ANALEMMA

JOURNEY OF THE YEAR

One person esteems one day as better than another, while another person esteems all days alike. Let everyone be fully convinced in his own mind.
—Romans 14:5

THE BOOK OF TIME

CALENDARS
and
THE ANALEMMA AS
INFRASTRUCTURE

THE ANALEMMA

One of the frustrations in language is that we often have only one word for several different things. In English we have the word "day", but it has four meanings. The first meaning of day is the time of light from early dawn to evening twilight, this as complementary to night the time of darkness from late twilight until early dawn. A second meaning of day is the time of rotation of the earth with respect to the sun, that is, the time it takes for the sun to return to the same position in the sky. For example, the time between meridian passages of the sun. A third meaning of day is the sidereal day or time between meridian passage of fixed stars. This might be called the true or absolute period of rotation of the earth. In the book of Genesis in the Bible, there is a fourth meaning given to the English word, day, an epochal period of time. Let us distinguish these four days by calling the first daylight, the second day, the third the rotation time, and the fourth creation epoch.

A year is about 365 Days. In the northern hemisphere in the summer daylight gets longer and in the winter daylight gets shorter. But now a surprise! As daylight shortens, the day lengthens. In fact the shortest daylight occurs at the winter solstice about December 22nd, while the longest day of the year is December 24th - 25th.

How come? We, all know that the sun moves south in autumn making the daylight shorter (in the northern hemisphere), and moves north in spring making the daylight longer. But how can the length of the day change? To answer that, let us suppose that the sun not only moves north and south during the year, but also moves east and west. What effect would that have? Let us take our local meridian as a pointer. Now if there were no east-west motion of the sun then it would take exactly 24 clock hours for the sun to return to the meridian. (And the day would be the same as the rotation period.) But if the sun is moving east then in 24 hours our meridian would have caught up with where the sun was yesterday, but the sun has moved east so it is going to take a little longer for the meridian to reach the sun's new position. In other words the day is longer. So if the sun is moving east it makes the days longer and if moving west it makes the days shorter. And from about November 4th until February 12th the sun does move east making the days longest when the daylight is shortest. And the motion of the sun to the east is the most rapid about the 25th of December.

Just a minute. We know the sun moves north and south because watching the sky we can see it getting lower in the south in winter and higher in summer. Now if the sun is actually moving east and west how come we never see that? Good question. We aren't aware of the east-west motion of the sun because the earth rotates in the east-west direction. The 360 degree daily motion of the sun caused by the earth's rotation completely masks the earth's orbital velocity changes which cause the solar east-west motions. So, how do we know this other motion takes place? One way is to compare clock time with sun-dial time. Clocks run at a constant rate, but the difference between the time a clock shows and the time a sun-dial shows varies throughout the year.

An even better way to see the sun's motion is to set up a camera in a fixed location, pointed to the sky in a fixed direction, and expose the same photographic plate every Day throughout a year at the same clock time every Day, (say at 9:00:00 a.m.). The trace of the sun's images on the photograph will look like a figure eight. The up and down direction of the eight representing the north and south motion of the sun and the left and right direction representing the east and west motion. This figure eight is called an "analemma" and gives the representation of the sun's total movement as viewed from earth throughout the year.

JOYMUSIC.P51 DISK: JOURNYOYEAR September 7, 1990

There exist certain parallels and dualities between the generation of a musical scale by the circle of fifths and the generation of a liturgical year by the analemma loop. The basic algorithm is the same:

	CIRCLE OF FIFTHS	ANALEMMA LOOP
1.	Select a base pitch	Select a base date
2.	Select the pitch factor	Select the date interval
3.	Generate the pitch sequence	Generate the date sequence
4.	Effect closure	Effect closure

Whereas the circle of fifths deals with pitch ratios, the analemma loop deals with time intervals. Thus the pitches in the circle of fifths form a geometric sequence, while the dates in the analemma loop form an arithmetic sequence.

The CIRCLE OF FIFTHS

Musical scales can be generated in many ways. One method is by iterated third harmonics, usually called the circle of fifths. The human ear tends to equate all even harmonics, hence discriminable notes must be derived from the odd harmonics. The third harmonic is the most important one. (The physicist says that the E` an octave above C is the third harmonic of C. The musician says that the E above C is the fifth of C,. where E an octave below E`.) For the third harmonic the pitch factor is 3. But to reduce to the base octave the pitch must be divided by 2. Hence the pitch factor in the circle of fifths is 3/2.

Useable scales will be obtained whenever the powers of 3/2 (the third harmonics) are approximately equal to some power of 2, since the sequence of pitches must close on an octave.

	Powers of 3/2		Powers of 2	Ratio
1	1.50	1	2.00	0.75
2	2.25			1.125
3	3.38	2	4.00	0.845
4	5.06			1.265
5	7.59	3	8.00	0.949*
6	11.39			1.424
7	17.09	4	16,00	1.068*
8	25.63			1.602
9	38.44	5	32.00	1.201
10	57.67			1.802
11	86.50	6	64.00	1.352
12	129.75	7	128.00	1.014*

We note that the ratios between a power of 3/2 and a power of 2 are close to unity in the three starred cases. The first starred case leads to a pentatonic scale. The second leads to a seven note scale and the last to a twelve note scale. This last was selected as the basic chromatic scale used in occidental music. However, the

12th root of 128 is 1.4983 not 1.5000, close but not exact. So in order to adjust for the non-exactness, the so-called equal temperament scale was devised in which the twelve notes were separated by a pitch factor of 1.05946 which is equal to the twelfth root of two. Adjustments are always required in order to fit a power of 3, 5, 7, ... to the octave, i.e to a power of 2.

Relating to the algorithm, we first choose a base pitch, say C = 286 hz. This pitch is then repeatedly multiplied by the pitch factor, 1.4983 and finally reduced to one octave, or it is simply multiplied by 1.05946 to generate the 12 pitches of the scale. Closure is effected either by adjusting the pitch factor or leaving some anomolous ratios. If the ratios are true third harmonics, the sequence will not close on an octave. If the scale is adjusted to close, the pitches are no longer true third harmonics. We have here an example of Godel's incompleteness theorem. The scale cannot be both perfect (true harmonics) and complete (close on an octave).

. . . . . .

THE ANALEMMA LOOP

The liturgical year may be generated by a fibonacci ratio of 8/13 or by the golden ratio (= 0.618034). These are values that effect near closure like the starred values in the circle of fifths example. The algorithm may be carried out in two ways. The first way requires the generation of numerical sequences directly from the ratios then translates these sequences into date intervals by multiplying by the length of the year. The second method first evaluates a basic date interval from the ratio and then generates the date sequence with this date interval.

In astronomy, an analemma (pronounced /?æn??l?m?/, Greek for the pedestal of a sundial) is a curve representing the angular offset of a celestial body (usually the Sun) from its mean position on the celestial sphere as viewed from another celestial body relative to the viewing body's celestial equator. For instance, knowing that Earth's average solar day is almost exactly 24 hours, an analemma can be traced by plotting the position of the Sun as viewed from a fixed position on Earth at the same time every day for an entire year. The resulting curve resembles a figure of eight. This curve is commonly printed on globes, usually in the eastern Pacific Ocean, the only large tropical region with very little land. It is possible, though challenging, to photograph the analemma, by leaving the camera in a fixed position for an entire year and snapping images on 24-hour intervals (or some multiple thereof).

There are three parameters that affect the size and shape of the analemma: obliquity, eccentricity, and the angle between the apse line and the line of solstices. For an object with a perfectly circular orbit and no axial tilt, the Sun would always appear at the same point in the sky at the same time of day throughout the year and the analemma would be a dot. For an object with a circular orbit but significant axial tilt, the analemma would be a figure of eight with northern and southern lobes equal in size. For an object with an eccentric orbit but no axial tilt, the analemma would be a straight east-west line along the equator.

The north-south component of the analemma is the declination, or the latitude at which the sun is directly overhead. The east-west component is the equation of time, or the difference between solar time and local mean time. This can be interpreted as how "fast" or "slow" the sun is compared to clock time.

Earth's analemma
Analemma for Earth as seen from the northern hemisphere with altitude and azimuth to the same scale.
Analemma for Earth.

Owing to the tilt of Earth's axis (23.439°) and its elliptical orbit around the Sun, the relative location of the sun above the horizon is not constant from day to day when observed at the same clock time each day. Depending on one's geographical latitude, this loop will be inclined at different angles.

The figure on the left is an example of an Earth analemma as seen from the northern hemisphere. It is a plot of the position of the sun at 12:00 noon at Royal Observatory, Greenwich, England (latitude 51.4791°N, longitude 0°) during the year 2006. The horizontal axis is the azimuth angle in degrees (180° is facing south). The vertical axis is the altitude in degrees above the horizon. The first day of each month is shown in black, and the solstices and equinoxes are shown in green. It can be seen that the equinoxes occur at altitude ? = 90° - 51.4791° = 38.5209°, and the solstices occur at altitudes ? ± ? where ? is the axial tilt of the earth, 23.439°. The analemma is

plotted with its width highly exaggerated, which permits noting that it is slightly asymmetrical (due to the two-week misalignment between the apsides of the Earth's orbit and its solstices).

A well-known consequence of the "Equation of Time" is the asymmetrical distribution of sunrise and sunset times. For northern hemisphere observers this is very apparent around the date of the winter solstice. The following table gives the Durham sunrise and sunset times in December and January :

	Sunrise	Sunset
1st December	8:08	15:43
6th December	8:16	15:40
13th December	8:24	15:38
20th December	8:29	15:40
27th December	8:32	15:45
2nd January	8:31	15:50
9th January	8:28	16:00

Hence by early January the evenings have become significantly lighter where the mornings remain at their darkest.

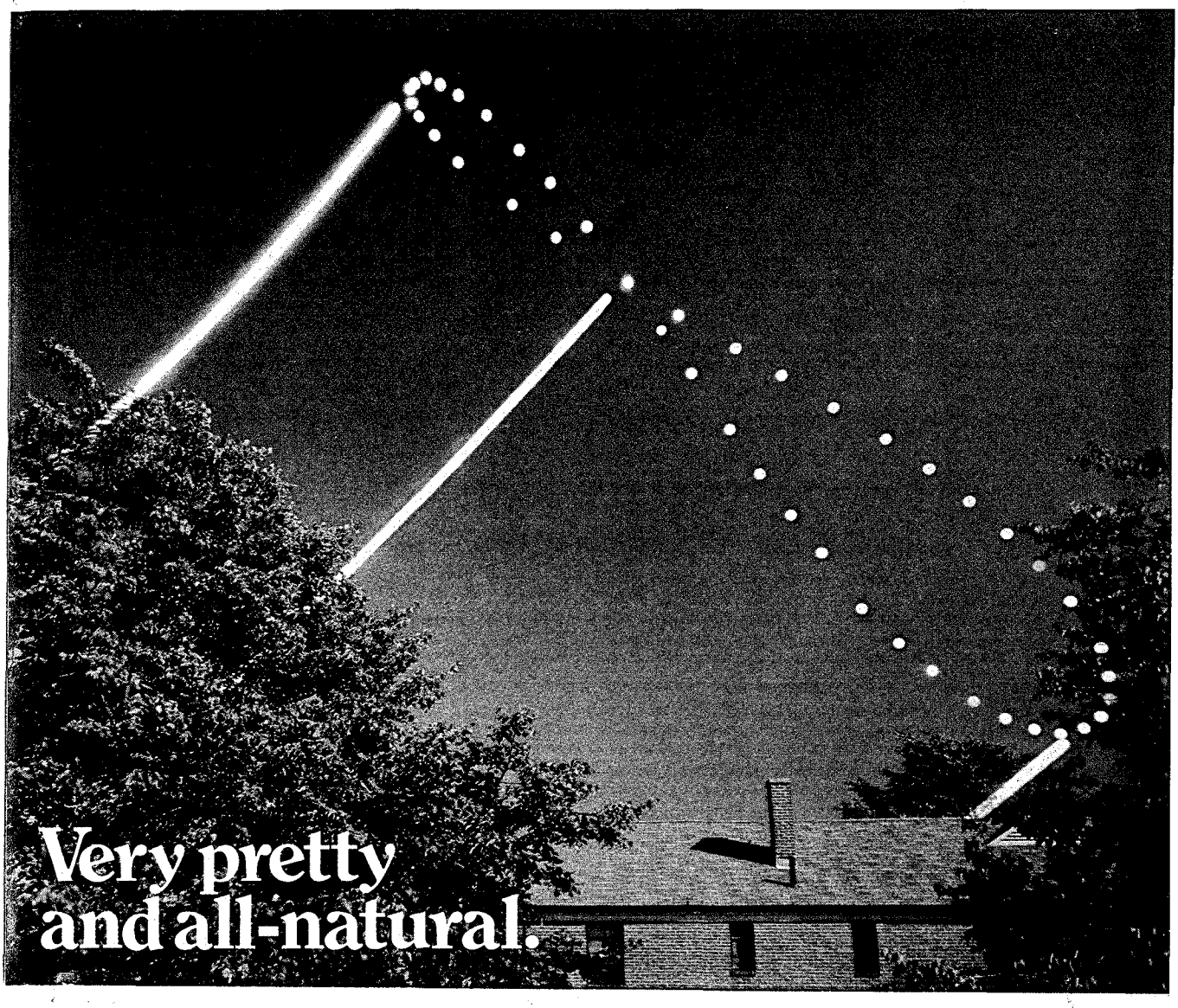
The analemma may be constructed in two ways:

1) Using a meridian circle to measure the declination of the sun and note the exact clock time when the cross-hairs bisect the solar disk at noon each day. This is the fixed position variable time method.

