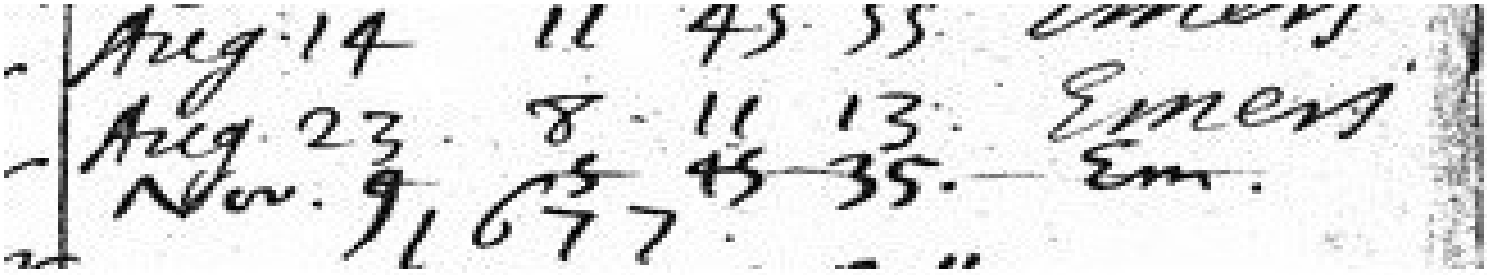
Ole Romer's Nov 9th ,1676. IO eclipse prediction translation error



On examination of the date for nov 9th. Time = 05h 45m 35s
The minute is 15...not 45. the 4 is a 1?

If we calculate from aug 23rd 8h 11m 13s ,a duration of 44 orbits

Romer's synodic estimate of IO = 42h 28m 30½ s

This takes us to nov 9th **05h 05m 35s** = 6,728,062s

Airing on the side of caution. Romer then estimates a conservative ten minute delay,
= 05h 15m 35 s

= 42h 28m 44s per orbit

The paper over time has been doctored and misinterpreted
The times and dates published after the prediction ,have also been misconstrued .

As for Romer's misinterpreted prediction of IO's eclipse for Nov 9th 1676 .
I have calculated a increase of 30 minutes and 4 seconds.
With the minute and second time reversed as also misinterpreted.

Aug 23rd 8-11-13 Nov 9th 5-35-45
6,729,872s 44 orbits
Aprox = **42h 29m 11s per orbit.**

Hypothesis of the suns orbital path.

If we examine the orbital times of IO, recorded by Ole Romer.
The times are inconsistent with the propagation of light over distance.

For the years 1672 and 1673 when earth is approaching Jupiter
The orbital times Should be consistent with the theory of propagation of light .
Even if Romers clock is irregular. It will be consistently irregular for both sets.

Both set periods have the same number of orbits...27.
Though there is a discrepancy of 15+ minutes between both sets
On publication of Romer's theory. Giovanni Cassini refutes the finding as incorrect.
disagreeing with Romer and his advocates,Newton ,Flamsteed, and Huygens

Cassini cites..its is not propagation,it is something else?.

Though... Romer and Cassini do not have any other options
as this conflicts with governing heliocentrism
without option for barycentrism. This would lead to exponential compounded error
over time.

If Cassini's instincts are right,The only other explanation would be that ;

1 the shadow cast by Jupiter is deviating.
2 known visual understanding and interpretation of light is wrong

In this video,we can see that a 2 body physical system plots the analemma using a
sun/earth 3 to 1 orbit ratio https://www.youtube.com/watch?v=RW8yHYbCXSA&t=17s.

Even with given instrumentation.(soho sat) it is difficult to discern both theories except
with Romer's data that leans towards barycentrism as the most probable explanation that
accounts for all anomalistic errors .
.
If we examine Romer's complete records,they are inconsistent with propagation;
Though consistent with the suns motion altering the position of the umbra

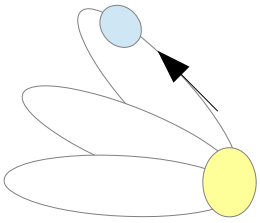
..

The precession of the perihelion of mercury.

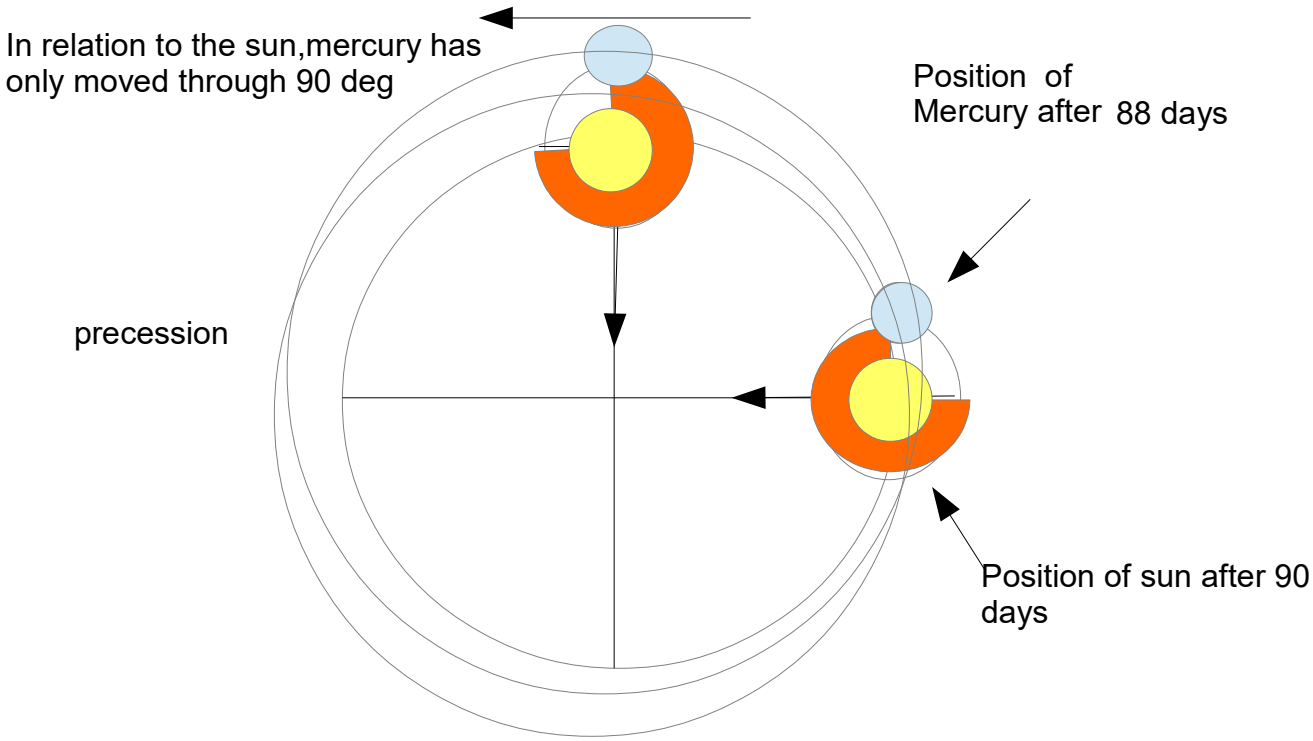
If Newton and le Verrier's calculations are based on a heliocentric reference frame
The calculations will be erroneous ,if in fact.
the sun has a orbital path and mercury is a satellite of the sun

