



Ancient Astronomy

a very shallow and incomplete look at early astronomy



“Applied” Astronomy

- Farming
- Sailing
- Observatories & Research

Astronomical Phenomena

- Aurorae
- Lunar/Solar eclipses
- Eta Carinae
- Supernova 1054



Flooding of the Nile River

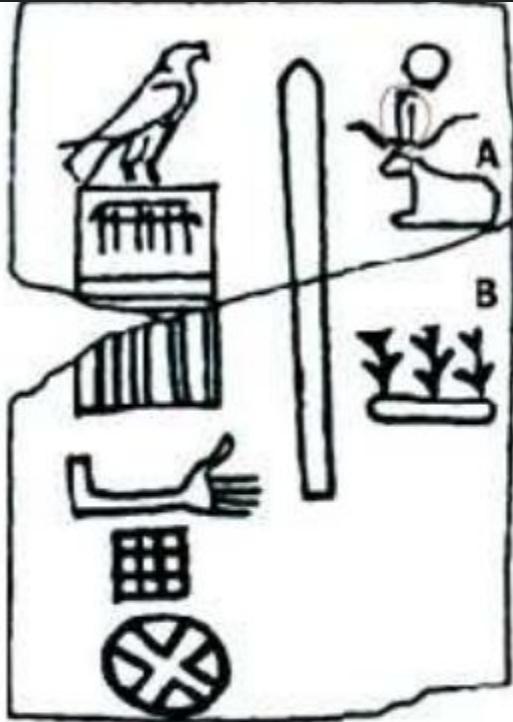


Fig. 1. Plate which states the relationship between the first morning visibility of Sirius and the flooding of the Nile. It is believed that the sign between the form of a cow, which is noted by the letter "A", means "the star Sirius". The circled inscription between the horns of the cow is read as "the beginning of the year". Character designated under the letter "B" means "the season of the spill".

Flooding of the Nile coincided with the appearance of Sothis (Sirius)

Source: Heliacal rising of Sirius and flooding of the Nile, M Nickiforov, A Petrova:

[2012BlgAJ..18c..53N](#)

Flooding of the Nile River

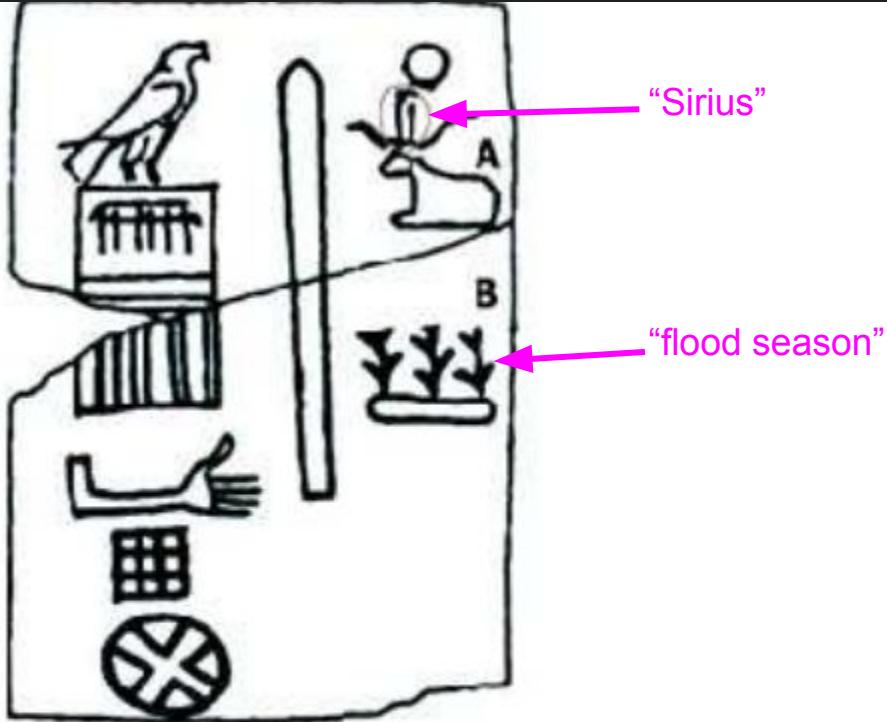


Fig. 1. Plate which states the relationship between the first morning visibility of Sirius and the flooding of the Nile. It is believed that the sign between the form of a cow, which is noted by the letter "A", means "the star Sirius". The circled inscription between the horns of the cow is read as "the beginning of the year". Character designated under the letter "B" means "the season of the spill".

