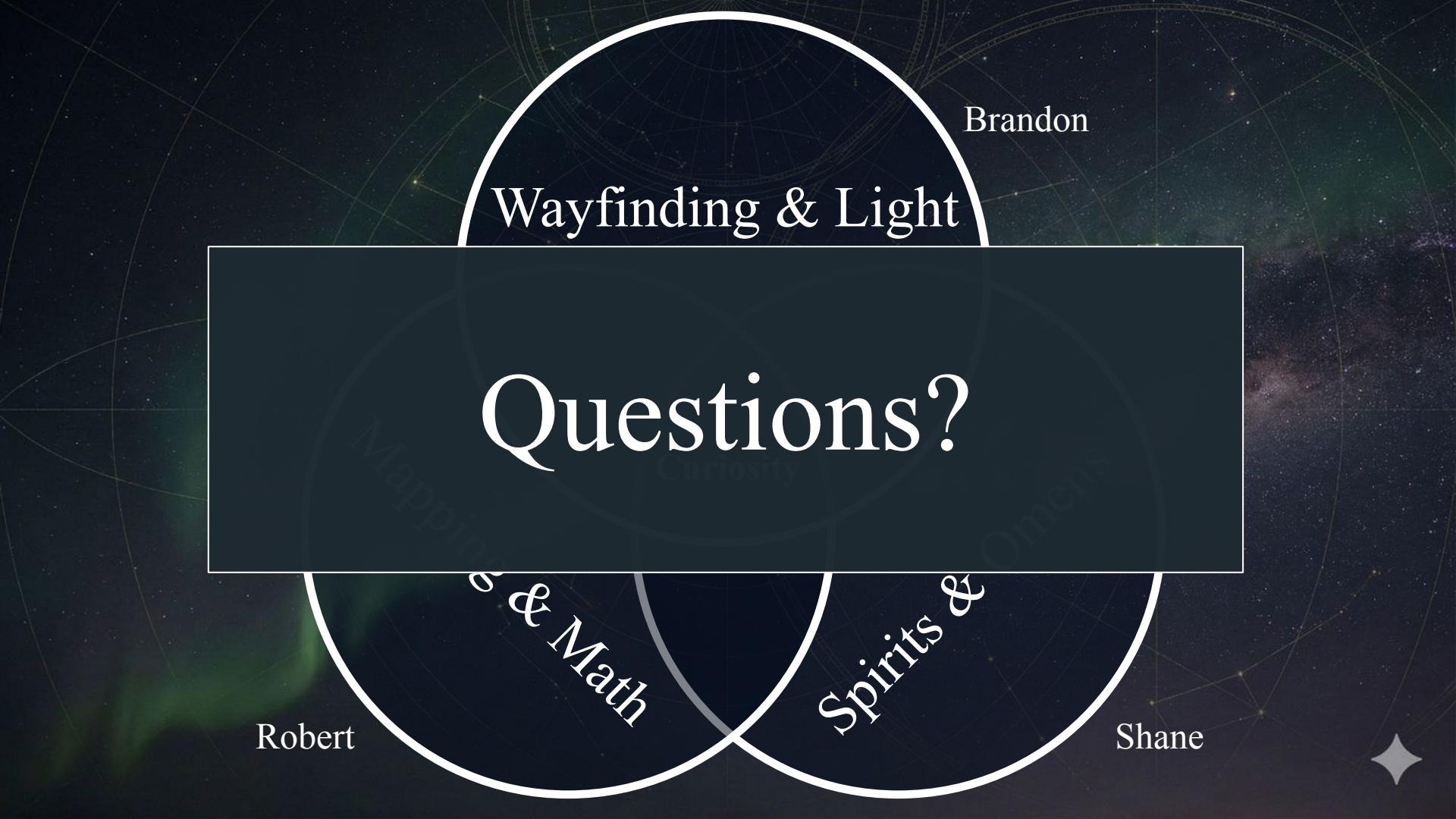
Curiosity

Mapping & Math

Robert

Spirits & Omens

Shane



Wayfinding & Light

Brandon

Questions?

Robert

Shane

Spirits & Math

Spirits &