How long is a year?

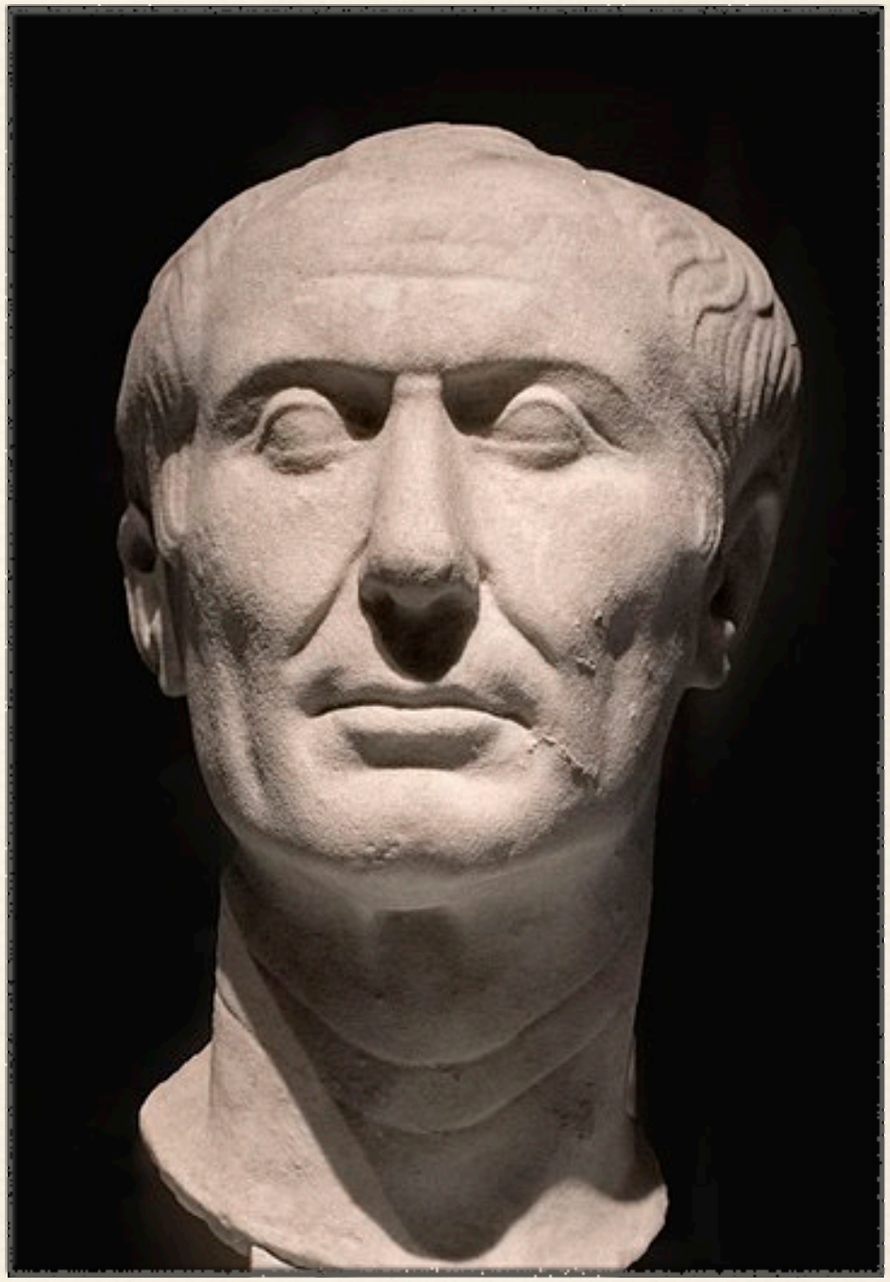
How many days in a year?

Julian Calendar

- The old Roman calendar was lunisolar, and the number of days in a year might be 354, 355, 377, 378, or some other number, as decreed by the pontifex maximus. A basic goal was to observe the Spring Equinox on the same day each year, although this did not always happen.

- Julius Caesar was both consul and pontifex maximus in 708 AUC (46 BC), which he made 445 days long to correct the date of the spring equinox, and he instituted a reformed calendar of 365/366 days, which took effect on 1 January 709 AUC (45 BC), which was the date of the first new moon in Rome after the Winter Solstice.