2) Taking an exposure on a photographic plate of the position in the sky of the sun at the same clock time each day throughout a year with a fixed camera. This is the fixed time variable position method.

Two kinds of day are implicit in the analemma. The first is the sunrise to sunset day which is a function of the declination or north-south motion of the sun. The second is the noon to noon day which is a function of the equation of time or the east-west motion of the sun. The north-south motion has to do with light and darkness, the east-west motion has to do with expansion and contraction of time.

Our senses combine these two physical phenomena of light/dark and yin/yang into our psychic condition. The analemma also combines these two phenomena into a graphic unity. We might therefore expect that there is some relation between our moods and mental spirits and the attributes of the analemma.


Very pretty
and all-natural.

THE ANALEMMA YEAR
PATH OF THE SUN

January		
	4	Perihelion: r = minimum = 0.983 a.u.
February		
	2	Southern maximum acceleration West
	12	Major maximum displacement East: $\epsilon = -14^m\ 20^s$; $\delta = -14°\ 0'\ 25"$
March		
	19	Maximum velocity North: +23.7 '/d
	21	Vernal Equinox: $\delta = 0°$
	27	Minor maximum velocity West: +18.34 s/d
April		
	1	Maximum rate of increase of r
	3/4	r = 1.000 a.u.
	14	Crossover: $\epsilon = -36^s$; $\delta = +9°\ 1'$
	15/16	$\epsilon = 0$
May		
	9	Northern maximum acceleration East
	14/15	Minor maximum displacement West: $\epsilon = +\ 3^m\ 44^s$
June		
	14	$\epsilon = 0$
	21	Minor maximum velocity East: -12.24 s/d
	22	Summer Solstice: $\delta = +23°\ 26'\ 31"$
July		
	6	Aphelion: r = maximum = 1.016 a.u.
	27	Minor maximum displacement East: $\epsilon = -\ 6^m\ 25^s$
August		
	6	Northern maximum acceleration West
	31	Crossover: $\epsilon = 36^s$; $\delta = 9°\ 1'$
September		
	2/3	$\epsilon = 0$
	17/18	Major maximum velocity West: + 21.42 s/d
	21/22	Autumnal Equinox: $\delta = 0°$
	27	Maximum velocity South: - 23.4 '/d
October		
	5	r = 1.000 a.u.
	8/9	Maximum rate of decrease of r
November		
	4	Major maximum displacement West: $\epsilon = +\ 16^m\ 23^s$; $\delta = -15°\ 4'\ 20"$
	15	Southern maximum acceleration East
December		
	22	Winter Solstice: $\delta = -23°\ 26'\ 28"$
	24/25	$\epsilon = 0$ and Major maximum velocity East: - 29.95 s/d

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r = radius vector of the earth's orbit
δ = declination of the sun
ϵ = the equation of time

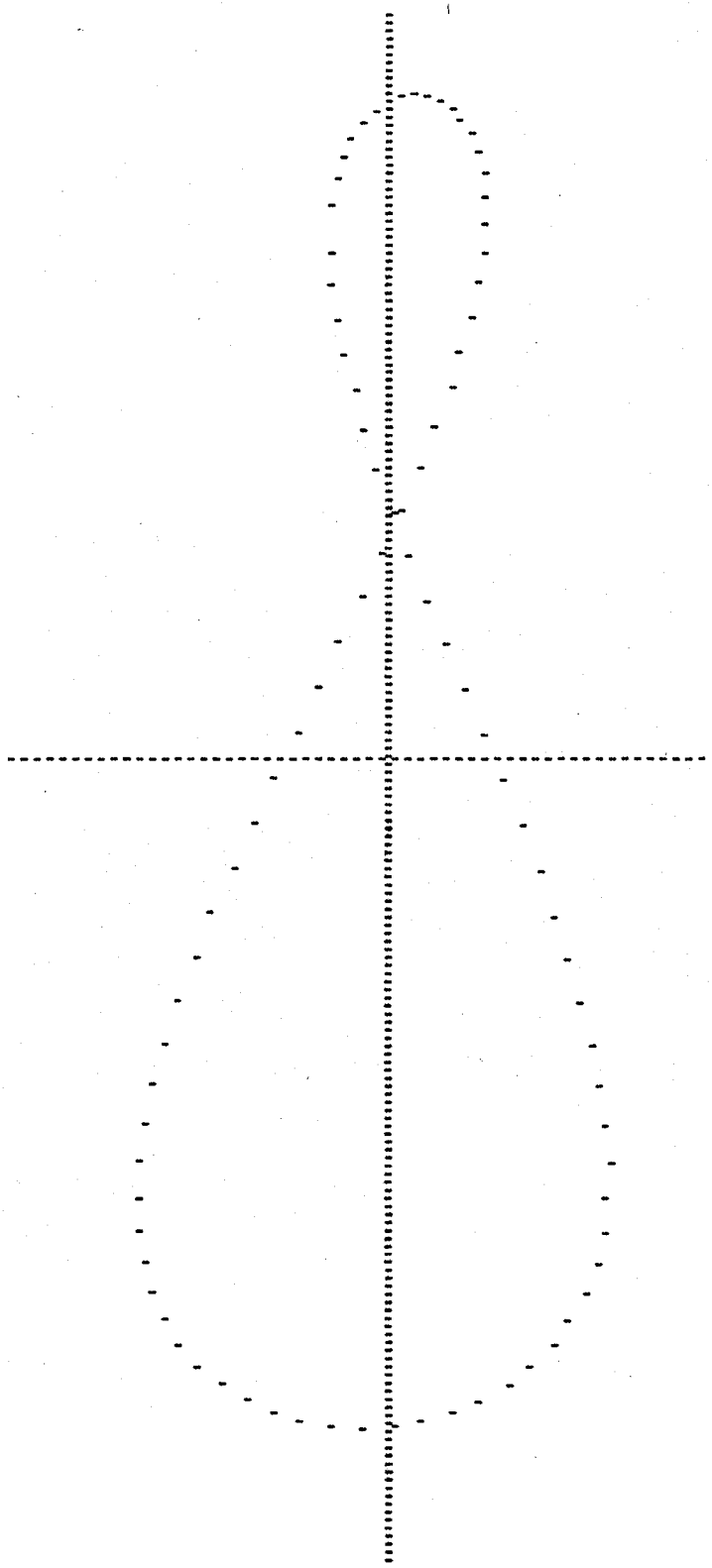
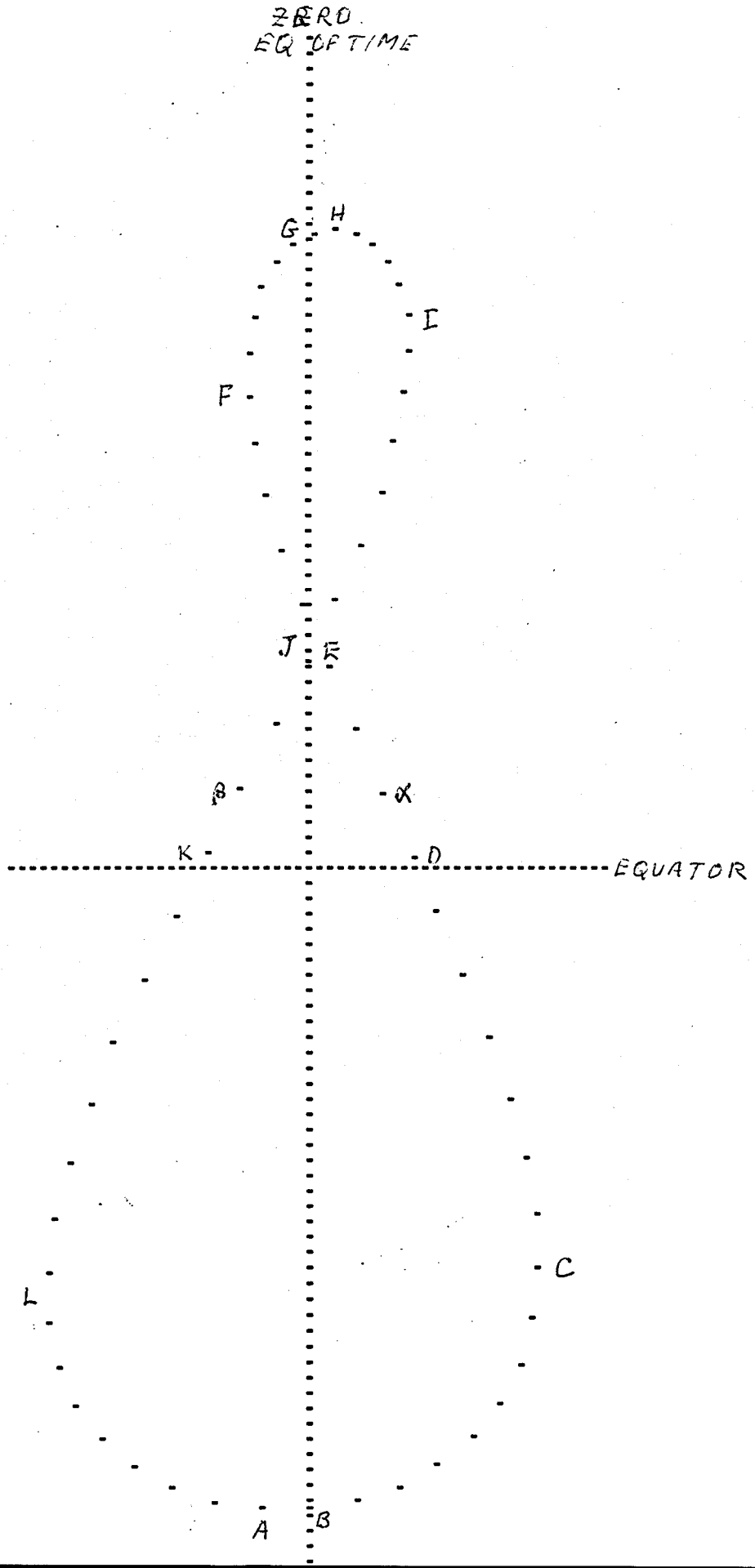


FIGURE I



For those who would go deeper
There is sacred geometry
and sacred chronology

FIBRAM1.WPD February 13, 2004

Fibonacci Numbers

The recursion formula for the Fibonacci numbers is $F_{r+1} = F_r + F_{r-1}$
Beginning with the initial numbers 1 and 1 the recursion formula gives the Fibonacci sequence:
1,1,2,3,5,8,13,21,34,55,89,144,233,.....
The limit of the ratio between two successive numbers, $\lim(F_{r+1}/F_r)$ as r increases is $(1+\sqrt{5})/2$
[It is to be noted that whatever the initial pair of numbers, the ratio limit is always $(1+\sqrt{5})/2$]

The Divine Proportion or Golden Mean

The Divine Proportion is A:B :: B:A+B
Dividing by B and letting A/B = x, we have $x = 1/(1+x)$ or $x^2 + x - 1 = 0$
The solutions to this quadratic equation are $x = (1 \pm \sqrt{5})/2$
By convention the positive root, $x = (1 + \sqrt{5})/2$, is designated by Φ 1.618034
This value is called the Golden Mean or Divine Proportion
[Here we shall designate the negative root $x = (1 - \sqrt{5})/2$ by ϕ] ϕ -0.618034

Explicit Formula

If we wish to know the value of the 110th Fibonacci number, for example, and do not want to repeatedly apply the recursion formula, we need an **explicit** formula which gives the value of F_n when we are given only n. While it is not always possible to derive an explicit formula from a recursion formula, in the case of sequences like the Fibonacci sequence it is. The explicit formula for Fibonacci numbers is:

$$F_n = (\Phi^n - \phi^n)/\sqrt{5} \qquad L_n = \frac{\Phi^n + \phi^n}{2} \quad \text{Lucas}$$

The above is a brief introduction to the arithmetic properties of the golden mean. There are also many geometric and esthetic properties and many manifestations in nature. [An example, the loops in the analemma. The northern loop is to the southern loop as the southern loop is to the whole year. This is roughly true at present but the shape of the analemma evolves over thousands of years.]