Einstein
Accounts for the precession of mercury with his Space time curvature formula ?

Visual interpretation of Mercury's orbit based on a heliocentric reference frame



Hypothetical barycentric example. orbital path of Mercury as a satellite



Sun orbital period	= 122 days
Sun mean radius from bary	= 10.000.000 km
Sun orbital velocity	= 21,458 kmh
Mercury mean radius	= 47.000.000 km
Mercury. relative orbital period	= 352 days
Mercury orbital velocity	= 35.000 kmh
Rotations	= 6

Approximation.

The distance between the aphelion and perihelion of Mercury is approximate to the deviation of the umbra, cast by Jupiter ,by accounting for the change in the orbital times of IO,that determine the suns orbital path

Aphelion to perihelion = 23.000.000km
Umbra deviation = 15 minutes

If the sun and earth have orbital resonance. The equation of time will translate the suns known position in its orbit. The deviation of Jupiter's umbra must correspond with this, and by using IO's orbital time and mean radius as the fixed datum against the deviation of the umbra ,we can find the radius of the sun.

If we ignore propagation of light and doppler effect as the cause of IO's anomalistic motion,and calculate the orbital times as real time events; An alternate hypothesis unfolds.

Dates. 1672 LY immersion /approaching jupiter.

		Orbits	av orbital time	deviation time
jan	03	12-42-36		
jan	10	14-32-14	4	42-27-24
jan	12	08-59-22	1	42-27-08
feb	11	10-57-06	17	42-28-06
feb	20	07-20-26	5	42-28-40

9 orbits crossing umbra

Dates. 1672 emergence /receding from jupiter.

Mar	7	07-58-25	
mar	14	09-52-30	4	42-28-31
mar	23	06-18-14	5	42-29-08
mar	28	13-45-30	3	42-29-05
mar	30	08-14-46	1	42-29-16
apr	6	10-11-22	4	42-29-09
apr	13	12-08-08	4	42-29-09
apr	22	08-34-28	5	42-29-16
apr	29	10-30-06	4	42-28-54

Dates. 1673 immersion /approaching jupiter.

		Orbits	av orbital time	deviation time
feb	04	17-31-10		
feb	06	12-00-00	1	42-28-50
feb	13	13-53-20	4	42-28-20
feb	27	17-40-10	8	42-28-21
mar	01	12-09-01	1	42-28-51
mar	15	16-00-48	8	42-28-58
mar	17	10-28-16	1	42-27-28
mar	24	12-24-30	4	42-29-03

14 orbits Crossing umbra

Dates. 1673 emergence /receding from jupiter

apr	18	09-22-00		
apr	25	11-18-05	4	42-29-01
may	02	13-12-40	4	42-28-38
may	11	09-37-39	5	42-28-59
may	18	11-32-44	4	42-28-46
aug	04	08-30-41	44	42-28-35

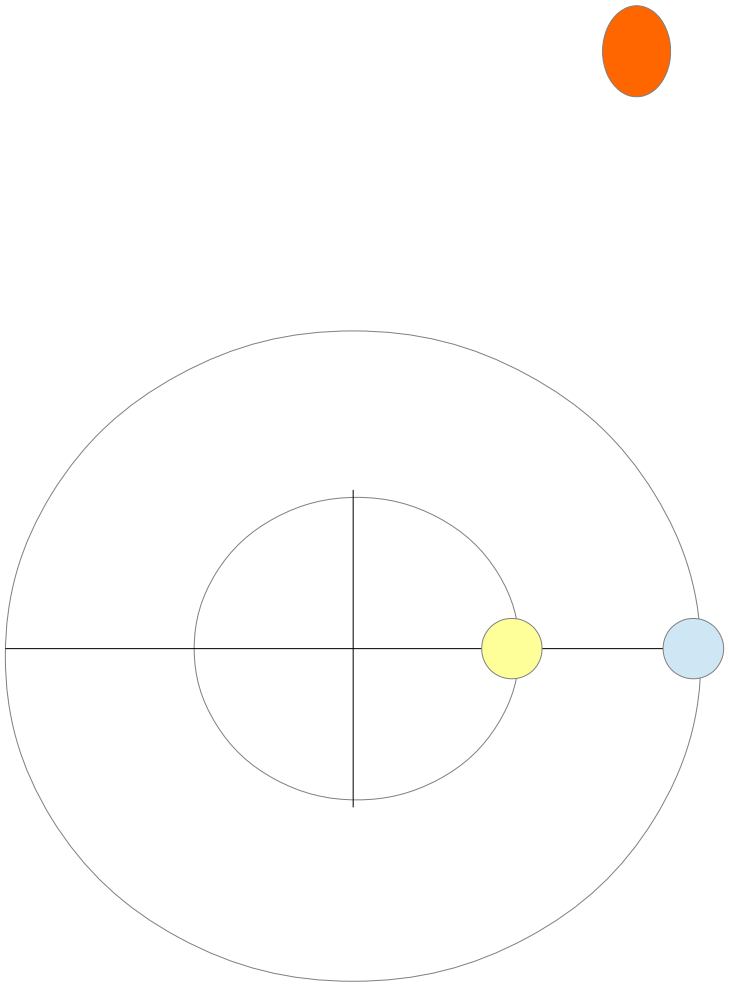
Sun /Earth orbital alignment with umbra deviation