- The Julian Calendar, with 29 February as an extra Leap Day every fourth year, became the calendar of Christians.



Gregorian Calendar

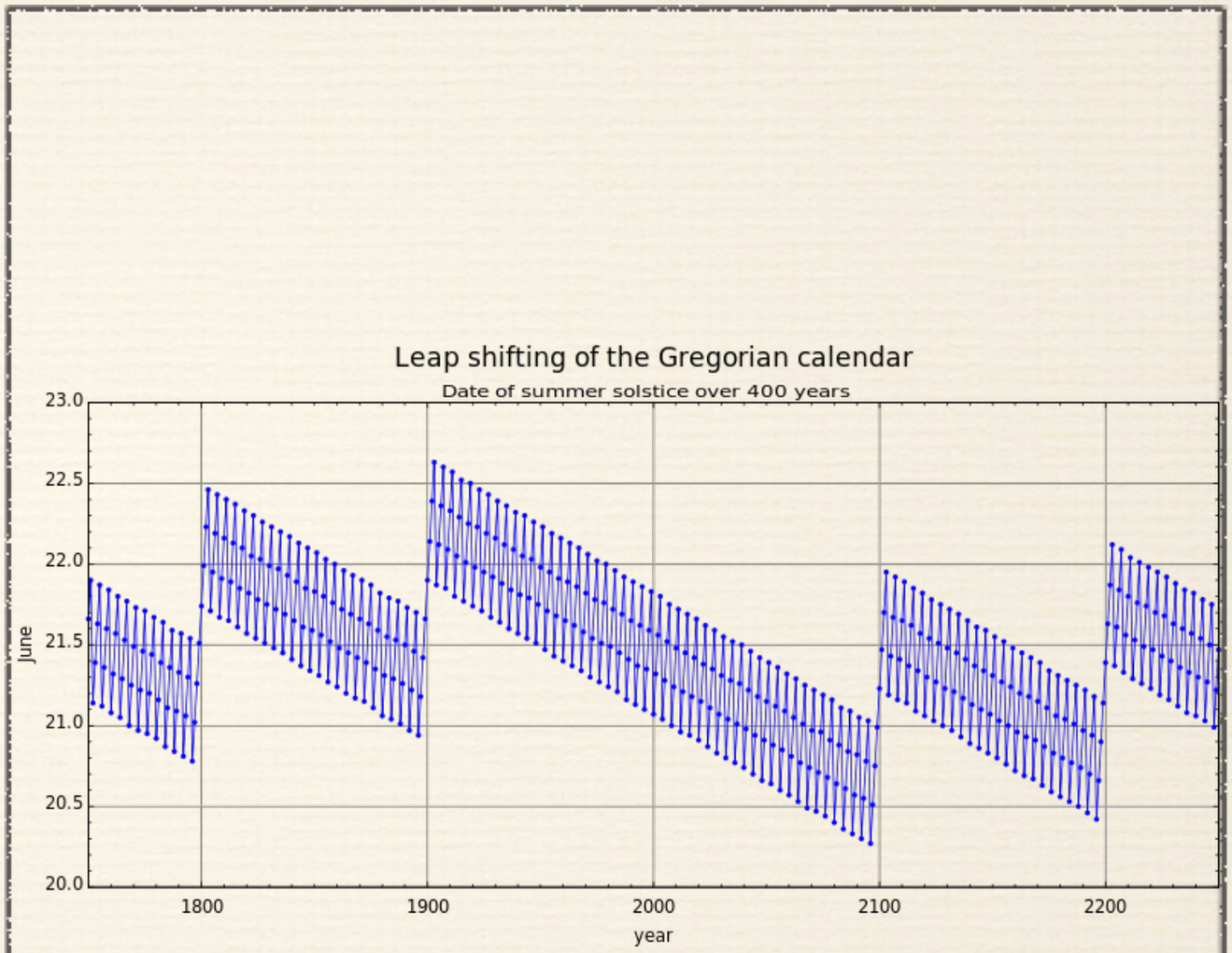
- Anno Domini (AD) referred to the years of the Julian Calendar, which became the calendar of Christians in Roman times.

- The Julian year had an average of 365¼ days, but the average tropical year was actually about 365 days 5 hours 49 minutes 16 seconds, so the date of the spring equinox was slowly changing. By 1582, it was about 10 days off.