For more information on the mathematical, esthetic, and historical aspects of Φ, I recommend

The Divine Proportion by H.E.Huntley Dover Publications 1970
and Vol XVI no 4 Winter 1991 of PARABOLA magazine.

Golday.wpd

The Golden Ratio or Divine Proportion is 1.618034... It's inverse is 0.618034...
0.618034 times the Gregorian year of 365.25 days = 225.74 days
365.25 days minus 225.74 days = 139.51 days

This results in **two** golden days:
The long or golden day is the birth date plus 225.74 days
The short or silver day is the birth date plus 139.51 days
(In all cases allow plus or minus a day because of the fractions and intruding leap years.)

The golden and silver days for the people at our party yesterday are:

Hafiza	birthday	Mar 12	golden	Oct 23	silver	Jul 29
Al		Jul 28		Mar 11		Dec 13
Eloise		Sept 16		Apr 29		Feb 3
Eleanor		Dec 10		Jul 23		Apr 29
Sharon		Dec 13		Jul 27		May 1

Note the coincidences some exact, some within a day or two.
We know we are all closely connected to each other in our interests, our values, our affections and our visions. But it seems we are also connected to each other through the Divine Proportion.

Ref:

- The Shape of the Analemma - Bernard M. Oliver S&T July 1972
- The Analemma of the Planets - S&T March 1982
- Photo - Dennis di Cicco S&T June 1979
- The Divine Proportion - H.E. Huntley Dover 1970
- PARABOLA, WINTER 1991 vol XVI #4

GOLDEN DAY TABLES

10 = PRECEDING YEAR
ENTER BIRTHDAY IN LEFT COLUMN 10-11 11 = FOLLOWIN YEAR

e.g. 7-28-10 3/10/11

March 10 is the long golden day of July 28 OR FORWARD GOLDEN DAY

ENTER BIRTH DAY IN RIGHT COLUMN

7-28-11 12-15-10

DEC 15 is the short golden day of July 28 or Silver BACK GOLDEN DAY
[or Silver]

A FORWARD CYCLE of 13 JUMPS COMES BACK TO ITS ORIGIN IN 8 YEARS (APPROX)

e.g. July 28 .... → .. Aug 2 4 = 4 days

Fibonnaci $\frac{1}{2}\ \frac{2}{3}\ \frac{3}{6}\ \frac{5}{8}\ \boxed{\frac{8}{13}}\ \frac{13}{21}\ \ldots$ (8/13: YEARS / STEPS)

$$365.25 \times 0.618034 = 222.7369 \text{ long} \quad \pm 1 \text{ or } \pm 2$$
$$139.5731 \text{ short}$$

chicagotribune.com

December 29, 2008

veri on wireless

Clarence Page

Clarence Page

Bio | E-mail

No need to get mad at Obama's church pal

December 21, 2008

Some of President-elect Barack Obama's supporters are upset that he chose Rick Warren to give the invocation at his inauguration. They should not be surprised. He promised as a candidate that he would try to change the divisive tone of America's politics.

Recent columns

Civic pride in public shame

December 17, 2008

Ah, what a gift the media give us to see ourselves as others see us. With President-elect Barack Obama's victory, Chicago was being portrayed as a world-class model of political enlightenment. Then the governor got arrested.

Jackson Jr.'s entanglement

December 14, 2008

The year's not over, but I think my first annual Basket Crab Award can safely be awarded to Gov. Rod Blagojevich.

Blagojevich, Obama: Parallel worlds

December 10, 2008

A network news producer based in New York wanted to get my reaction to the arrest of Gov. Rod Blagojevich. Except she had a problem. She was reading the criminal complaint as she was talking to me. She couldn't stop gasping. "I'm sorry," she said. "This is . . . unbelievable!"

Gay pride, black prejudice

December 7, 2008

"Gay is the new black," declares the Dec. 16 issue of The Advocate, a leading gay-oriented magazine. Well, not quite. How about, "Gay is the new gray?"

Obama takes leftists' fire

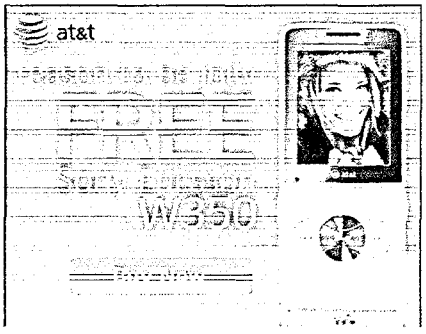
December 3, 2008

You can't please everybody in politics. You can't even please your fans all of the time. Remember when President-elect Barack Obama was battling opposition to his promise of "change"? That was so last month.

Obama and his BlackBerry blues

November 30, 2008

It has not taken President-elect Barack Obama long to learn what his predecessor quickly discovered: His new job is a gilded cage.



φ = .6180338

φ · 365.2422 = 225.7820

DATE	GOLDEN DAY	DATE	GOLDEN DAY	DATE	GOLDEN DAY
01/01/10	08/15/10	01/02/10	08/16/10	01/03/10	08/17/10
01/04/10	08/18/10	01/05/10	08/19/10	01/06/10	08/20/10
01/07/10	08/21/10	01/08/10	08/22/10	01/09/10	08/23/10
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06/06/10	01/18/11	06/07/10	01/19/11	06/08/10	01/20/11
06/09/10	01/21/11	06/10/10	01/22/11	06/11/10	01/23/11
06/12/10	01/24/11	06/13/10	01/25/11	06/14/10	01/26/11
06/15/10	01/27/11	06/16/10	01/28/11	06/17/10	01/29/11
06/18/10	01/30/11	06/19/10	01/31/11	06/20/10	02/01/11
06/21/10	02/02/11	06/22/10	02/03/11	06/23/10	02/04/11
06/24/10	02/05/11	06/25/10	02/06/11	06/26/10	02/07/11
06/27/10	02/08/11	06/28/10	02/09/11	06/29/10	02/10/11
06/30/10	02/11/11	07/01/10	02/12/11	07/02/10	02/13/11

226 p 2

07/03/10	02/14/11	07/04/10	02/15/11	07/05/10	02/16/11
07/06/10	02/17/11	07/07/10	02/18/11	07/08/10	02/19/11
07/09/10	02/20/11	07/10/10	02/21/11	07/11/10	02/22/11
07/12/10	02/23/11	07/13/10	02/24/11	07/14/10	02/25/11
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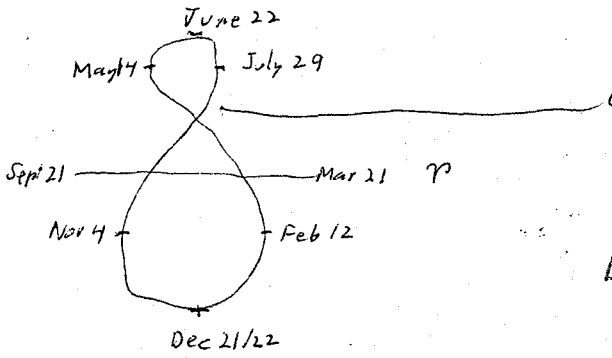
12/24/10	08/07/11	12/25/10	08/08/11	12/26/10	08/09/11
12/27/10	08/10/11	12/28/10	08/11/11	12/29/10	08/12/11
12/30/10	08/13/11	12/31/10	08/14/11	01/01/11	08/15/11

It requires a second kind of time (or independent source of time) to reveal the analemma. Viz clock-time

If the earth's rotation is the basis of time, The analemma disappears.

When: The 3 meaning of Day
1) Rotation Period
2. Daylight
3. YOM, Biblical Day

The eight analemma dates.



Ephemeris Transit = 12 00 00
i.e. Sun-dial ≡ clock time
Apr 15
Jun 14
Sep 2
Dec 25

The cross quarter dates of the Celts ≒ Q

Analemma	The Celtic Calendar				CHRISTIAN
Nov 4	New Years	Samhain	Nov 1	Q	All Saint
Dec 22		Yule	Dec 22		Christmas
Feb 12		Bridgit or Imbolg	Feb 2	Q	Candlemass
Mar 22		Eostar	Mar 22		Easter
Apr 15 – May 14 1/2		Beltane	May 1	Q	
Jun 22		Litha	June 22		
July 29	Lugh nasesh or	Lammas	Aug 2	Q	cf. Aug 6 Transfiguration
(Sept 2 – Nov 4) 1/2		Mabon	Sept 21		

Hallowe'en Oct 31
Valpurgis Apr 30

ANALEMMA:

Maps have always intrigued me. I especially like maps mounted on globes since they portray the counter intuitive spherical relationships that exist between locations on the earth. When I was a boy, I was also quite taken with the various symbolic devices that cartographers used in decorating globes--assorted sea monsters, ships from various centuries and cultures, puffy cherubic faces blowing across the meridians, and compasses criss-crossed with omni-directional lines illuminated with elaborate fleurs-de-lis. But I was especially fascinated--and also confused--by a mysterious figure-of-eight symbol that cartographers frequently pasted on globes, usually somewhere in the Pacific ocean west of the Galapagos and east of Hawaii. While I was able to see, if not rationally, at least imaginatively, the relevance of winds, ships, compasses and monsters, I could never surmise the meaning of the mysterious figure-eight or what it had to do with the map. None of the adults I asked seemed to know much about it. Once I encountered someone who knew more than others, who said that it had something to do with the sun, but without elaborating, he jumped quickly into an explanation, with the help of the globe, of how it was that the sun could never set on the British Empire. Today both the British Empire and the figure-eights have disappeared from globes. Perhaps, both for the same reason--confusion finally overwhelmed fascination.

Later, I learned that this figure eight was called an "analemma" and represented the sun's position in the sky corresponding to the day of the year. This helped a bit, since the top of the analemma was located at 23 1/2° north latitude, the northernmost position reached by the sun on June 22, and the bottom of the analemma was located at the southernmost latitude reached by the sun, on about December 21st. But why the two loops forming the eight, and why the curious asymmetry, with the northern loop much smaller than the southern loop. With these questions unanswered I had to let the subject rest but hoped to learn more later when I was older.

However, it was a great many years later before the analemma caught my attention again. Its resurgence into my life was the result of the efforts of a very clever (and persistant) photographer who undertook to make a photographic record of the positions of the sun throughout an entire year on a single

photographic film. This photo-entrepreneur determined the size of the field of view so that the seasonal changes in the sun's position would not move it out of the picture, then he carefully mounted his camera to point fixedly to the center of this field. He selected filters and exposure times so that the film would not be overexposed with the 365 necessary exposures, then at precisely the same instant of time each day, he would take the sun's picture. The result was the analemma. In the course of a year the sun had traced out a huge figure eight in the sky which was faithfully captured on film. What the photographer had done, in taking the sun's picture at the same time each day, was effectively to stop the rotation of the earth and leave in the record only those motions of the sun which were due to the earth's revolution.