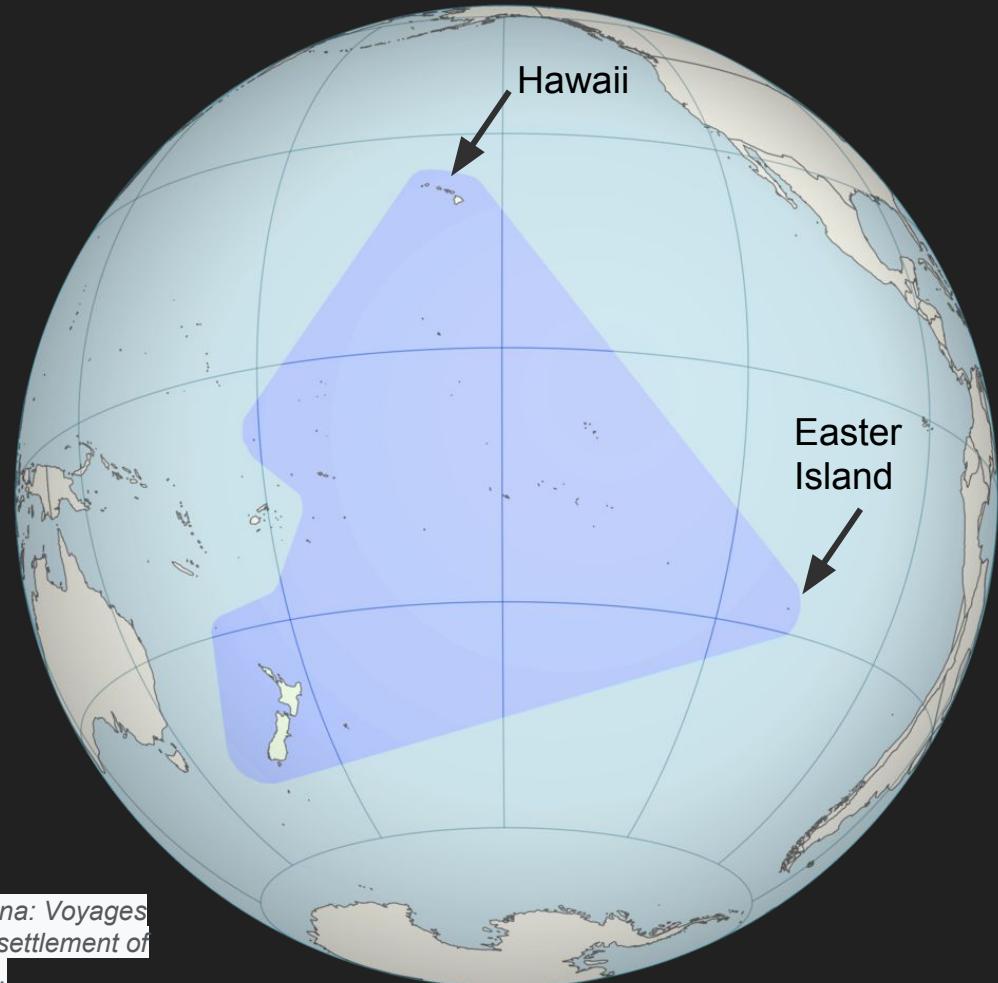
Flooding of the Nile coincided with the appearance of Sothis (Sirius)

Source: Heliacal rising of Sirius and flooding of the Nile, M Nickiforov, A Petrova:

[2012BlgAJ..18c..53N](#)