Only one Sun/Earth orbit ratio will align with the deviation of the umbra , and the equation of time.

The sun orbits 3 times for every 1 earth orbit.

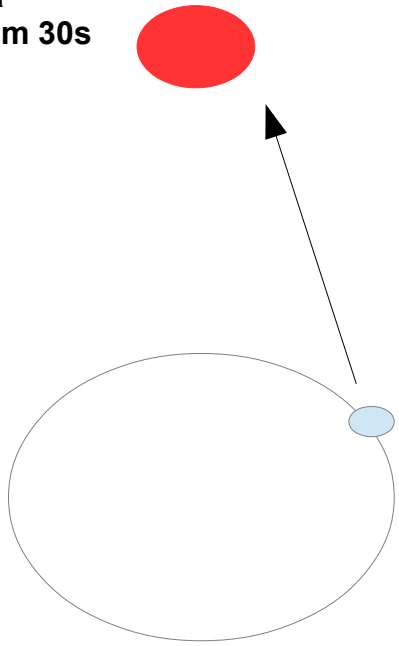
Giving a Sun / Earth 3/1 orbital resonance

Position of Jupiter /sun and earth 1st jan 1672.



Set times approaching opposition for years 1672 and 1673

Note: all times are based on a synodic orbital time of 42h 28m 30s



Note:
For 1673
Orbit time of IO is increasing instead of decreasing

Times on average should be 7 minutes shorter For propagation over distance for 27 orbits of IO, For both said years

1672
Jan 03 12- 42-36
Feb 20 07- 20-26

= 27 orbits

Av orbit time =42-28-04

-11m 42s

Total time duration 47d 18h 37m 50s

1673
Feb 04 17-31-10
Mar 24 12-24-30

= 27 orbits

Av orbit time =42-28-38

+3m 38s

Total time duration 47d 18h 53m 20s

Io orbit time for 27 orbit 47d 18h 49m 30s

= 15m 30s

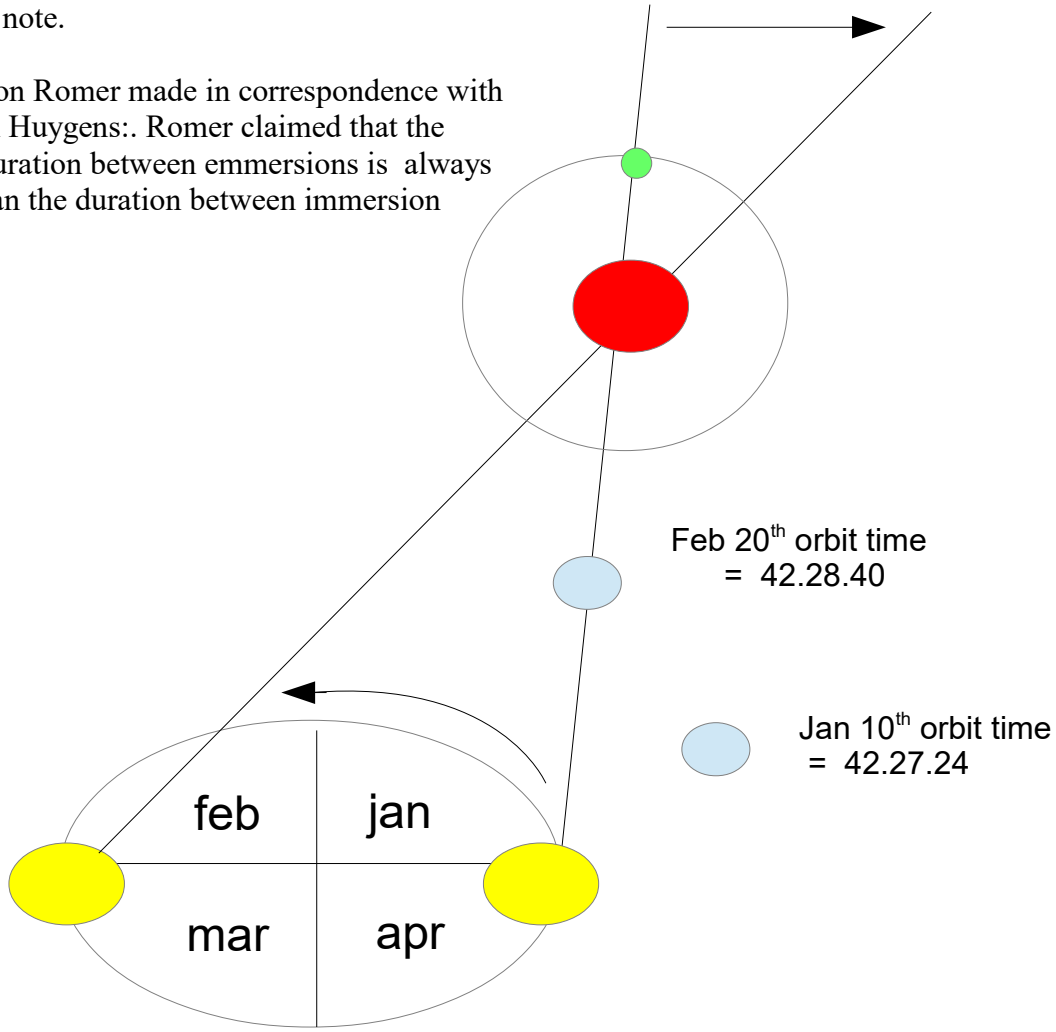
Difference between 1672 and 1673

Jupiter orbital motion east

Umbra advances west
From 1st jan to 1st march
decreasing orbit time

Important note.