If the earth did not rotate, then the figure eight pattern of the sun's yearly motion would be readily perceptible. As it is, the north-south motion is evident to everyone who is at all conscious of the seasons, but the east-west motion and the two resulting loops elude all but careful observers. The explanations for the apparent figure eight motion of the sun have been known for several centuries. The north-south motion, as is commonly known, is due to the 23 1/2° tilt of the earth's axis to the plane of its orbit. The east-west motion is also due to the tilt of the axis, but involves something further. The orbit of the earth is not an exact circle. The distance between the earth and the sun changes and the speed in the orbit also changes. The combination of all these ingredients results in the analemma with its asymmetric loops. The details become a bit mathematical, but the theories and the observations seem to agree rather well.

Knowing that the total motion of the sun has two components, we might be led to suspect, if its north-south component of motion is responsible for the seasons, might not its east-west component also play some role in influencing climatic or other conditions on earth. Could it be that there are other yearly "seasons" due to east-west effects that are superimposed on the north-south effects which we term winter, spring, summer and fall. Such effects, if any, must be more subtle than the familiar seasons, since we seem to have been largely unaware of them. It is worth looking at the analemma in more detail to see if something like this is possible.

BOOK OF TIME

October 7, 1985

THE ANALEMMA--JOURNEY OF THE YEAR--FORMATTED DISK #7--MEMORITE III--VECTOR

THE ANALEMMA: and History of the Calendar

My first encounter with the analemma occurred sometime before I was 10 years old. This was a long time ago before formal manners had defected ~~from etiquette books~~ to history books and it was still the custom to pay afternoon calls on one's friends. For a small boy such visits were always ~~threatening~~ traumatic. It meant not only having to clean up and dress up but worst of all it was the sacrifice of an entire afternoon to sitting quietly while the grownups talked endlessly and unintelligbly about almost everything and everyone. However, there was usually some respite when tea was served and cookies finally appeared, ("Take just one!"), but the principal relief came through knowledge that shortly after tea parole was at hand. ¶ But not all visits were traumatic. Sometimes the visit was to Mrs. Hollister. She not only had bigger and better cookies, but had in her library a magnificent 2-foot globe of the world which she enthusiastically allowed me to study. I was intrigued with the idea we lived on a sphere and found sanctuary from the grownup talk ~~monotheme~~ in the contemplation of the antipodes and in wondering how long it would take to get there.

¶ I was also intrigued with the various symbolic devices that the cartographers used in decorating the globe--assorted sea monsters, ships from various centuries and cultures, puffy cherubic faces apoplectically blowing up gales, and multi-crossed compasses illuminated with fleurs-de-lis. But I was especially fascinated--and confused--by a mysterious figure-of-eight symbol which was located somewhere west of the Galapagos Islands in an empty part of the Pacific Ocean. While I was able to comprehend, if not rationally at least with some imagination, the relevance of winds, ships, compasses and sea monsters, I could never surmise the meaning of the mysterious figure-eight or what it had to do with the map. None of the grownups I asked seemed to know anything about it. Once, however, I encountered someone who said that it had something to do with the sun, then without elaborating further, quickly turned to a demonstration of how the sun could never set on the British Empire. Today both the British Empire and the figure-eights have disappeared from globes. Perhaps, both for the same reason--confusion finally overwhelmed fascination.

Later, I learned that this figure eight was called an "analemma" and represented the sun's position in the sky corresponding to the day of the year. This helped a bit, since the top of the analemma was located at 23 1/2° north latitude, the northernmost position reached by the sun on June 22, and the bottom of the analemma was located at the southernmost latitude reached by the sun, on about December 21st. But why the two loops forming the eight, and why the curious asymmetry, with the northern loop much smaller than the southern loop. With these questions asked, but unanswered, I had to abandon the subject, but hoped to return to it when I was older.

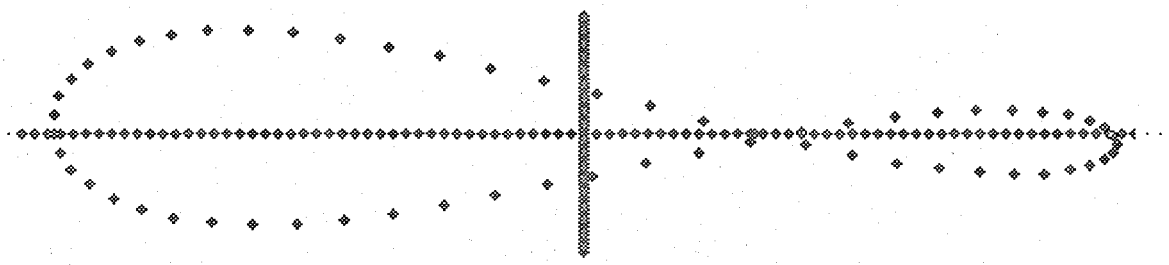
A great many years passed before the analemma again caught my attention. Its resurgence into my life was the result of the efforts of a very clever (and persistant) photographer who undertook to make a photographic record of the positions of the sun throughout an entire year on a single photographic film. This photo-entrepreneur determined the size of the field that would contain

the seasonal changes in the sun's position, then he carefully mounted his camera to point fixedly to the center of this field. He selected filters and exposure times so that the film would not be overexposed with the 365 necessary exposures, then at precisely the same instant of time each day, he would take the sun's picture. The result was **the analemma.** In the course of a year the sun traced out a huge figure eight in the sky which was faithfully captured on film. In essence what the photographer had done in taking the sun's picture at the same time each day, was to remove the effects of the rotation of the earth and leave in the record only those motions of the sun which were due to the earth's orbital movement.

The explanation for the apparent figure eight motion of the sun has been known for several centuries. The north-south motion, as is commonly known, is due to the 23 1/2° tilt of the earth's axis to the plane of its orbit. The east-west motion is also due to the tilt of the axis, but involves something further. The orbit of the earth is not an exact circle. The distance between the earth and the sun changes and the speed in the orbit also changes. The combination of these effects results in the analemma and its asymmetric loops. The details become a bit mathematical, but the theories and the observations seem to agree rather well.

Knowing that the total motion of the sun has two components, if the north-south component is responsible for the seasons, might not the east-west component also play some role in influencing climatic and other conditions on earth? Could it be that, superimposed on the north-south effects which we term winter, spring, summer and fall, there are other cyclical effects which we might term, "east-west seasons"? Such effects, if any, must be more subtle than the familiar seasons, since we seem to be largely unaware of them. But it is worth looking at the analemma in more detail to see if something like this is possible.

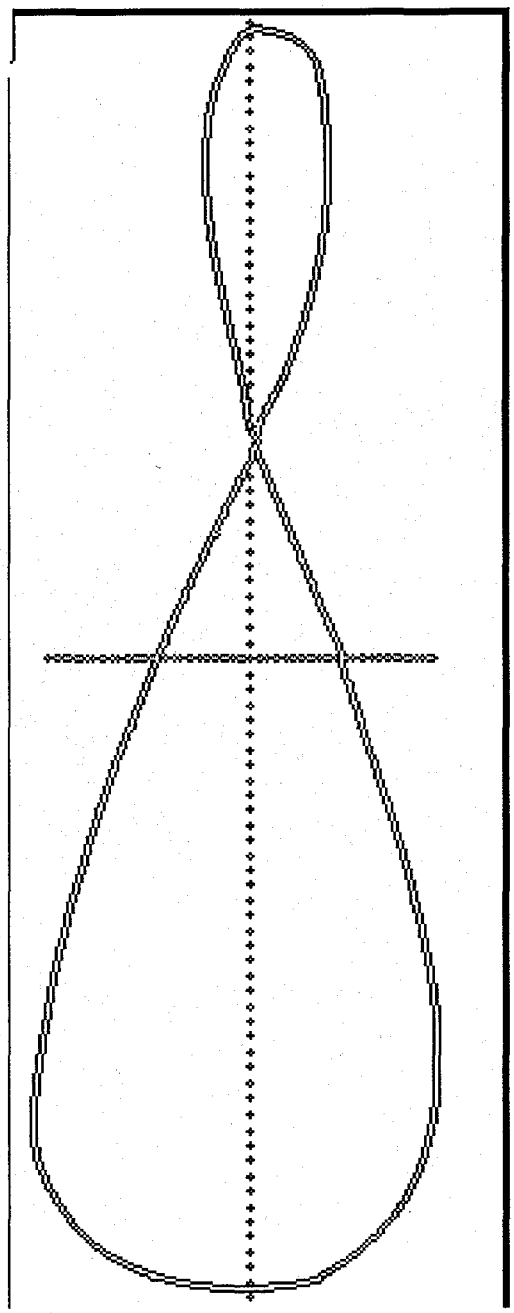
Let us imagine that the earth does not rotate. Then the analemma would be the pattern described in the sky by the sun in the course of a year. Where in the sky the pattern would be located would of course depend on the longitude and latitude of the observer. We recognize the importance of the latitude for the north-south seasons, but the longitude would also be important for east-west seasons, even though ordinarilly washed out by the earth's rotation. Depending on the longitude, there would be places on the earth where the analemma would be described near the meridian, other places where it would be low in the east or the west, perhaps with the sun rising only during part of the year, as at present it does north of the arctic circle. Then there would be longitudes at which the analemma path would be always below the horizon. Certainly we would be aware of these east-west seasons if the earth did not rotate, but given the very basic fact of the earth's rotation, do east-west seasons still have any significance? The principal features of the north-south seasons are variations in light and heat. This could not be a principal feature of an east-west season unless there were no rotation. So, given the rotation, we must conclude that if an east-west season has any impact or effect it will lie somewhere other than in heat and light. Are there any clues?



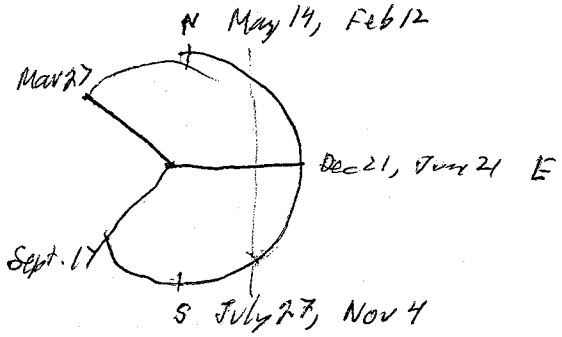
ANALEMMA

B:ANALG.PCX
width = 6"

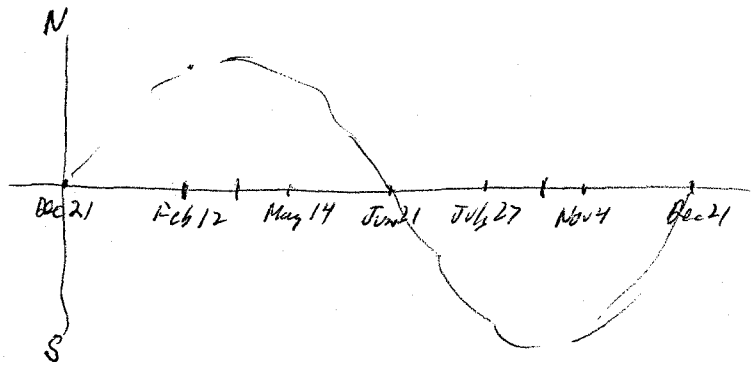
B:ANAL5.PCX



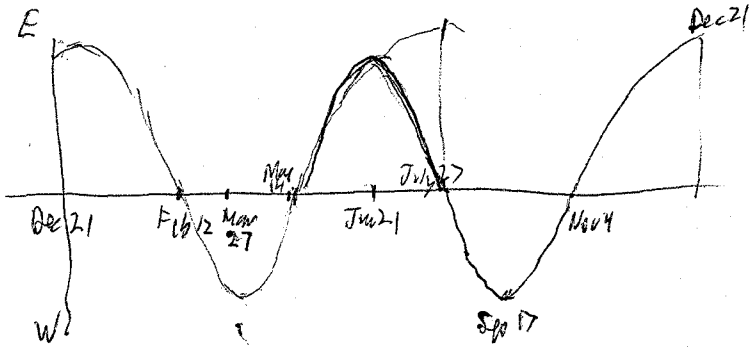
11/15/94



Pendulum
1 cycle equals 2 cycles
L-R 1 cycle, up-down 2 cycles



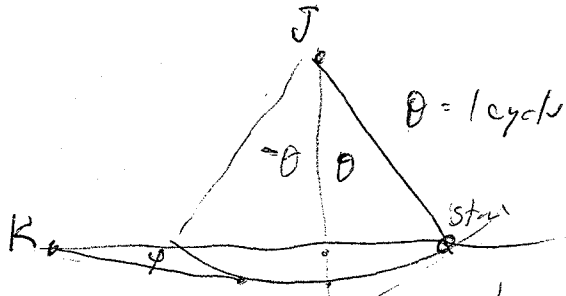
N-S
one ~~loop~~ cycle



E-W
2 Cycles

E > S beginning Dec 8
N > E beginning Jan 6
E > N beginning June 14
S > E beginning June 30

Max E 7.79

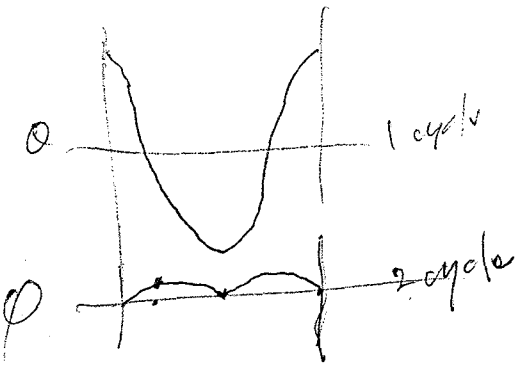


4|29.92
7.49

What angle gives 2 cycles

Surmise: By suitable locating J and K any figure 8 can be modeled.