Polynesian Navigation

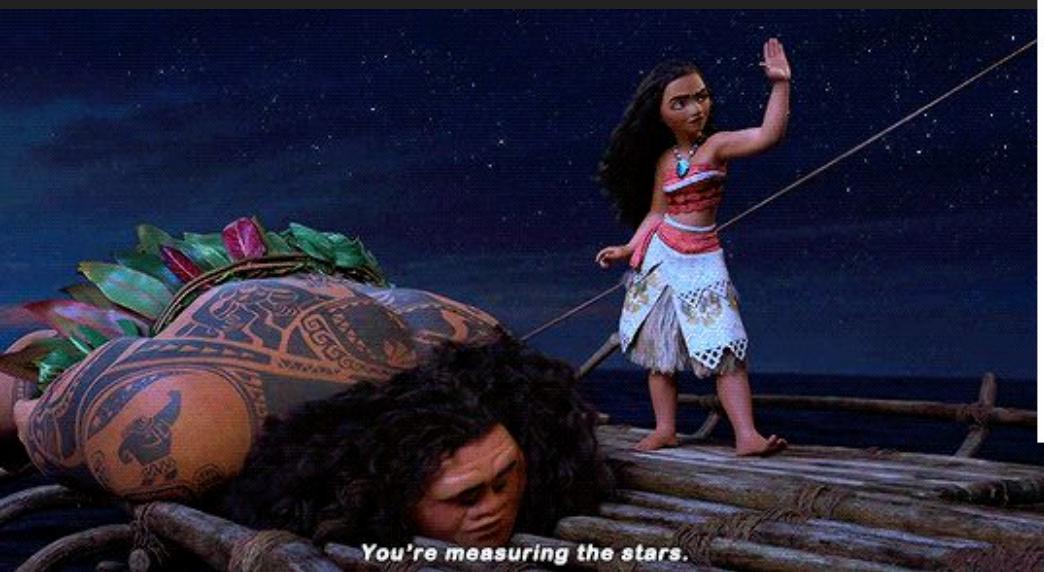
- Polynesian sailors used double hulled canoes to navigate within this triangle.
- Used stars, ocean currents and wind patterns to navigate.
- Made it to Hawaii ~400 CE



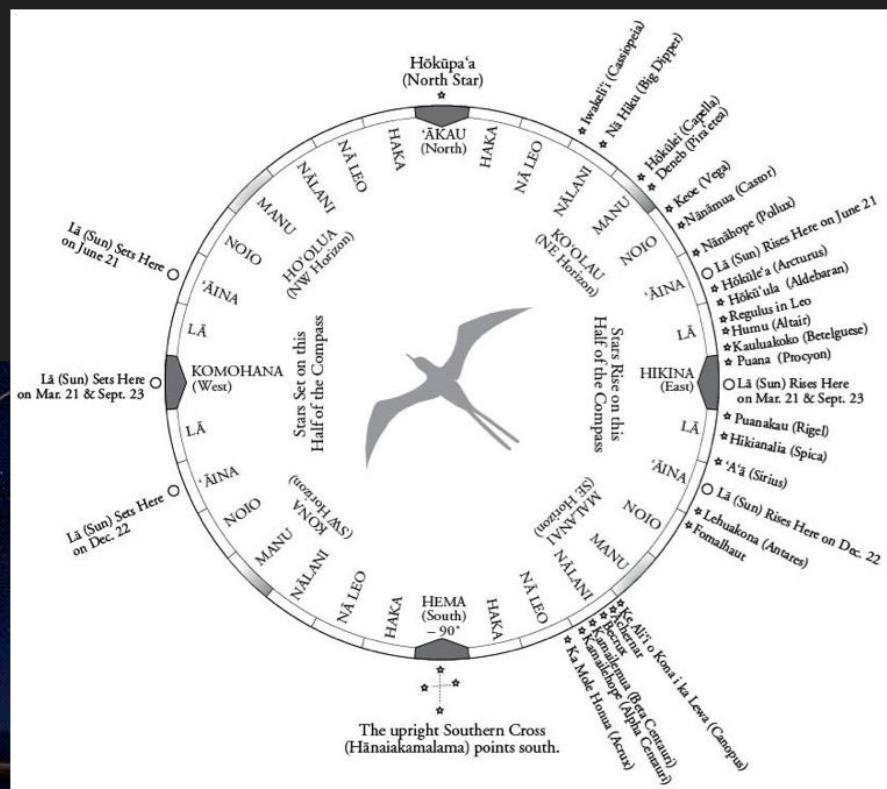
Map information based on *Vaka Moana: Voyages of the Ancestors - the discovery and settlement of the Pacific*, ed K.R. Howe, 2008, p57.