Observation Romer made in correspondence with Christiaan Huygens:. Romer claimed that the average duration between emmersions is always greater than the duration between immersion



Feb 20th orbit time
= 42.28.40

Jan 10th orbit time
= 42.27.24

Io orbit time for 27 orbits
47d 18h 49m 30s

Total time duration for 27 orbits
47d 18h 37m 50s

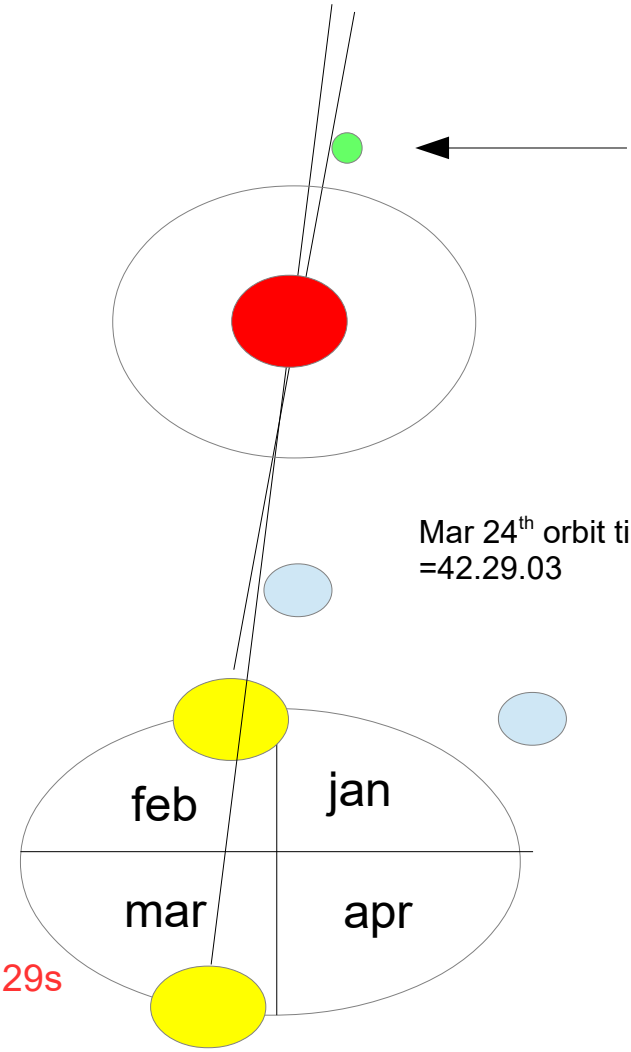
= - 11m 40s

Romer's conservative estimate for light to cross earths diameter = 22 m based on this data.

Jupiter orbital motion east

Umbra advances west from Feb 4th to mar 1st decreasing Orbit time.

Umbra advances east From 1st mar to 30th apr Increasing orbit time.



Mar 24th orbit time =42.29.03

Feb 13th orbit time = 42,28.20

Feb 4th to feb 27th
13 orbits = 23 d 9m

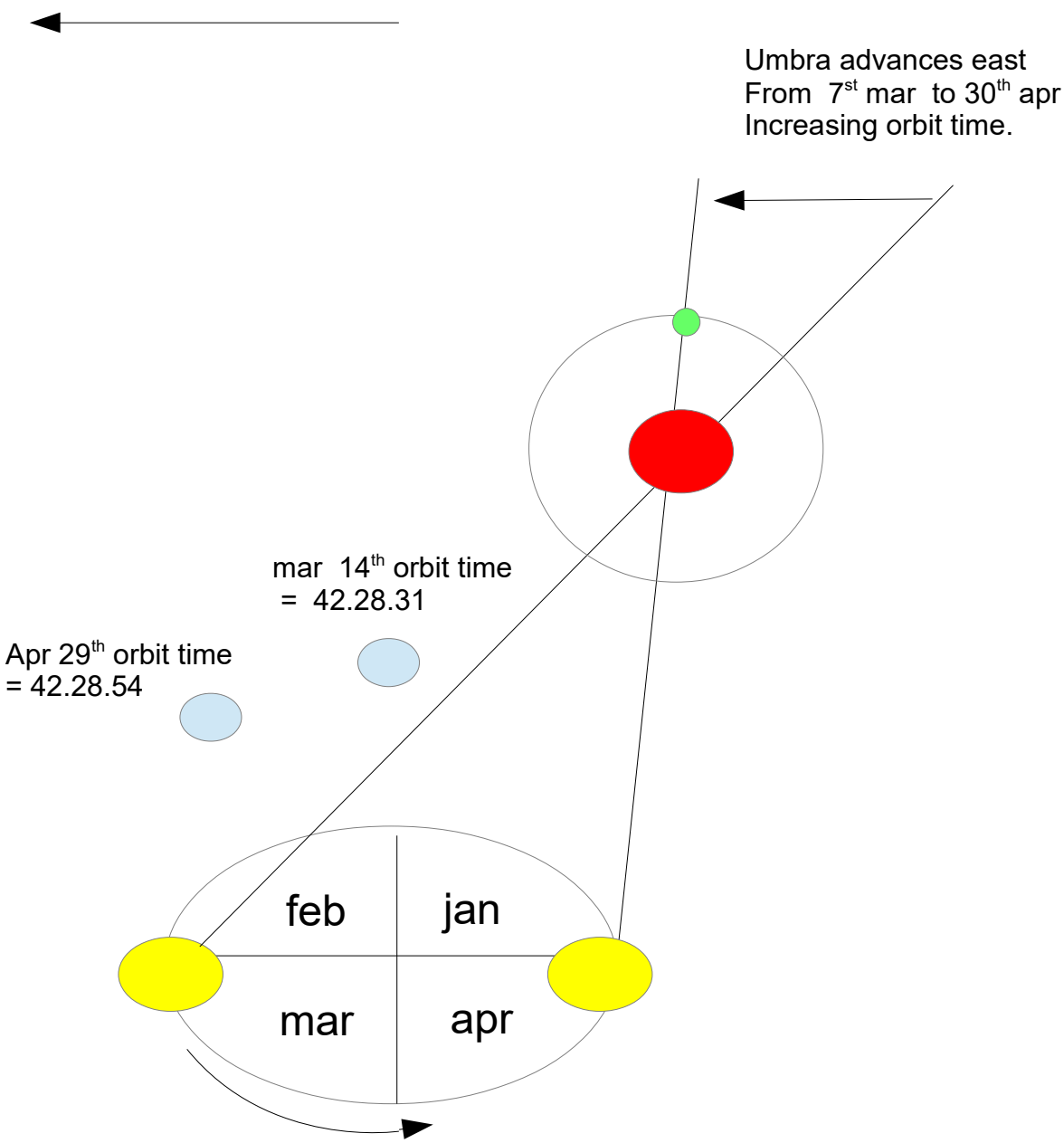
Mar 1st to mar 24th
13 orbits= 23d 15m 29s