∴ The analemma and its evolution can be mapped onto a J-K coordinate system.



variable does not exist, it will be left blank in the .INI file. If a double percent %% is entered, a single percent % will be used.

The paths you specify do not affect your Location of Files settings, they are only used in the App Server, when executing a shared code application, or in the Ini Paths, to redirect where the .INIs for an application will go.

OPEN (04/30/92)

The word "Retrieve" has been changed to "Open" in two different menus. "Format Retrieved Documents for Default Printer" (File, Preferences, Environment) has been changed to say "Reformat Documents for Default Printer on Open." "Update on Retrieve" (Tools, Spreadsheet, Link Options) has been changed to "Update Links on Document Open."

PAPER SIZE (04/30/92)

After you edit the current paper definition, WordPerfect now updates the Paper Size code when you choose Close from the Paper Size dialog box. If you choose Select from the Paper Size dialog box, a new Paper Size code will be inserted at the insertion point, or placed at the top of the page if Auto Code Placement is on.

PRINT QUALITY (11/04/91)

When you have a Windows printer driver selected, the Graphics Quality and Text Quality pop-up lists offer three settings to choose from: Set In Driver, Draft, and Do Not Print.

Set In Driver tells WordPerfect to use the current resolution that is set in the driver.

Draft sets the driver to draft mode when printing. Each Windows printer driver can handle draft mode differently. For example, some drivers do not print graphics in draft mode.

PRINT PREVIEW (04/30/92)

The Print option is available in Print Preview. Choose Print from the File menu to close the Print Preview window and open the Print dialog box to print your document.

REVEAL CODES WINDOW SIZE (04/30/92)

You can set the default size of the Reveal Codes window. The default value is 50%, but can range from 1% (a very small portion of the window) to 99% (most of the window). To set a new default size, choose Preferences from the File menu, and then choose Display. Type a percentage in the Reveal Codes Window Size text box, then choose OK. The setting you choose will be in effect each time you open a document.

THE ANALEMMA

The order of experience

O = objective
S = subjective

I - O	The North - South Seasons	10,000 B.C. ?
II - S	The Liturgical Year	2000 BC – 1000 AD
III - O	The equation of time	15th century after clocks
IV - S	The orbital theory i + e	After Newton
V - O	The photograph	197-
VI - S ↔ O,O	The linkage between II and V	197- (My Work)
VII - S ↔ O,S	Theory of the Linkage	?

1. Jet Lag
2. Solar Wind Fields
3. Bimodal psychological distribution

S. A. D.

References:
S&T March 82 Analemmas of the different planets
SKY & TELESCOPE " June 79 - photo
" July 72 p 20 The Shape of the Analemma with time
" June 89 p 673, 9 photo
" Sept. 89 p 257 letter
" Dec 88 computation: Keith & Stagg

ANALEMMA

The Unique Days
Extrema

Lemniscates
Ovals of Cassinni
Infinity Symbol

Orientation + Description
East-West
The Crossover time

The Golden Section
Analogy to Octave in music
~ Circle of 5ths ~ 0.618 ratio

The Fall of Man
See Hoyle
Stonehenge p
Matthew Arnold
Quote

Interpretations
Yin + Yang
Jet Lag
Inner Ear and orbital accelerations
Magnetic Storms

The Seasons of the Analemma
Hipparchean Method
Solstices + Equinoxes
Changes Method δ δ̇ δ̈ / e ė ë

δ > ė , ė > δ

FESTIVALS of the Analemma
The Golden Ratio
The Two Cycles

Stone Henge and the 56 Aubrey Holes
56×4 = 224
Hypothesis: Used for calendric purposes
to find the cross-quarter days

$\frac{8}{13} \times 365.25 = 224.77$

$\varphi \times 365.25 = 225.74$

SVETLANA DARCHE
5141 COMERCIO AVE
WOODLAND HILLS, CA O

ALIMTRA (AUDREY) DAVINROY
3551 EL LADO DR.
GLENDALE, CA 91208

DELORES DAVIS

, CA O

CAROL DE MARS
6964 SHOUP
CANOGA PARK, CA 91307

GEOFFREY P. DEBRITO
8821 LINDLEY AVE.
NORTHRIDGE, CA 91325

RAJ KAMAR DEOSARANSINGH

, CA O

JOCK DESWORT
2310 GLENCOE AVE.
VENICE, CA 90291

ROXANNE DEVAL
10400 WIDDINGTON STREET
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DOLORES DI SILVERIO
7956 SALE AVE
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RUTH DICKEY

, CA O

MARIE DIGIURO
19856 LABRADOR STREET
CHATSWORTH, CA 91311

Matthew Arnold

"The very first thing that strikes one in reading the Mabinogion, is how evidently the mediaeval story-teller is pillaging an antiquity of which he does not fully possess the secret; he is like a peasant building his hut on the site of Halicarnassus or Ephesus; he builds, but what he builds is full of materials of which he knows not the history, or knows by a glimmering tradition only."

Also Include

The Cartoon on Winter TV & Soup Commercials

Quote from Ecclesiastes

Ann Herberts

TROPICAL YEAR 365.24219 days

φ = 1.6180339887498949...
" 874831...

The Analemma and Recursion

06/25/89

n = north loop

s = south loop

y = year

$\frac{n}{s} = \frac{s}{y}$ i.e. extreme-mean proportion

but in addition if

$n + s = y$ 3th Fibonacci condition

i.e $\frac{n}{s} = \frac{s}{n+s}$

any Proportion	$\frac{n_1}{d_1} = \frac{n_2}{d_2}$
extreme mean condition	$d_1 = n_2$
Fibonacci condition	if also $n_1 + d_1 = d_2$ i.e. $\frac{n_1}{d_1} = \frac{d_1}{n_1+d_1}$

eg

$\frac{7}{19} = \frac{21}{57}$

$\frac{7}{19} = \frac{19}{51.57}$

if only $n_1 + d_1 = d_2$

$\frac{7}{19} = \frac{9.58}{26}$

does not satisfy Fibonacci criterion

The Analemma Satisfies the fibonacci Condition if $\Phi = 1.618$

$y = 1.618\,s$, $s =$

$y = \Phi s$ and $s = \Phi n$

$y = (\Phi + 1)\,n = \Phi^2 n$

1, 1, 2, 3, 5, 8, 13, 21, . . .

$\frac{1}{8} = 45.66$, $n = \frac{3}{8}y = 137d$ $\frac{5}{8}y = 228d = s$

$\frac{1}{13} = 28.096$, $n = \frac{5}{13}y = 140.48$ $\frac{8}{13}y = 224.77 = s$

$n = \frac{1}{\Phi^2}y = 139.51$ $\frac{1}{\Phi}y = 225.74 = s$

But 1 month $\doteq$ 28d $\therefore$ the golden ratio approximation of $\frac{5}{13}, \frac{8}{13}$ is useful

SETEPSON
W82FX
PRINT fn

!!

ANLEMINT.WS2 JOURNEY OF THE YEAR REV 8/8/86
FROM DISK #7--MEMORITE III VECTOR GRAPHIC 10/7/85

THE ANALEMMA:

My first encounter with the analemma occurred sometime before I was 10 years old. This was a long time ago before formal manners had defected from etiquette books to ~~history books~~ historical novels and it was still the custom to pay afternoon calls on one's friends. For a small boy such visits were always threatening. It meant not only having to clean up and dress up but worst of all it was the sacrifice of an entire afternoon to sitting quietly while the grownups talked endlessly and unintelligbly about almost everything and everyone. However, there was usually some respite when tea was served and cookies finally appeared, ("Take just one!"), but the principal relief came through knowledge that shortly after tea parole was at hand. ~~But~~ Hemmed not all visits were traumatic. Sometimes the visit was to Mrs. Hollister. She not only had bigger ~~and better~~ cookies, but had in her library a magnificent 2-foot globe of the world which she enthusiastically allowed me to study. I was intrigued with the idea we lived on a sphere and found sanctuary from the grownup talk in the contemplation of the antipodes and in wondering how long it would take to get there.

I was also intrigued with the various symbolic devices that the cartographers used in decorating the globe--assorted sea ~~monsters~~ serpents, ships from various centuries and cultures, puffy cherubic faces apoplectically blowing up gales, and multi-crossed compasses illuminated with fleurs-de-lis. But I was especially fascinated--and confused--by a mysterious figure-of-eight symbol which was located somewhere west of the Galapagos Islands in an empty part of the Pacific Ocean. While I was able to comprehend, if not rationally at least with some imagination, the relevance of winds, ships, compasses and sea monsters, I could never surmise the meaning of the mysterious figure-eight or what it had to do with the map. None of the grownups I asked seemed to know anything about it. Once, however, I encountered someone who said that it had something to do with the sun, movement of then without elaborating further, quickly turned to a demonstration of how the sun could never set on the British Empire. Today both the British Empire and the figure-eights have disappeared from globes. Perhaps, both for the same reason--confusion finally overwhelmed fascination.

Later, I learned that this figure eight was called an "analemma" and represented the sun's position in the sky corresponding to the day of the year. This helped a bit, since the top of the analemma was located at 23 1/2° ~~Lat~~ north latitude, the northernmost position reached by the sun on June 22, and the bottom of the analemma was located at the southernmost latitude reached by the sun, on about December 21st. But why the two loops forming

the eight, and why the curious asymmetry, with the northern loop

much smaller than the southern loop. With these questions asked, but never answered, I had to abandon the subject. ~~but hoped to return to it when I was older~~.

A great many years passed before the analemma again caught my attention. Its resurgence ~~into my life~~ was the result of the efforts of a very clever (and persistant) photographer who undertook to make a photographic record of the positions of the sun throughout an entire year on a single photographic film. This photo-entrepreneur determined the size of the field that would contain the seasonal changes in the sun's position, then he carefully mounted his camera to point fixedly to the center of this field. He selected filters and exposure times so that the film would not be overexposed with the 365 necessary exposures, then at precisely the same instant of clock time each day, he would take the sun's picture. The result was the analemma. In the course of a year the sun traced out a huge figure eight in the sky which was faithfully captured on film. In essence what the photographer had done in taking the sun's picture at the same time each day, was to remove the effects of the rotation of the earth and leave in the record only those motions of the sun which were due to the earth's orbital movement.

The explanation for the apparent figure eight motion of the sun has been known for several centuries. The north-south motion, as is commonly known, is due to the 23 1/2° tilt of the earth's axis to the plane of its orbit. The east-west motion is also due to the tilt of the axis, but involves something further. The orbit of the earth is not an exact circle. The distance between the earth and the sun changes and the speed in the orbit also changes. The combination of all these effects results in the analemma and its asymmetric loops. The details become a bit mathematical, but the ~~theories~~ equations explain very ~~rather~~ well.

Knowing that the total motion of the sun has two components, if the north-south component is responsible for the seasons, might not the east-west component also play some role in influencing climatic and other conditions on earth? Could it be that, superimposed on the north-south effects which we term winter, spring,

summer and fall, there are other cyclical effects which we might call, "east-west seasons"? Such effects, if any, must be more subtle than the familiar seasons, since we seem to be largely unaware of them. But it is worth looking at the analemma in more detail to see if something like this is possible.

