WHAT DOES IT TAKE?
WHAT DOES IT TAKE?

The moon's orbit is tilted.

5° tilt
WHAT DOES IT TAKE?
What does it take?
WHAT DOES IT TAKE?
WHAT DOES IT TAKE?
WHAT DOES IT TAKE?

• With modern computing power it is relatively easy to calculate and predict both solar and lunar eclipses well into the future
• Ancient astronomers were able to predict them as well
• Most cultures consider eclipses to be significant events
ANTIKYTHERA MECHANISM

• Ancient Greek Astronomical Calculator (Orrey) discovered in early 1900’s by some divers
• Considered by many to be the earliest discovered example of an analog computer
• Could be used to predict astronomical positions including eclipses decades ahead of time
• Believed to be created during the Hellenistic Period
ANTIKYTHERA MECHANISM
ANTIKYTHERA MECHANISM
MAYAN CALENDAR

• Used multiple calendars to seek correspondences to predict eclipses
• Tzlokin cycle (260 days) (13 numbers and 20 day names)
• Tun cycle (360 days) (18 months of 20 days)
• Haab cycle (365 days) (18 month of 20 days plus 5 more)
• Use correspondences between these cycles for Sun and Moon to predict eclipses
MAYAN CALENDAR

• Dresden Codex – Believed to be 11th or 12th century making it the oldest surviving writings from the Americas discovered

• Given the name due to being rediscovered in the city of Dresden Germany

• Accordion fold 8 inches by 12 feet long

• One of 4 Maya codices that survive the Spanish “Exploration” of the New World

• Contains information on eclipses and the movements of Venus
DRESDEN CODEX
HISTORICAL OBSERVATION

County Meath, Ireland
Loughcrew Cairns, approx. 3300BC

Neolithic burial site

Timeline of building of cairn coincides with the total solar eclipse of 3340BC
HISTORICAL OBSERVATION

The Spring and Autumn Annals
770-476 BC

Some of the earliest consistent records from Chinese culture

Record some 37 eclipses during this time period

Some records prior to this are vague and sporadic in their documenting

Oracle Bones
HISTORICAL OBSERVATION

Historical Hebrew and Egyptian observations of the 1207 BC Eclipse

Initially confusing since it was an annular eclipse where disc of sun is not completely covered

“Ring of Fire” effect

Helped identify timeline of Ramesses the Great
PUEBLO SOCIETY
Chaco Canyon Petroglyph
Potentially a record of the 1097 eclipse
Possible representation of a Coronal Mass Ejection since Sun was one year away from a Solar Maximum in the sunspot cycle
Similar to representation depicted by a Spanish Astronomer of a CME from the 1860 eclipse
ECLIPSE LORE AND MYTHOLOGY

• Many Indigenous North American cultures have a rich lore surrounding eclipses.

• Laguna-Acoma Pueblo (NM) not a time of fear, rather a time of transformation.

• Cherokee – A giant frog is eating the sun, everyone was to go outside with drums and make a ruckus to scare it away.
ECLIPSE LORE AND MYTHOLOGY

• Hopi – A time of celebration for the Sun Clan. Children granted their ceremonial names

• Inuit – believed the Sun and Moon are siblings and they fight amongst themselves

• Chippewa – Shot flaming arrows into the sky to rekindle the Sun
ECLIPSE LORE AND MYTHOLOGY

• Batammaliba (Benin and Togo) Foremothers Kuiyecoke and Puka Puka were angry with squabbling villagers so extinguished the Sun and Moon to get them to stop fighting

• Hindu pantheon-demigod Rahu too the nectar of immortality from Vishnu. Vishu had him beheaded but his head remained alive and would pursue the Sun and Moon across the sky
ECLIPSE LORE AND MYTHOLOGY

• Norse Myths-Hati and Skoll two wolf creatures pursue the Sun and Moon across the sky, eclipses are near misses for Ragnarok
ECLIPSE SCIENCE

- Helium was discovered due to eclipses
- Jules Janssen during August 1868 total eclipse
- Did spectroscopy on solar prominences
- Initially discovery was ridiculed until it was isolated on earth in the U decay
ECLIPSE SCIENCE

• Arthur Eddington used the May 1919 eclipse to test Einstein’s theory of general relativity
• Photos of Sun during totality showed that gravity can bend light
QUESTIONS?

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