Io orbit time for 27 orbits
47d 18h 49m 30s

Total time duration for 27 orbits.
47d 18h 53m 20s

= + 3m 50s

Jupiter orbital motion east

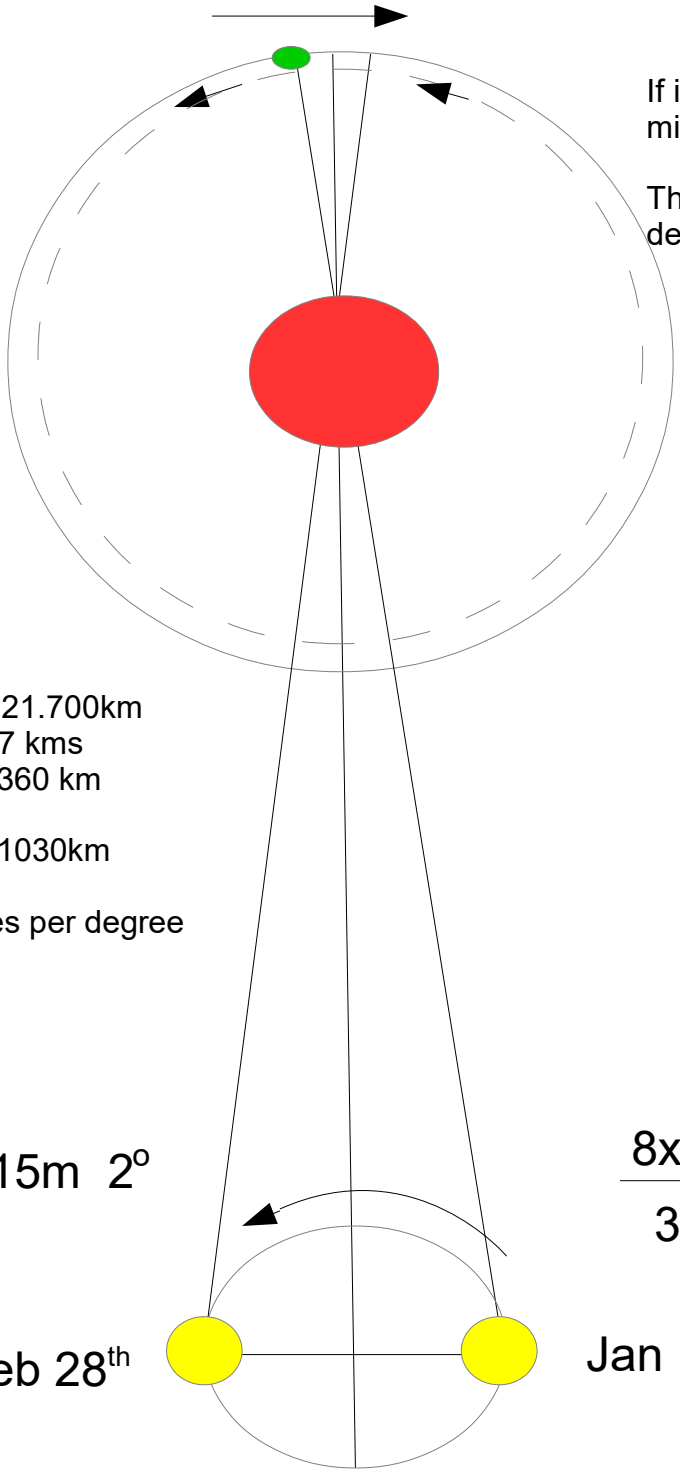


Io orbit time for 30 orbit
53d 2h 15m

Total time duration for 30 orbits
53d 2h 31m 41s

Time = + 16m 41s

1672. from the beginning of january to the end of february the umbra will advance west.



If io's orbit time decreases by 15 minutes

The umbra will advance west by 2 degrees

IO
Mean radius =. 421.700km
Velocity = 17 kms
1 degree = 7360 km

17kms x 60 s = 1030km

Aprox 7.5 minutes per degree

Over the sun jupiter
Distance of
800 million km

The suns arc radius will deviate by 2 degree
= 22 million km

Sun radius
=11 million km

Deviation= 15m 2^{o}

$$\frac{8x10^{8\ pr2}}{360}=1.3x10^{7}$$

Feb 28th

Jan 1st

We can find the approximate diameter of Jupiter by calculating from the immersion of IO to the emmersion of IO between opposition

Using a base time of 42h 28m 30s per orbit.