Let us imagine that the earth does not rotate. Then the analemma would be the pattern described in the sky by the sun in the course of a year. Where in the sky the pattern would be located would of course depend on the longitude and latitude of the observer. We recognize the importance of the latitude for the north-south seasons, but the longitude would also be important for east-west seasons, even though ordinarily washed out by the earth's rotation. Depending on the longitude, there would be

places on the earth where the analemma would be described near the meridian, other places where it would be low in the east or the west, perhaps with the sun rising only during part of the year, as at present it does north of the arctic circle. Then there would be longitudes at which the analemma path would be always below the horizon. Certainly we would be aware of these east-west seasons if the earth did not rotate, but given the very basic fact of the earth's rotation, do east-west seasons still have any significance? The principal features of the north-south seasons are variations in light and heat. This could not be a principal feature of an east-west season unless there were no rotation. So, given the rotation, we must conclude that if an east-west season has any impact or effect it will lie somewhere other than in heat and light. Are there any clues?

ANALEMMA AS ENGINE

7/22/82

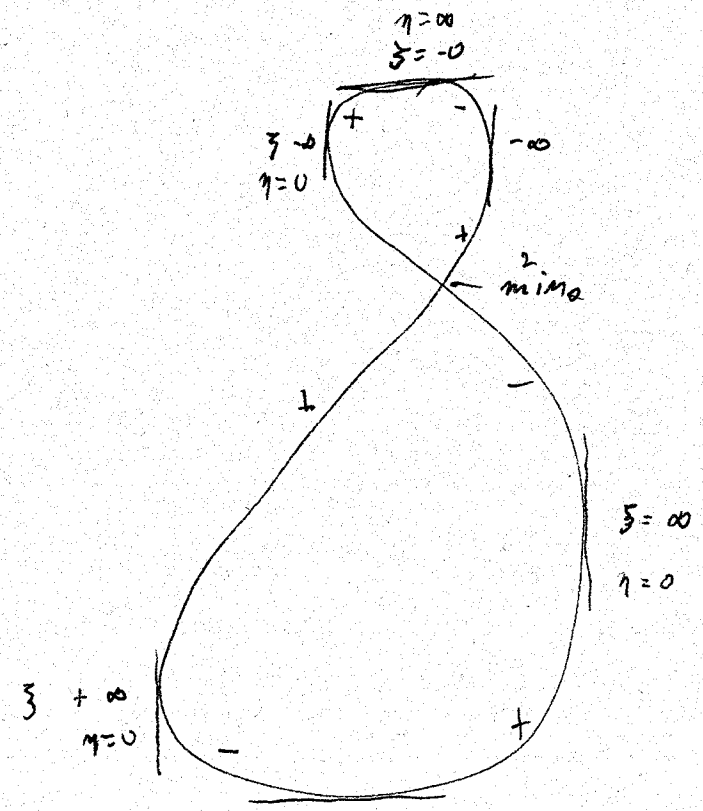
If, in the sense of two oscillations, the analemma is regarded as an engine or pump, then the phase between the oscillations is of significance.

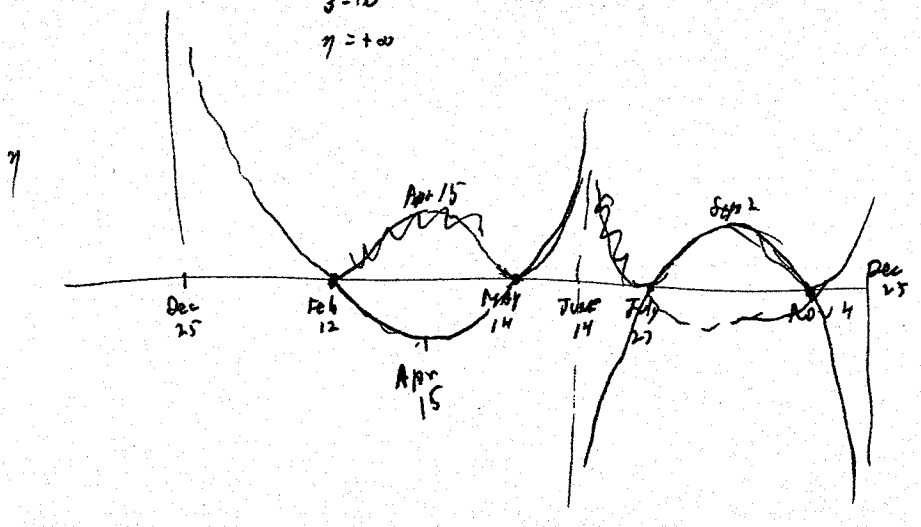
We have a N-S oscillation
and at right angles an E-W oscillation

The phase in one sense is 90° (i.e. at right angles)

The immediate phase, however is related to

$y = n - s$
$x = e - w$ $\quad \xi = \frac{dy}{dx} = \frac{\dot{y}}{\dot{x}}$ $\quad$ or use $\frac{\dot{x}}{\dot{y}} = \eta$





THE ANALEMMA YEAR
PATH OF THE SUN

January		
	4	Perihelion: r = minimum = 0.983 a.u.
February		
	2	Southern maximum acceleration West
	12	Major maximum displacement East: $\epsilon = -14^m\ 20^s$; $\delta = -14°\ 0'\ 25"$
March		
	19	Maximum velocity North: +23.7 '/d
	21	Vernal Equinox: $\delta = 0°$
	27	Minor maximum velocity West: +18.34 s/d
April		
	1	Maximum rate of increase of r
	3/4	r = 1.000 a.u.
	14	Crossover: $\epsilon = -36^s$; $\delta = +9°\ 1'$
	15/16	$\epsilon = 0$
May		
	9	Northern maximum acceleration East
	14/15	Minor maximum displacement West: $\epsilon = +\ 3^m\ 44^s$
June		
	14	$\epsilon = 0$
	21	Minor maximum velocity East: -12.24 s/d
	22	Summer Solstice: $\delta = +23°\ 26'\ 31"$
July		
	6	Aphelion: r = maximum = 1.016 a.u.
	27	Minor maximum displacement East: $\epsilon = -\ 6^m\ 25^s$
August		
	6	Northern maximum acceleration West
	31	Crossover: $\epsilon = 36^s$; $\delta = 9°\ 1'$
September		
	2/3	$\epsilon = 0$
	17/18	Major maximum velocity West: + 21.42 s/d
	21/22	Autumnal Equinox: $\delta = 0°$
	27	Maximum velocity South: - 23.4 '/d
October		
	5	r = 1.000 a.u.
	8/9	Maximum rate of decrease of r
November		
	4	Major maximum displacement West: $\epsilon = +\ 16^m\ 23^s$; $\delta = -15°\ 4'\ 20"$
	15	Southern maximum acceleration East
December		
	22	Winter Solstice: $\delta = -23°\ 26'\ 28"$
	24/25	$\epsilon = 0$ and Major maximum velocity East: - 29.95 s/d

6 $\frac{d(E-W)}{dt} = \frac{d(N-S)}{dt}$

When, if ever, W-E = N-S in Mar & Sept?
i.e. does sun ever move North-West or South-West?

≈ - 7.49 /day

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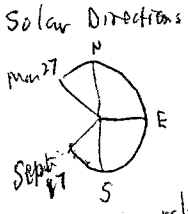
r = radius vector of the earth's orbit
δ = declination of the sun
ϵ = the equation of time

From Dec 8 to Jan 6 the East motion > the N-S motion
From June 14 to June 30 the East motion > the N-S motion



Not a circle but a pendulum

Plot the direction of motion of the sun vs. date

e.g. Jan 6 motion is north-east
Dec 22 motion is east
Dec 8 motion is south-east
June 14 motion is north-east
June 22 motion is east
June 30 motion is south east

It is never west, but can be NW or SW

ANALEMMA			CODE		
			Δ days		
q=0, dq=max E, ddq =0	12/25/80		q = EQUATION OF TIME		
ddq=max w	08/06/81	224	D = DECLINATION		
D=0	19 03/22/82	225 228	r = RADIUS VECTOR	25	231
q=max W	11/04/82	230 227	d = FIRST TIME DERIVATIVE		224
q=0	06/14/83	222	dd = SECOND TIME DERIVATIVE		
	01/25/84	225	E = EAST, W = WEST MAJOR		
q=0	09/03/84	222	e = EAST, w = WEST minor		
q=0	04/16/85	225	N = NORTH, S = SOUTH		
	11/27/85	225			
r = max	07/06/86	221			
q=max E	02/12/87	221			
dD=max S	09/29/87	229			
q=max w	05/14/88	228			
q=0, dq=max E, ddq =0	12/25/88	225			

$\frac{8}{13}$ years interval

$365.25 \times 8 = 2922 \quad 2922 \div 13 = 224.769 = \frac{8}{13}$ Y

$\varphi \times 365.25 = 225.737$
Y

$(\varphi \cdot Y) = \left(Y \cdot \frac{8}{13}\right) + 1$

$\left(\varphi - \frac{8}{13}\right) Y = 1$

$= 0.968$

ON EPHIPHANY north motion begins to exceed east motion

For a period of about 29 days from Dec 8 to Jan 6 when the east motion of the sun exceeds the N-S motion and again June 14 – June 30 c. 16 days

$\frac{45}{365} = .1233 \doteq \frac{1}{8}$ of the time

Trop $365.242199 \times \varphi = 225.741$

Sid 365.256365

365.2425

337.147
x12 = 309.051
x11 = 280.956
x10 = 252.860
x9 = 224.765 ← x 5/8 = 140.478
x8 = 196.669
x7 = 168.573
x6 = 140.478 ← x 5/8 = 87.799 x 5/8 = 54.879
x5 = 112.382
x4 = 84.287
x3 = 56.191
x2 = 28.096 days

365.2425 ÷ 13 = 28.09,5526

MECHANICS AND MAPPINGS

JOFYR01.00C Seasons
Book of Seasons Cannot find this on a computer file

probably Memory typewriter

This evening we have come together to consider a journey --a journey that we all are engaged in and have been for as many years as we have lived: The Journey that each life takes as it lives through the portion of time we call the Year.

Each soul that is incarnated on our Earth is engaged in a great spiritual journey--a journey whose point of departure is hidden from us in mists and whose destination is only glimpsed at brief moments when we can penetrate to lofty summits on a distant horizon. Though mostly hidden from us, knowing the summits are there gives us the strength for our journey.

For some reason our spiritual journey has led us to this Earth and while we are here we have found that our journey and that of our planet are shared. We thus come to the Journey of the Year as a most important part of our personal and collective spiritual journey while we are sharing the journey of the Earth.

We have learned that the earth has a physical journey which takes it on an elliptical orbit about the sun in a time period of about 365 days, which we call the year. We have also learned that the sun itself is moving through space taking its family of planets with it, so that the elliptical orbits are stretched out in space like the coils of a giant spring, no orbit ever covering the exact same space in its repetitions. While we have learned many things about the Earth's physical journey, we have also learned that the Earth repeats a yearly spiritual journey and this journey impresses itself upon our personal spiritual journeys as the Earth's physical journey impresses itself on our physical lives. Just as there are physical seasons, there are spiritual seasons and while on Earth we must recognize and honor these periods and changes--both the physical and the spiritual.

Book of Time

And this brings us to the purpose of our coming together this evening: To explore the spiritual Journey of the Year so that we may be tuned to it and honor it in our spiritual lives and decisions. And just as the Earth's successive orbits are stretched out helically, forever

traversing new space by circling the direct path to the sun's goal , our spiritual progress is made by annual repetition of the offices of the sacramental year, moving us helically towards our spiritual goal.

Book of Seasons

This metaphor of the helix--or stretched out coils of a spring--is a most useful one for describing progress through a cyclical process that, without spiritual vision, becomes but dull repetition forever traversing over and over the same ground. This applies to the Journey of the Day, the Journey of the Week, and to all of the cyclical and rhythmic patterns that govern our lives.