- A papal bull, *Inter gravissimas*, of 24 February 1582, decreed that the day after Thursday, 4 October 1582 would be Friday, 15 October (not 5 October) 1582. The new Gregorian Calendar also improved the insertion of a Leap Day.

97/400 instead of 1/4

- The mean tropical year (for 2000) is 365.2422 mean solar days long.
- The mean northern equinox year (for 2000) is 365.2424 days long.
- The Julian Calendar Year is on average 365.25 days long.
- The Gregorian Calendar Year is on average 365.2425 days long.
- John Herschel proposed having 969 leap days every 4000 years (for a 365.24225 day average).



31 December, A.D. 1582

- The Papal States, Venice, Spain, Portugal, France, and parts of the Netherlands adopted the Gregorian Calendar in 1582, but some countries kept the Julian Calendar until the 1900s.

- For people using the Gregorian Calendar, 31 December 1582 was a Friday. For people still using the Julian Calendar, 31 December was the Monday, 10 days later.

- William III of England arrived at Brixham in England on 5 November 1688 (Julian calendar), after setting sail from the Netherlands on 11 November 1688 (Gregorian calendar).

365~366 days / year

- The Gregorian Calendar reform also helped to standardize 1 January as the first day of the year.

- In some countries, the year began on a different day, such as 1 March, 25 March, Easter (different each year), 1 September, and 25 December.

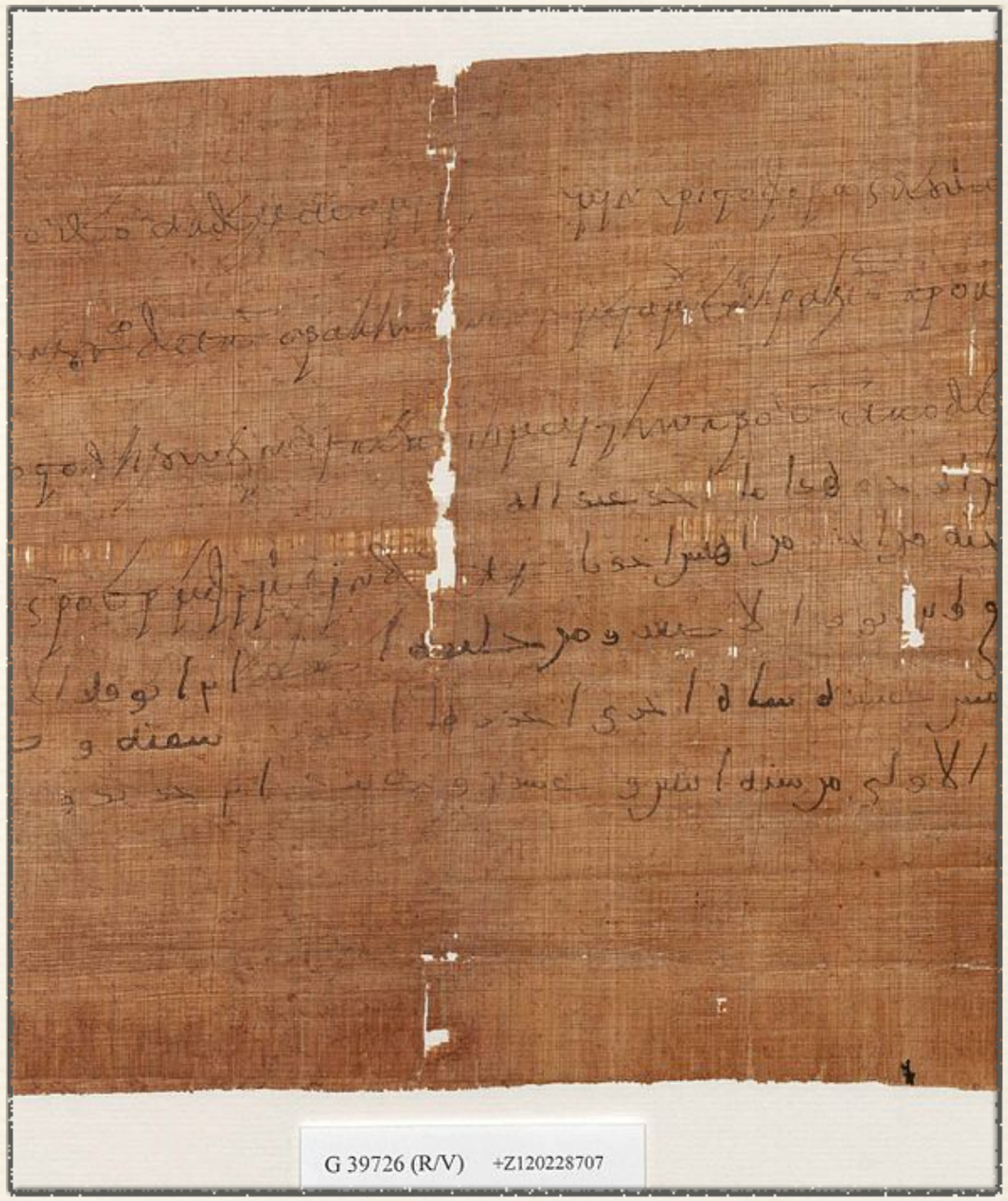
- Whether using Gregorian or Julian, all Europeans agree that each year has either 365 or 366 days.