For the year 1672 from feb 20th to mar 7th

IO completes 9 orbits. The average time per orbit is 42h 44m 13s.
The difference from the base time is 15m 43s

If we multiply this by the number of orbits
= 2h 21m 27s
And multiply this by IO's orbital velocity
= 17kms
We find Jupiter's aprox diameter = **143,820km**

For the years 1672 ,1673 and 1677.
The umbra advances east due to the relative position of the sun in its orbit and the position of Jupiter, increasing orbital time

Except for 1676.when the umbra advances west decreasing orbital time

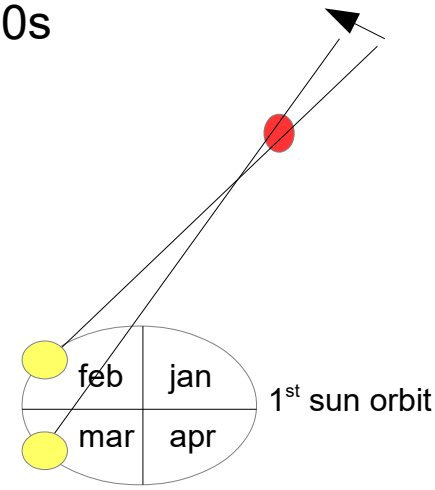
Time decreases by aprox 11m =11,200km

IO orbit time = 42h 28m 30s

Date 1672

Feb 20th immersion time
07-20-26
Mar 7th emmersion time
07-58-25
Orbits = 9
Av orbit duration 42h 44m 13s
15m 43s
X 9 = 2h 21m 27s
X 17kms **=144,279km**

Opposition mar 5th



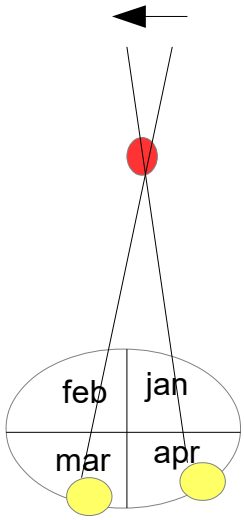
Umbra east

1st sun orbit

Date 1673

Mar 24th immersion time
12-24-30
Apr 18th emmersion time
09-22-00
Orbits = 14
Av orbit duration 42h 38m 23s
09m 53s
X 14 = 2h 18m 22s
X 17kms **=141,134km**

Opposition apr 5th



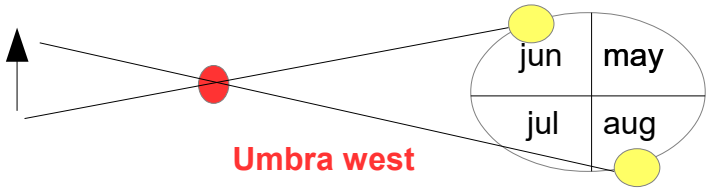
Umbra east

1st sun orbit

Date 1676

Jun 13th immersion time
10-56-11
Aug 7th emmersion time
09-49-50
Orbits = 31
Av orbit duration 42h 32m 41s
04m 11s
X 31 = 2h 09m 41s
X 17kms **=132,277km**

Opposition jul 7th



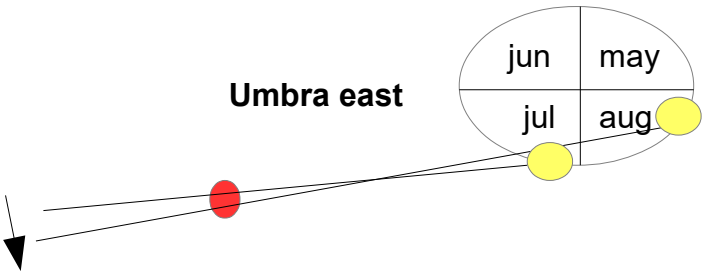
Umbra west

2nd sun orbit

Date 1677

Jul 25th immersion time
12-37-10
Aug 26th emmersion time
11-31-50
Orbits = 18
Av orbit duration 42h 36m 22s
07m 52s
X 18 = 2h 21m 36s
X 17kms **=144,432km**

Opposition aug 9th



Umbra east

2nd sun orbit

With these examples. we calculate from the start of the immersion to the emmersion of IO, over the diameter of the suns orbit.

1672

- 11m 24s
Red = synodic period.

Eg:
From Jan 3rd to Mar 7th , is aprox 1 sun diameter.

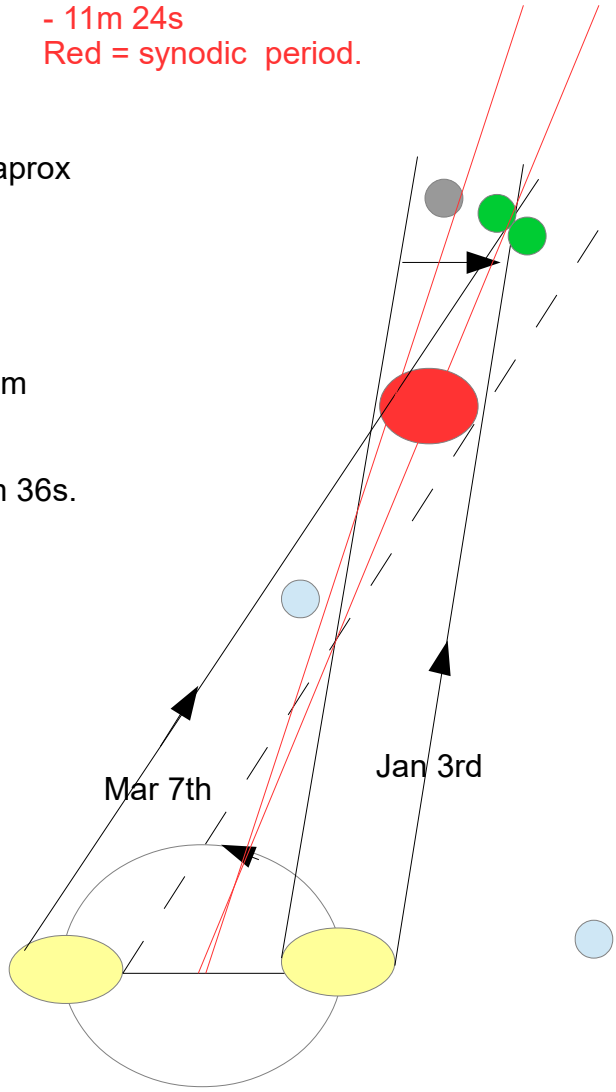
= 36 orbits.. = 63 days
Sun orbit = 122 days

Time overall should be 2h 21m
For IO to cross the umbra..