Let us here briefly summarize what we have learned about the Earth's physical journey:

Book of Time

The Earth moves in an elliptical orbit about the sun whose greatest distance is 152 million kilometers and whose least distance is 147 million kilometers. It completes this orbit in 365.2422 days, being closest to the sun on January 2-5, between New Years and Epiphany, and most distant from the sun on July 3-6. The rotational axis of the Earth is tilted so that the sun appears to move in an annual north-south path, reaching its greatest northern position on June 21, and its greatest southern position on December 21. It is at midpath, i.e. on the equator, when the length of day and night are the same, on March 21 and September 21. Other physical observations show us that the sun sets earliest on December 6, and rises latest on January 6, while it sets latest on and rises earliest on . The mean speed of the earth in its orbit is 30 kilometers/second. The sun, together with the planets, is moving with respect to other nearby stars, with a speed of 20 kilometers/second along a path toward the constellation of Hercules, the apex of motion being roughly marked by the bright star Vega.

cf. shortening of day speeding in orbit first and 2° Derivatives

Dec 21 — Jan 6

⊕ speeding up

Day lengthening (Northern Hemisphere)

It has taken many centuries to amass our present knowledge of the physical journeys of the Earth and its neighbor celestial objects, but certain basic things were known quite accurately a very long time ago, as evidence from Egyptian, Chinese, and Chaldean records shows --and as can be deduced from monuments such

as Stonehenge. But what do we know of the Earth's spiritual "orbit"? What "measurements" must be made to make an appropriate almanac for the spiritual phenomena of the year?

All nature is a vast symbolism.
Every material fact has sheathed
within it a spiritual truth. Chapin

As in the case of the knowledge of physical phenomena, primitive peoples had already learned a great deal about the spiritual orbit of the Earth centuries ago. This knowledge is contained in the festivals, sacred days and anniversaries, solemnized in the religious traditions of the world. And it is in the study of these religious traditions, together with the explorations of our own psychological patterns-in-time that we must conduct our search to determine the "elements of the Earth's spiritual orbit".

The physical world and its year rest primarily on the framework of space and time, or as the relativists have formulated it, on the framework of space-time.

The world and the year that we seek to explore brings additional dimensions to our experience. It requires a framework more elaborate than the physicist's space and time or space-time.

For example, the physicist views time as an ongoing frame whose duration can be measured by clocks of various sorts and whose intervals are all equatable to one another provided their duration is the same.

But our living experience tells us that we do not sense each interval of time in the same way. Psychological phenomena immediately require a dimension of time that transcends the physicist's definitions and measurements.

Different intervals of time, even though physically equal in duration, have a different quality. The seasons, for example, have different feelings, different flavors, different moods. It is in the admission of our experiences containing these sorts of differences that the spiritual Journey of the Year has its inception.

This qualitative dimension of time is expressed in the Scriptural passage from the 3rd Chapter of Ecclesiastes:

The epoch (except for L) is $1900 + T$ centuries. The longitude of perihelion $\tilde{\omega}$ is measured from Υ, whence $\tilde{\omega} = \Omega + \omega$ where ω is the longitude of perihelion measured from the ascending node along the orbit. Ω and L are also measured from Υ.

In the semi-diameter column of the table of physical elements, C = inferior conjunction (Mercury and Venus only), and O = opposition. In the second last column an inclination of the equator to the orbit greater than 90° indicates that the rotation is retrograde with respect to the orbit.

For secular variations of planetary orbits: see [13].

Planetary

Planet	Semi-major axis of orbit [1, 3, 4]		Sidereal period [1, 3, 4]		Synodic period [1]	Mean daily motion [1, 4]	Mean orbital vel. [1]
	AU	10^6 km	Tropical years	Days	Days	″	km/s
Mercury ☿	0·387 099	57·91	0·240 85	87·968 6	115·88	14 732·420 2	47·90
Venus [2] ♀	0·723 332	108·21	0·615 21	224·700	583·92	5 767·671	35·03
Earth ⊕	1·000 000	149·60	1·000 04	365·257		3 548·192 6	29·80
Mars ♂	1·523 69	227·94	1·880 89	686·980	779·94	1 886·518 6	24·14
Jupiter ♃	5·202 8	778·3	11·862 23	4 332·587	398·88	299·127 8	13·06
Saturn ♄	9·540	1 427	29·457 72	10 759·20	378·09	120·456	9·65
Uranus ♅	19·18	2 869	84·013	30 685	369·66	42·234	6·80
Neptune ♆	30·07	4 498	164·79	60 188	367·49	21·53	5·43
Pluto ♇	39·44	5 900	248·4	90 700	366·74	14·29	4·74

Physical

Planet	Semi-diameter (equatorial) at 1 AU [1, 4]	Semi-diameter (equatorial) at mean C or O [1, 4]	Radius (equatorial) R_e [1, 3, 4, 8]		Ellipticity $\frac{R_e - R_p}{R_e}$ [1]	Volume	Reciprocal mass (including satellites) [1, 8, 9, 13]
	″	″	km	⊕ = 1		⊕ = 1	1/☉ = 1
Mercury ☿	3·34	5·45	2 420	0·38	0·0	0·055	6 050 000
Venus [5, 6] ♀	8·43	30·5	6 100	0·96	0·0	0·88	408 600
Earth ⊕	8·80		6 378	1·00	0·003 4	1·000	328 700
Mars ♂	4·68	8·94	3 380	0·53	0·005 2	0·150	3 089 000
Jupiter ♃	98·47	23·43	71 350	11·19	0·062	1 318	1 047·38
Saturn ♄	83·33	9·76	60 400	9·47	0·096	769	3 497·6
Uranus ♅	32·8	1·80	23 800	3·73	0·06	50	22 930
Neptune [9] ♆	30·7	1·06	22 200	3·49	0·02	42	19 390
Pluto ♇	4·1	0·11	3 000	0·47		0·1	400 000

DATA SHEET

FORM 18 2 (10[illegible] AP

SYNODIC PERIODS (days)

(all black values - earth days)

Sidereal Period on diagonal	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Mercury	87.9686	144.565	115.876	100.887	89.792	88.6938	88.222	88.097	88.054
Venus		224.700	583.914	333.927	286.991	229.493	226.358	225.542	225.258
Earth			365.2422	779.937	398.885	378.093	369.657	367.487	366.734
Mars				686.980	816.435	733.836	702.712	694.912	692.223
Jupiter					4332.587	7253.758	5044.906	4668.657	4549.930
Saturn						10759.20	16568.8	13101.2	12207.3
Uranus							30685	62599.4	46373.9
Neptune								60188	178914.9
Pluto									90700

DATA SHEET

FORM 18 2 (1[illegible] AP

Ratios of Sidereal Periods

Sidereal Periods in days or decimal

	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Mercury	87,9686	2.55	4.15	7.81	49.25	122.31	345.82	684.2	1031.05
Venus	0.34	224.700	1,63	3.06	19.28	47.88	136.56	267.86	403.65
Earth	0.24	0.62	365.257	1.88	11.86	29.46	84.01	164.78	248.32
Mars	0,128	0.327	0.532	686.980	6.31	15.66	44.67	87.61	132.03
Jupiter	.020	.052	.084	0.159	4332.587	2.48	7.08	13.89	20.93
Saturn						10759.2	2.85	5.59	8.43
Uranus							30685	1.96	2.96
Neptune								60188	1.51
pluto									90700

1970

	S	M	T	W	T	F	S
JAN					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31

	S	M	T	W	T	F	S
JUL					1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	

Counting Jan 6 as Day 1 of an interval before Jan 7, Nov. 29 is Beginning of Advent

	S	M	T	W	T	F	S
FEB	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28

earliest allowed

Ash Wed, 39 days before not counting each

	S	M	T	W	T	F	S
AUG							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31					

	S	M	T	W	T	F	S
MAR	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31				

latest allowed

earliest Easter

	S	M	T	W	T	F	S
SEP				1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30			

	S	M	T	W	T	F	S
APR				1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30		

If Easter — latest Easter

	S	M	T	W	T	F	S
OCT						1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31

Presentation Feb 2 not counting Xmas 39 days

All intervals = 39 days

earliest Easter — Acc. 39 days later not counting each

	S	M	T	W	T	F	S
MAY						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31						

	S	M	T	W	T	F	S
NOV	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30					

39 Day period begins 1st Sunday in Advent. Nov 29 Day before St. Andrew's Day.

latest ascends to

	S	M	T	W	T	F	S
JUN		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30				

	S	M	T	W	T	F	S
DEC				1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31		

Jan 6 is 39th Day New Cycle begins on 40th day Jan 7

Movable Cycle

earliest Feb 11 to Apr 23
E Mar 22

latest Mar 17 to June 3
E Apr 25

$10 \times 39 - 2 \times 13 = 364$

$39 \overline{)364}^{9}$ $\quad \frac{351}{13}$

13×28 $\quad \frac{13}{84}$ $\quad \frac{28}{364}$

or $13 \times (2) + 1) =$
$9 \times 39 + 13$
$351 + 13$

$\frac{390}{365}$ $\quad \frac{25}{16}$

$\frac{27}{14}$ $\quad \frac{108}{27}$ $\quad \frac{27}{378}$

$\frac{28}{13}$ $\quad \frac{84}{28}$ $\quad \frac{28}{364}$ $= 7 \times 52$

$\frac{29}{12}$ $\quad \frac{58}{29}$ $\quad \frac{29}{348}$

Year $= 9 \times 39 + 14\frac{1}{4}^{d}$

$= 28 \times 13 + 1\frac{1}{4}$

$\frac{\tau_0 \mu}{24}$ = 153.01 days (see CHON) for definitions

This is the period from

The Transfiguration to The Epiphany

August 6 to Jan 6

i.e. $\tau_0 \mu$ = The number of hours

1 day = 24 × 3600 sec

0.01 day = 24 × 36 sec = 2.4 × 6 min = 14.4 min

$$\tau_0 = \frac{2\pi a_0^{3/2}}{\sqrt{G M_H}} = 7239.3904 \text{ sec} = 2^h 39^s.39$$

μ = 1836.109

$\tau_0 \mu$ = 153.93

For Journey of the Year

$\mu = 6\pi^5 = 1836.12$

$2^{hr} \times \mu$ $6\pi^5 = 1836.1181$

$\frac{7 \circ \mu}{24} = 153.01$ days $\mu = 1836.1535$

= Aug 6 to Jan 6

all inc. f + l

May 23 - Sept 29 = 130 d

Aug 6 - Nov 30 = 117 d

Nov 28 { Nov 30 - Jan 6 = 38 d; Dec 25 - Jan 6 = 13; Dec 25 - Feb 2 = 40 } — 78 d

Aug 6 - Feb 2 = 195 d

Jan 6 - Aug 6 213

Aug 6 - Jan 6 154

13, 26, • 39, 52, 65, • 78, 91, 104, • 117, 130, 143, • 156, 169, 182, • 195, 208, 221, • 234, 247, 260, • 273, 286, 299, • 312, 325, 338, • 351, 364, 377, • 390

every 1456 y
364 d and 365.25 d
coincide

Beat period of
364 and 365.25
= 1456 y

728
364
182
91

$\frac{4.7.13.1461}{365.25}$

364 × 4 = (1456 y)

1945 − 364 = 1581

what is l.c.m
of 364 d and 1461 d

28.13
4.7.13.1461

1461 y

28 × 13 = 84 / 28 = 364

4 | 52 y = 13 ⟷ 13 / 65 d

156 y ⟷ 195 d

208 y — 260 d

260 y — 325 d

312 y ⟷ 390 d

39 × 5 = 195

365.25
730.5

prime 1461 d = 4 y

m 65 y = m 1461 d

1461 × 65 = 7305 + 8766 = 94965 days

65 × 4 = 260 years

364 | 94965 = 26 … 325

Test to 37 [1461.65] [1461. 13.5]

37 | 1461 = 39

11 | 1461 = 13

13 | 1461 = 11

17 | 1461 = 86

19 | 1461 = 7

23 | 1461 = 6

29 | 1461 = 5

31 | 1461 = 47

38 | 1461 = 9

65 | 1461 = 22.4769230 4

most molecular biologists believe that the "facts speak for themselves." Hopefully, as these facts collect, biologists, too, will seek some general interpretations. All these facts tell us at present is that life is distinguished from inanimate matter by exceptional dynamical constraints or controls which have no clear physical explanation. We will not find such an explanation by inventing new words for our description of each level of hierarchical control. Instead, we will have to learn how collections of matter produce their own internal descriptions.