the Islamic Calendar

- Anno Hegirae (AH) begins with the year of the Hijra هِجْرَة, which is when Muhammad moved from Mecca to Medina, a month-long migration which started on 26 Safar (17 June) and ended on 26 Rabi' I (16 July) in AD 622.

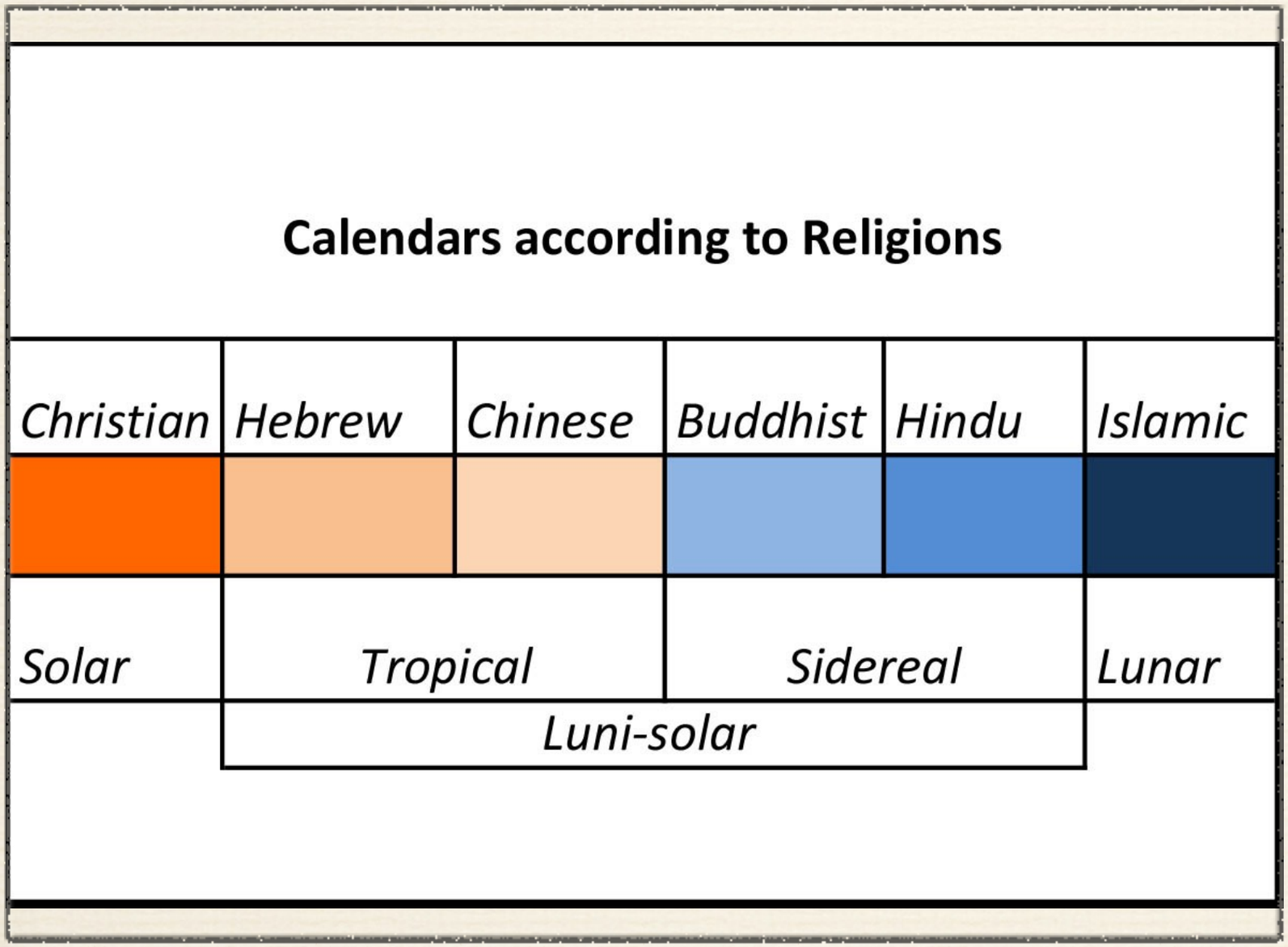
- Muslims adopted this numbering of years in AH 17, but they kept their traditional Arab system of lunar months.