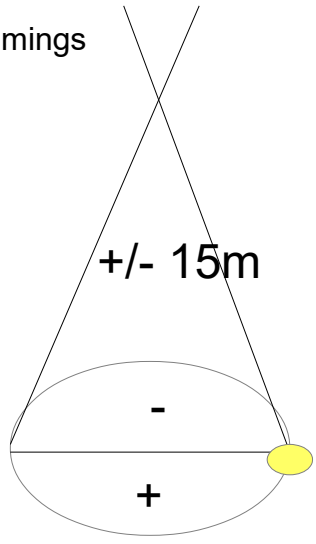
The time calculated is 2h 9m 36s.
Aprox 11m 24s less

.

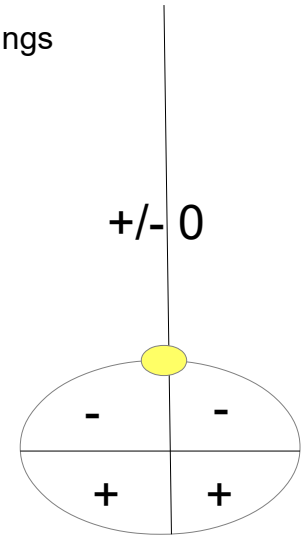
From mar 1st to may 1st, the time must be aprox double = 28m, or +14m from the synodic time of 2h 21m



1672
Transverse timings

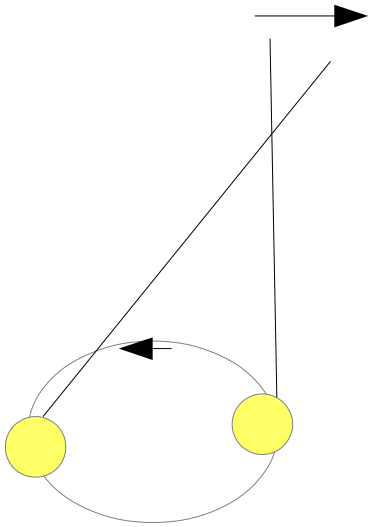


1673
Parallel timings

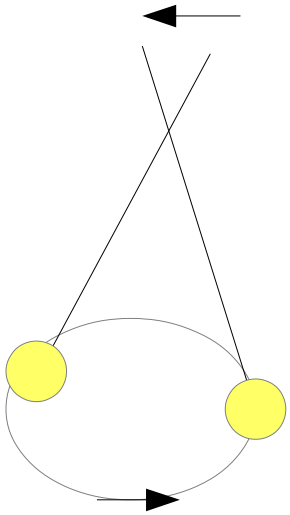


1672

42h 28m 30s
Synodic orbital period



Jupiter's diameter
= 2h 21m

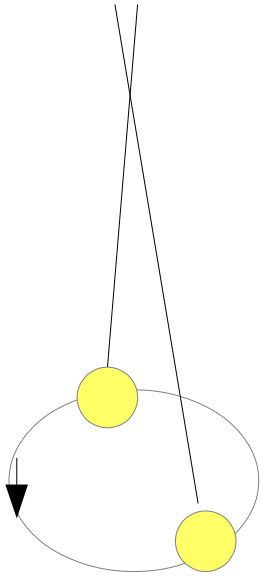


Jan 3rd Mar 7th

Time = 2h 9m 36s
= - 11m 24s
36 orbits

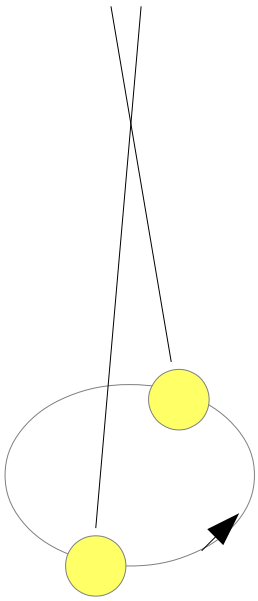
Feb 20th Apr 29th

Time = 2h 37m 57s
= + 16m 57s
39 orbits



1673

=2h 21m



Feb 4th Apr 18th

Time = 2h 22m 08s
= +1 m 8s
41 orbits

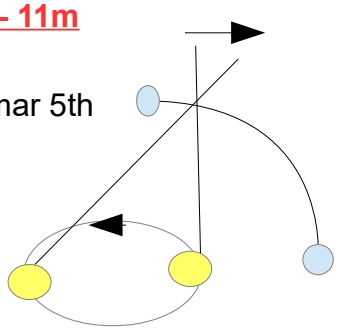
Mar 24th May 18th

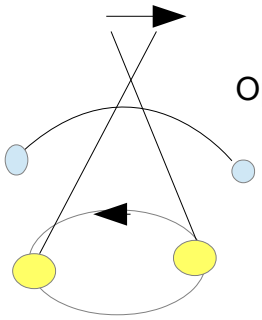
Time = 2h 24m 40s
= +3m 40s
31 orbits

Now that we have an alignment procedure,
We see that for years 1672 and 1676 the times are approximate.
Overall Times should be +/- 2m from immersion to emmersion

Times are **- 11m**

Opposition mar 5th





Opposition july 7th

Date 1672

Jan 3rd immersion time
12– 42 - 36
Mar 7th emmersion time
07-58-25
Orbits = 36
Av orbit duration 42h 32m 06s
03m 36s
X 36 = 2h 09m 36s
X 17kms **=132,192km**

Date 1676

Jun 13th immersion time
10-56-11
Aug 7th emmersion time
09-49-50
Orbits = 31
Av orbit duration 42h 32m 41s
04m 11s
X 31 = 2h 09m 41s
X 17kms **=132,277km**

As we can see from the previous diagram and this hypothesis .If propagation was the principle for the outcome . The timings for 1672 and 1673 would be approximately the same: they are not. Romer's calculations do however match the 3/1 orbital resonance of the sun and earth.