Polynesian Navigation

They used stars near the horizon as guides, and switched stars when they got too high to follow easily.



You're measuring the stars.



Chichen Itza (600-900 CE)



Chichen Itza



Chichen Itza

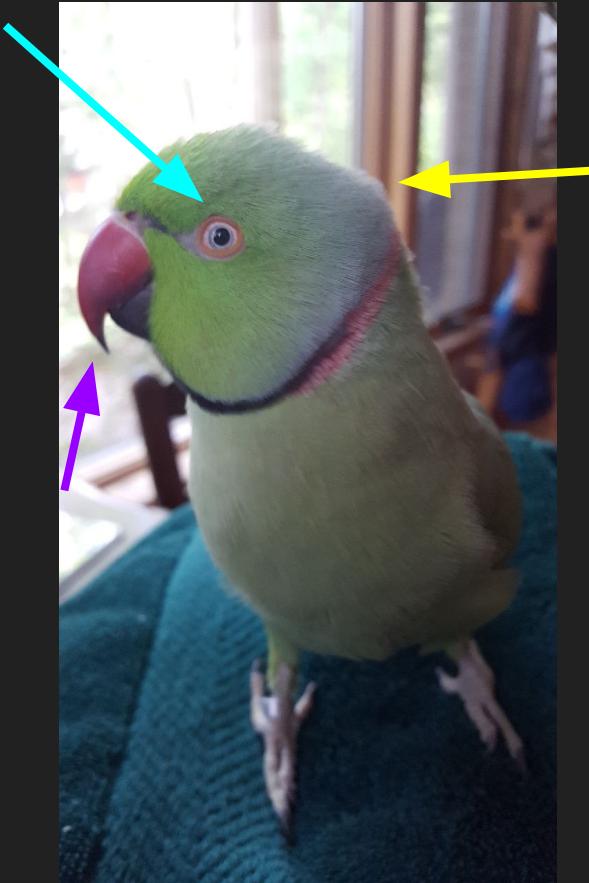


By Bjørn Christian Tørrissen

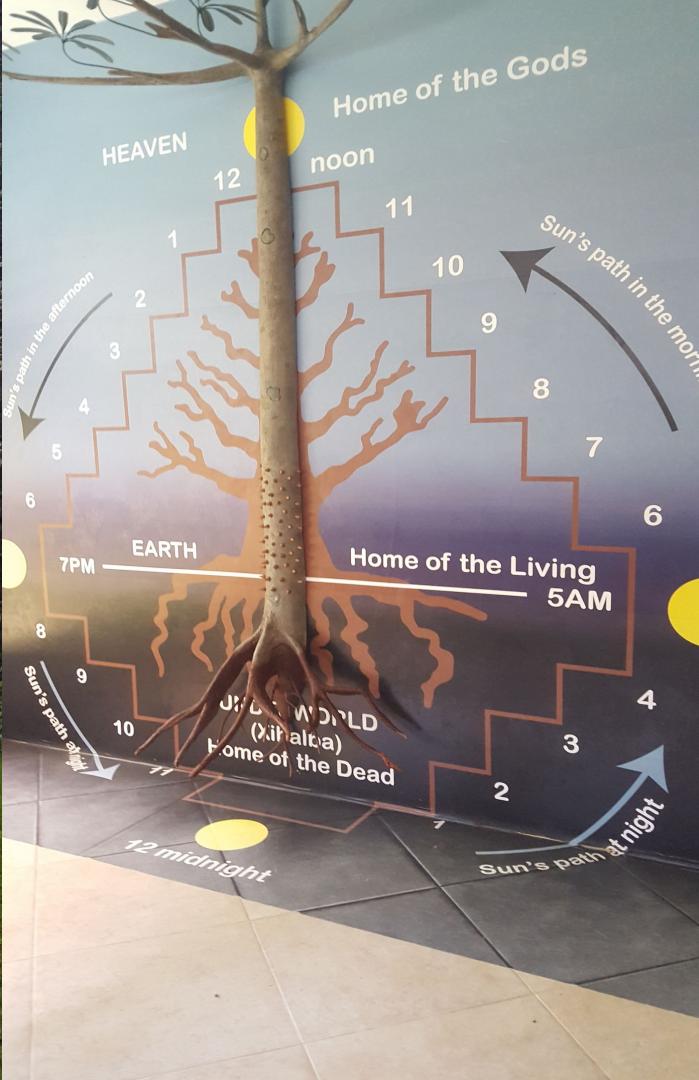
Coincidence?