- Thus, AH 1 began on 1 Muharram, which was Thursday/Friday 15/16 July AD 622.



a strictly lunar calendar

- 12 synodic months is only 12x29.53=354.36 days.
  Thus, the Islamic lunar "year" has either 354 or 355 days.



- 1 Muharram 29~30 days
- 2 Safar 29~30 days
- 3 Rabi' I 29~30 days
- 4 Rabi' II 29~30 days
- 5 Jumada I 29~30 days
- 6 Jumada II 29~30 days
- 7 Rajab 29~30 days
- 8 Sha'aban 29~30 days
- 9 Ramadan 29~30 days
- 10 Shawwal 29~30 days
- 11 Dhu al-Qi'dah 29~30 days
- 12 Dhu al-Hijjah 29~30 days

precession of Islamic holidays

The shorter lunar year results in the precession of Islamic holidays relative to the corresponding Gregorian dates.

- Muharram
- A.H. first day A.D. ~ last day A.D.
- 1429 9 January 2008 ~ 6 February 2008
- 1430 29 December 2008 ~ 26 January 2009
- 1431 18 December 2009 ~ 15 January 2010
- 1432 7 December 2010 ~ 4 January 2011
- 1433 26 November 2011 ~ 25 December 2011
- 1434 15 November 2012 ~ 13 December 2012
- 1435 4 November 2013 ~ 3 December 2013
- 1436 25 October 2014 ~ 22 November 2014
- 1437 14 October 2015 ~ 12 November 2015

- Ramadan
- A.H. first day A.D. ~ last day A.D.
- 1429 1 September 2008 ~ 30 September 2008
- 1430 21 August 2009 ~ 19 September 2009
- 1431 11 August 2010 ~ 9 September 2010
- 1432 1 August 2011 ~ 29 August 2011
- 1433 20 July 2012 ~ 18 August 2012
- 1434 9 July 2013 ~ 7 August 2013
- 1435 29 June 2014 ~ 27 July 2014
- 1436 18 June 2015 ~ 16 July 2015
- 1437 7 June 2016 ~ 5 July 2016

Japan

- Japan started using the Gregorian calendar on 1 January 1873: 明治6年1月1日 (Meiji rokunen ichigatsu tsuitachi, “the first day of the first month of the 6th year of the reign of Meiji”)