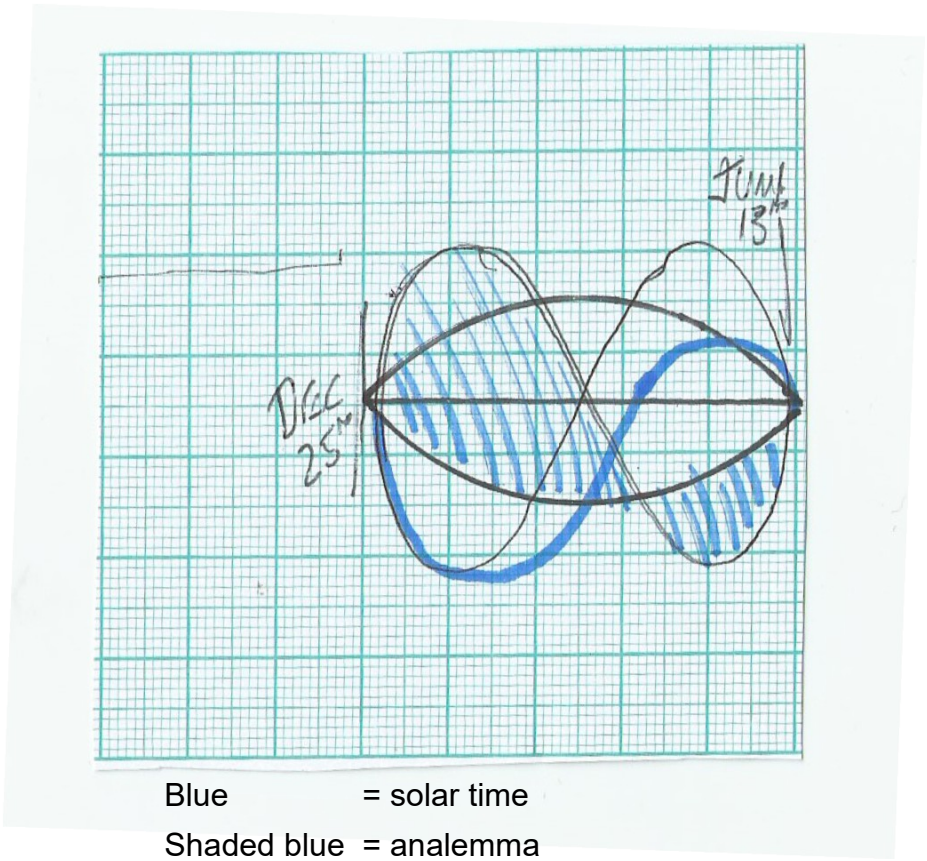
Romer's calculations for the years 1672 and 1673
Approaching and receding from Jupiter are aprox
For sun /earth arc radius. c = 2 au +/- 15m

For propagation of light ,this should be c = 1 au +/- 8m

Romer's calculations though correct. are in fact double. It is
Improbable that propagation of light as a visual reference is the
fundamental cause for this. with the known sun/earth distance.

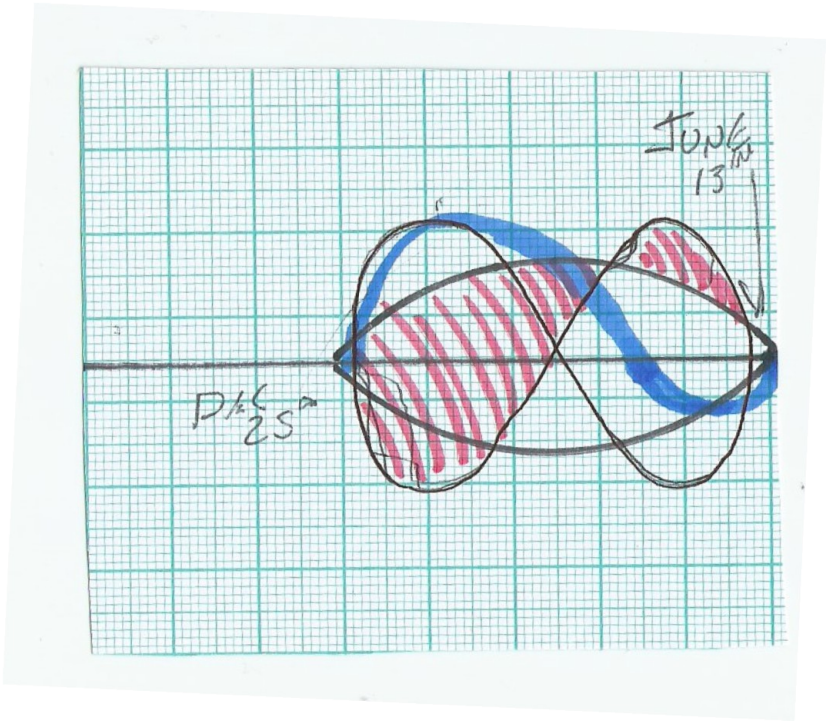
G Garroch
29/07/2018

3/1 orbit ratio Obliquinometer graphs.



Blue = solar time
Shaded blue = analemma

Dec 25th
To june 13th



Blue =solar time
Red = analemma

June13th
To dec 25th

Scale of orbits

Sun
Mercury
venus
earth