Coincidence?



- Sharp beak
- Great feathers
- “Can-do” attitude towards world domination



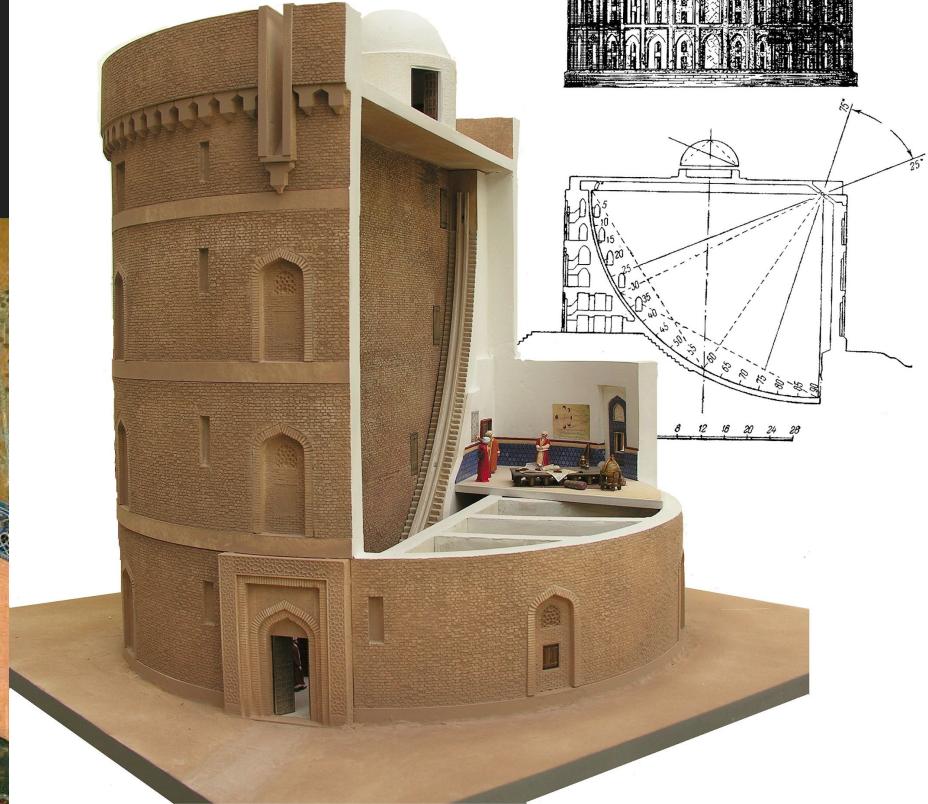
El Caracol Observatory (Chichen Itza)

- 600-900 CE



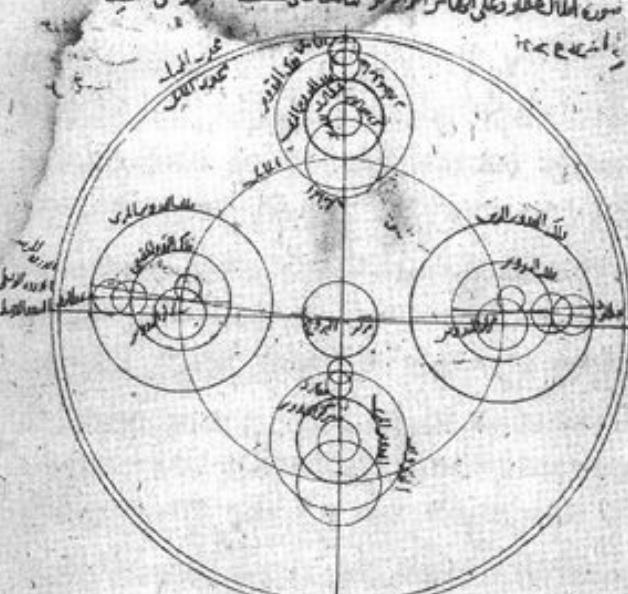
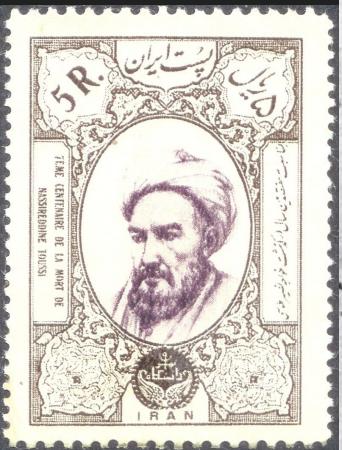
Maragheh Observatory