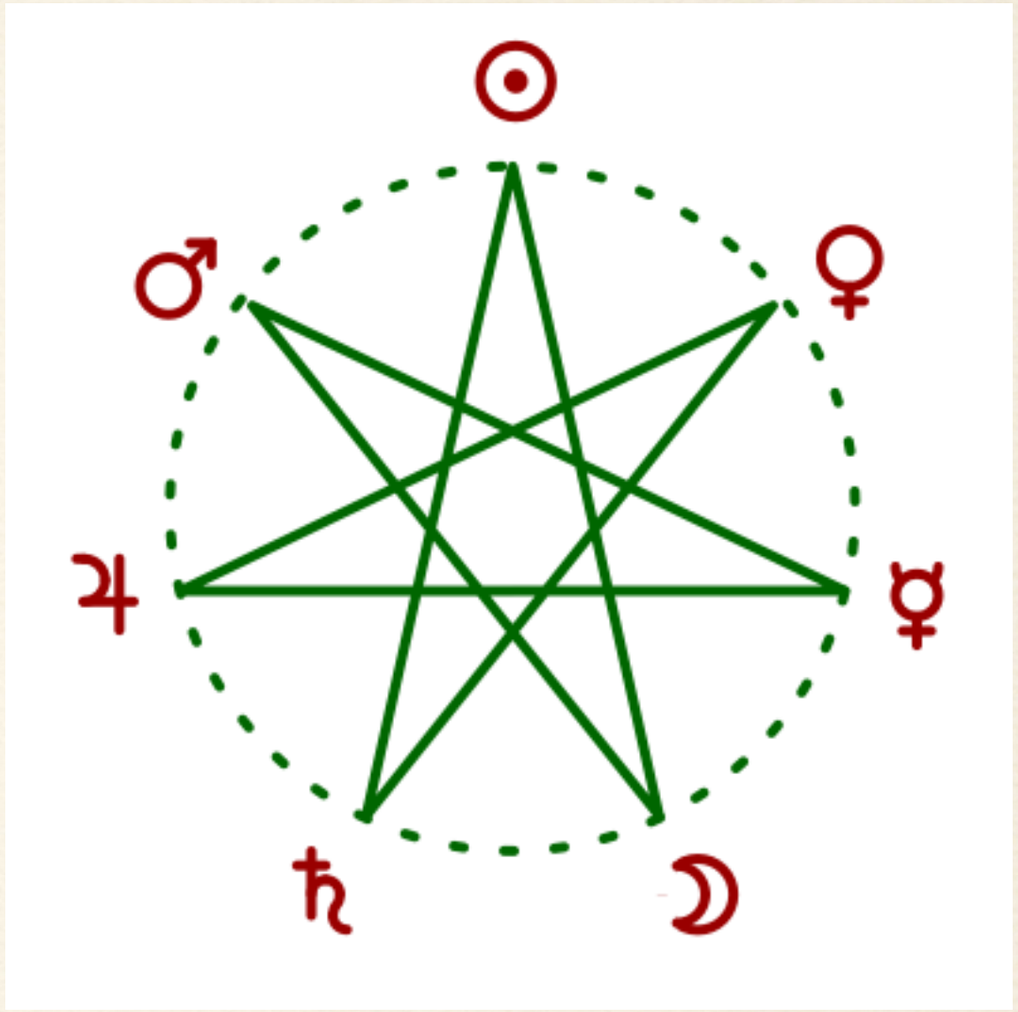
- The preceding day, Gregorian 31 December 1872 was 明治5年12月2日 (Meiji gonen jūnigatsu futsuka, “the second day of the twelfth month of the 5th year of the reign of Meiji”).

the 7-day week

- The continuous 7-day week has been used in Judaism since the 6th century BC, if not earlier. The Biblical Sabbath is recorded since the 9th century BC: The 7th day is the Sabbath, i.e., the day of rest.

- The oldest extant recorded date with the day of the week also included was written in AD 60 in Pompei.

- The Roman emperor Constantine officially adopted the 7-day week in AD 321, and Sunday (*dies Solis*) became a holiday.



other short cycles

- The early Roman 8-day *nundinal* cycle.
- The Maya *tzolk'in*: a 13-day cycle and a 20-day cycle, combining to form a 260-day cycle.
- The 19th Century French (1793-1805) *décade*, a 10-day cycle.

六曜 rokuyō, 六輝 rokki

- 先勝　Senshō　Good luck before noon, bad luck after noon. Good day for beginnings (in the morning).
- 友引　Tomobiki　Bad things will happen to your friends. Funerals avoided on this day. Typically crematoriums are closed this day.
- 先負　Senbu　Bad luck before noon, good luck after noon.
- 仏滅　Butsumetsu　The most unlucky day. Weddings are avoided. Shinto shrines sometimes close their offices. Presumed to be the day Buddha died.
- 大安　Taian　The luckiest day. Good day for weddings, shop openings, etc.
- 赤口　Shakkō　The hour of the horse (11 am–1 pm) is lucky. The rest is bad luck.