- East Azerbaijan Province, Iran
- 1259 CE
- Directed by Nasir al-Din Tusi



Nasir al-Din Tusi

Came up with a better planetary model than Ptolemy.



"The Milky Way, i.e. the galaxy, is made up of a very large number of small, tightly-clustered stars, which, on account of their concentration and smallness, seem to be cloudy patches. Because of this, it was likened to milk in color."

في صفات حركات عطارد وتفصيلها المقتنى ثالثاً أول سنة لحدى وسبعين سنة
لبروز خير ما أوصيكم بها طبقاً وهم مثل مسط الشحن والزهرة والأفعى
رب نسمة وأصل الماء له تأثيره البارئه ودبه وحرق الماء مثل حركة
وسط الشمس وهي في السنة باكملها حركة وحركة عاصمه عطارد في عصرين
ست فراسية رابعه وعشر سنه اخر من وفي شهر جذير ستة وأربعين يوماً
وحواليها الحلكه وفي سنه هـ ٢٠٣٠ رممه كروافا استعملنا اجرة الاجع
من حركة الونس لمحصل حركة اليرك وطريق يومها هنا الكوكب كظربي يوماً مثل

Gaocheng Astronomical Observatory

- Henan province, China
- 1276 CE
- Basically a giant sundial (“gnomon”) to measure time as a function of location.



By takwing.kwong

Ulugh Beg Observatory

- ~1420 CE
- Samarkand, Uzbekistan
- Built by Ulugh Beg



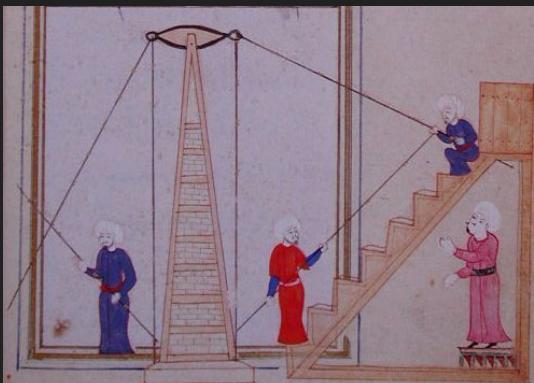
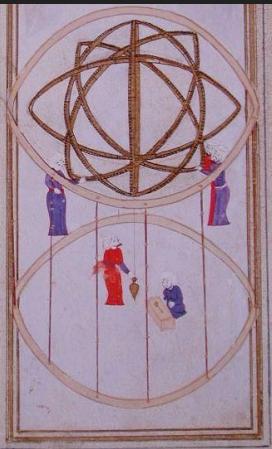
Ulugh Beg

- Corrected errors in star catalogs
- Accurately determined length of sidereal year
- Determined Earth's axial tilt

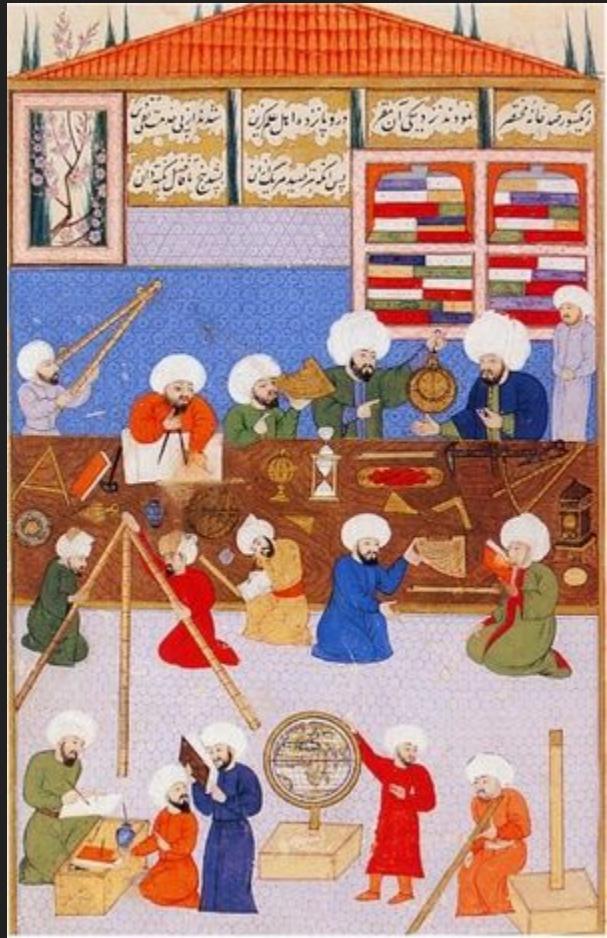
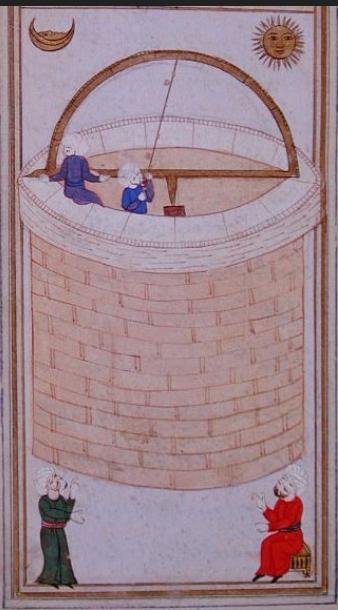


Istanbul Observatory of Taqi ad-Din

- 1577 CE (destroyed 1580)
- Observatory was destroyed because Taqi ad-Din interpreted the presence of a comet as meaning “the conquest of Persia.”
 - A plague happened instead



Source: Istanbul Topkapi Library, Hazine 452, f. 11ba.



Astronomical Phenomena - Aurorae

- The indigenous people of North America had different ways to explain the Northern Lights:
 - The Salteaus interpreted the lights as the dancing of human spirits
 - Nunavik Island Eskimos had a myth that it was a walrus playing ball with a human skull
- Sami - the lights come from the souls of the dead



Lunar Eclipses

- Incans believed that a jaguar attacked and ate the moon.
 - After eating the moon, the jaguar might come to earth and eat people. To prevent this, they would shake their spears at the moon and make a lot of noise to scare it away.
- The Mesopotamians saw the lunar eclipse as an assault by seven demons on both the moon and their king. To protect their king, they would temporarily install a surrogate king.
- The Luiseno tribe would sing chants or prayers to heal the moon during an eclipse.
- ~800 BCE, Babylonian astronomers have discovered 223 month period of lunar eclipses



Solar Eclipses

- The Ojibwe tribe would fire flaming arrows at the sun to reignite it.
- The Medes and the Lydians were fighting a battle during the eclipse of 585 BCE. Both sides interpreted the event as a sign of displeasure from the gods and ended the battle immediately.
- The Incans were freaked out when they happened, because it meant the Sun-god (Inti) got upset, so they would offer sacrifices and try to find ways to make it better.



*Rick Fienberg/TravelQuest
International/Wilderness Travel*

Solar Eclipses

- As far back as 700 BCE, Mesopotamians were predicting solar eclipses
- Chinese astronomers understand and predict eclipses ~200 CE.
- The Mayans also could have predicted them, however, too much was destroyed during the “European invasion of the Americas” to know for sure.

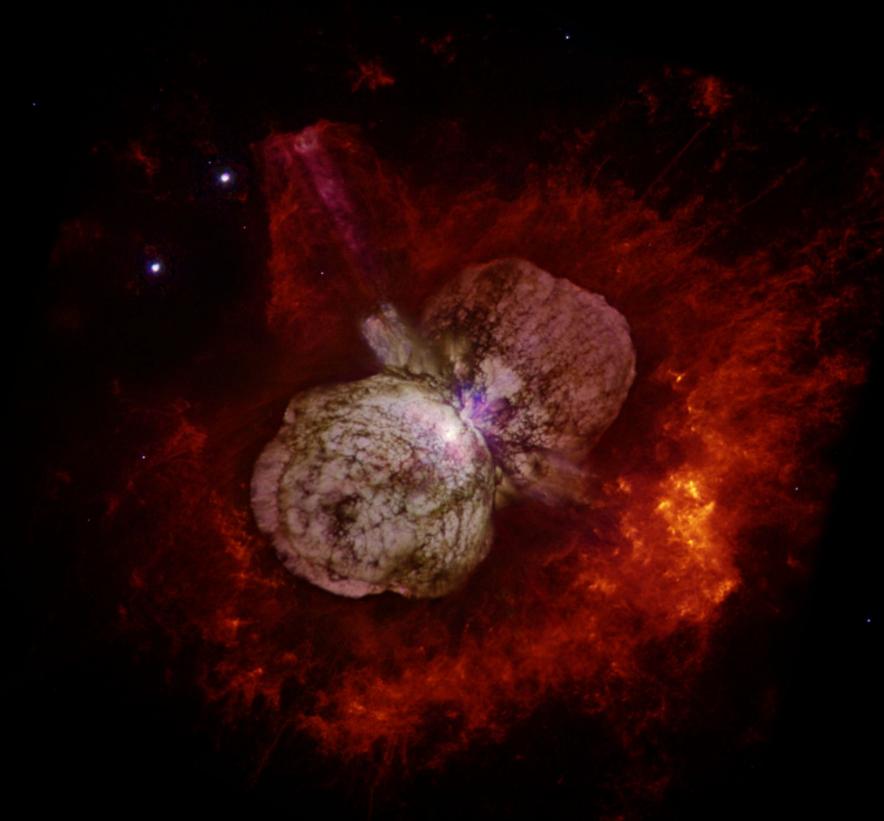


Dresden Codex
Solar Eclipse Tables with Serpent
Eating the Sun

Eta Carinae

The Boorong Aboriginal people witnessed the outburst of Eta Carinae in the 1840s. It was incorporated into their oral traditions after going into outburst (not before).

See “An Aboriginal Australian Record of the Great Eruption of Eta Carinae”, Hamacher & Frew (<https://arxiv.org/abs/1010.4610>)



SN (Supernova) 1054

- Observed and recorded by Chinese and Japanese astronomers
- 6 x brighter than Venus
- Visible during high noon



By Stellarium by Fabien Chéreau et al, Historical Supernovae Plug-in by Alexander Wolf,

SN 1054

- Chaco Canyon, New Mexico
- Strong evidence that this petrograph is a recording of SN 1054



photo by Ron Lussier

SN 1054

When the moon and earth are in similar positions to when SN 1054 happened:

- Moon is at the position pointed to by the fingers
- Looking towards the star, you will be looking at the Crab Nebula.



photo by [Ron Lussier](#)



Flooding of the Nile ~3000 BCE

Mesopotamians can predict eclipse ~700 BCE



Solar eclipse stops battle ~585 BCE



Polynesian navigators ~400 CE

Chinese astronomers can predict eclipses ~200 CE



Timeline!

(not to scale)

SN 1054

Maragheh Observatory ~1259 CE



Ulugh Beg Observatory ~1420 CE



Eta Carinae 1840 CE



Gaochang Observatory ~1276 CE



Sources:

- <https://www.theatlantic.com/science/archive/2017/08/kings-beware-the-eclipse-looms/536385/>
- <http://www.bibalex.org/eclipse2006/HistoricalObservationsofSolarEclipses.htm>
- <https://news.nationalgeographic.com/news/2014/04/140413-total-lunar-eclipse-myths-space-culture-science/>
- <https://image.gsfc.nasa.gov/poetry/ask/a11846.html>
- <http://www.astronomy.pomona.edu/archeo/outside/chaco/nebula.html>
- <https://www.thoughtco.com/inti-the-inca-sun-god-2136316>
- <http://blog.sailtrilogy.com/blog/maps-stars-polynesians-used-celestial-navigation-become-worlds-best-explorers>