This study is supported by the Office of Naval Research Contract Nonr 225 (90).

The 364 day Period

CHONK KC 39d d. 40d

Fixed e.g. St. Andrews Day to Epiphany = 39d

Moving { Lent 40d
Easter to Ascension = 40d

Fixed Christmas to Presentation = 40d

or 2 x 39

$\frac{9011}{24}$ = 153.01 days
= Transfiguration to epiphany

30 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

40

26

38

28

11
47
70

365 − Jan 31
334 − Dec 31
303 = year Feb March Nov
− Nov 30 Feb 1, 2
= 300

8 · 39 = 312
and Dec 13d must be taken out

39
8
312

N.Y.

Andrew — Christmas — Epiphany — Presentation

26 — 13 — 28

+ 8 x 39 − 13
go 4 each way with another one up

inc. 1° + last inc. 10 + last inc. 1° and last

Total 26 + 12 + 27 = 65d
39 + 26
26 + 13 + 26

KC KC
2 1 2
~ ascent + descent

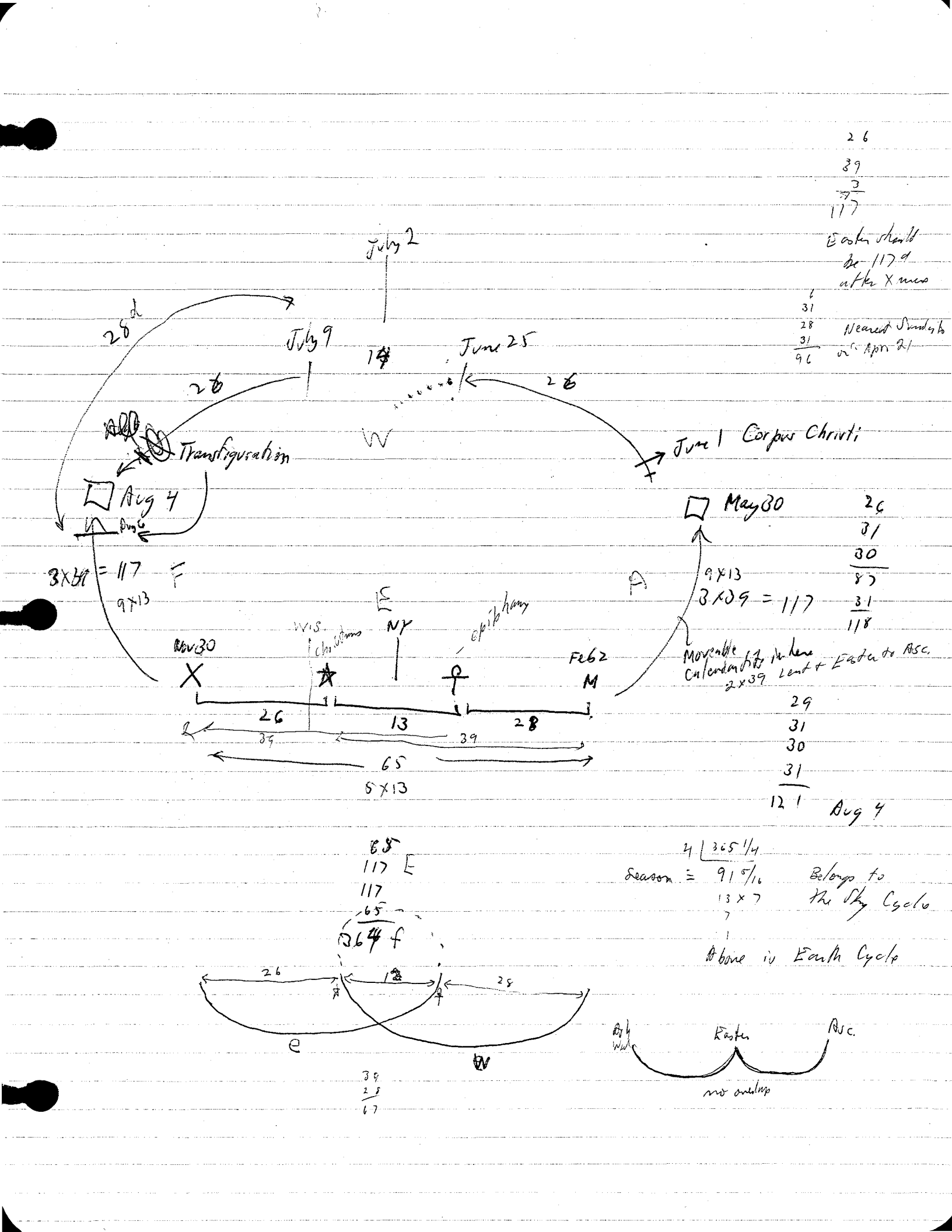
2 Feb to Mar 21
47d

5 x 13 = 65

Ash Wednesday — Easter — Ascension

40 — 40

6 x 13 = 78



26
39
3
117

Easter should be 117 d after X mas

31
28
31
90

Nearest Sunday is on Apr 21

29
31
30
31
121

Aug 4

4 | 365 1/4

Season = 91 5/16

13 × 7

7

1

Belongs to the Sky Cycle

Above is Earth Cycle

39
28
67

4 Times a year ∃ a switch in
dominance of E-W motion & N-S motion
From Dec 8 to Jan 6 E(W) motion dominates (30 days) or 28 Magic Time
From June 14 to June 30 E(W) motion dominates 17 days or 15

24^h	$= 360°$
1^h	$15°$
60^m	$15°$
4^m	$1° = 60'$
$60^s = 1^m$	$15''$
4^s	$1'$

East Motion — South Motion

East Motion (m s)		South Motion (° ' ")	÷15
Dec 6-7	-25.14 s	-443.8"	-29.59 s
7-8	25.64	417.4	27.83
8-9	26.13	390.9	26.06
9-10	26.57	364.0	24.27
10-11	27.00	337.1	

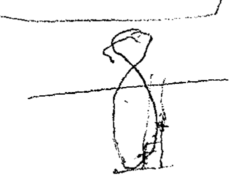
The south motion = East Motion
around 8th Dec

$24^h = 360°$
$60^m = 1^h = 15°$
$4^m = 1° = 60'$
$60^s = 1^m = 15'$
$4^s = 1' = 60''$
$1^s = 15''$
time — arc

Jan 5-6	-27.08	+393.7	26.24
6-7	26.65	420.6	28.04
7-8	26.20	447.3	29.82
8-9	25.70	478.6	

The North motion = East Motion
Jan 6 - Epiphany

δ Jan 25
$\frac{-19°}{-23°} = \frac{12^m}{14^m}$



~~JUNE~~ JUNE

12-13	12.25	238.7	15.91
13-14	12.42	214.1	14.27
14-15	12.55	~ 189.5	12.63
15-16	12.68	164.9	10.99

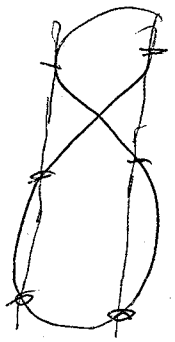
~~May 14~~ The North motion = the East Motion ~~east~~
June 14

JUNE

27-28	12.52	132.1	8.8
28-29	~~136.8~~ 12.37	156.8	10.45
29-30	12.20	181.2	12.08
30-1	12.00	205.7	13.71

JUNE 30
The South motion = The East Motion

Declination of the Sun
when q = extremes of minor loop



6 dates

May 15 $+3^m 43.^s 82$

July 27 $-6^m 24.^s 84$

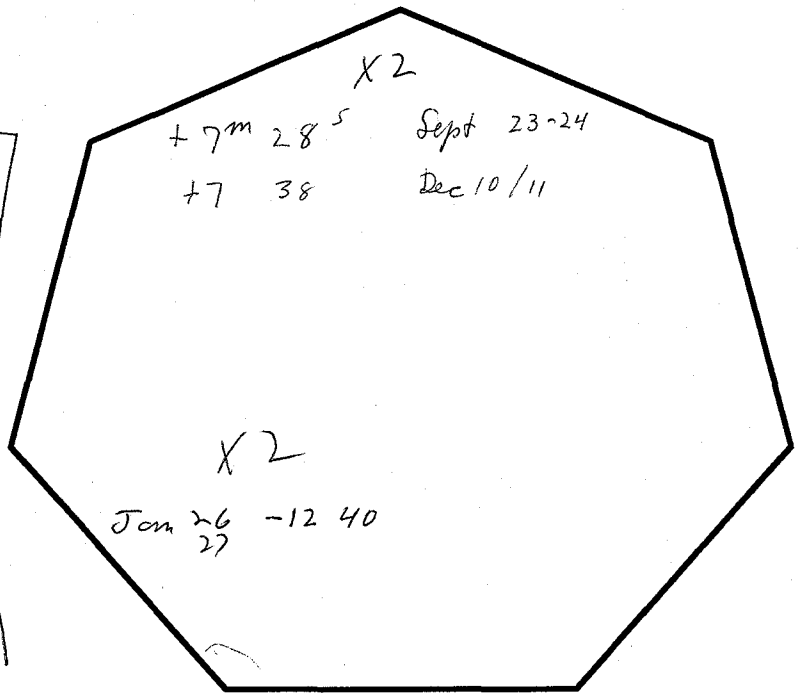
Sept 13 $+3^m 41.^s 60$

Dec 18/19 $3^m 39^s$

53
24
77
85

Jan 8 $-6^m 20^s$

Mar 25 -6 23



CALENDAR

PAMP5.WS1 JOURNYEARØ1 11/14/86 11/17/86

A NOTE ON CALENDARS

Calendars are yardsticks for the measure of time. Their basic structure derives from the cyclical astronomical configurations of the earth, sun and moon which determine the length of the day, month and year. Calendars are needed to calculate numbers of lapsed days and to inform us of the season. There are two basic problems in constructing calendars: 1) The problem of 'co-mensuration' arising because the day, the month, and the year are not even multiples of one another and the fractions of days and months must be taken care of. 2) The problem of keeping calendric dates coordinated with the vernal equinox, i.e. making the calendar conform to the year of the seasons as closely as possible.

Calendars as used for counting the number of lapsed days provide a temporal base for the comercial functions of society--On what day will the rent be due? How long before the shipment arrives? How much interest has accrued? Calendars used for synchronizing with the seasons provide a temporal base for the agricultural and religious functions of society--When should the corn be planted? When can we expect frost? When will Easter be this year? With these two needs we suspect we might need two calendars: Civil calendars and Ecclesiastical calendars. This is true, although Western society being highly secularized has with few exceptions adapted to a single calendar. Christians still need supplementary calendric data for calculating the dates of "moveable feasts" such as Easter, and those groups still using lunar calendars, such as Jews and Muslims, require their own ecclesiastical calendars. Civil calendars consider time as linear and ignore any quality attributes of time. Liturgical calendars, on the other hand, consider time as cyclical and inform us what activities should be emphasized at what times. Harvest is the time for thanksgiving, Lent is the time for purification, Carnival is the time for suspending the rules.

Although our cultural schizophrenia requires these two calendars, both are structured on the same basic astronomical data derived from the rotation and revolution of the earth. To design a calendar we need to specify a beginning point of the year and measure how long it takes for the sun to complete a circuit back to this beginning point. Although our civil calendars have selected the old Roman January 1 as New Year's day, the real reference point for the year of seasons is the vernal equinox, and the length of the year of the seasons, called the tropical year, has been determined as being 365.24219 days. But the design of an ecclesiastical calendar is more complex. We must know additional parameters of the earth's orbit, the inclination and the eccentricity, so that we may determine in more detail the timing of the seasons. The Greek astronomer Hipparchus who lived in the second century B.C. first calculated the lengths of the seasons. He found spring to be 92 days and 2Ø.2 hours, summer 93 days 14,4 hours, autumn 89 days 18.7 hours, and winter 89 days Ø.5 hours.

PAMP 5

The co-menurability problem centers on how to take care of the fractions of days that are left over after the year has been filled with whole days. Over centuries these fractions can lead to large discrepancies between the dates of the calendar and the seasons of the year. If calendars were needed solely for measuring intervals of time, then having periods with winter beginning in April and summer in October would be disconcerting but not disasterous. But if the seasons are important in our activities then we must establish a dependable correlation between the calendric dates and the physical and psychological quality of time. To do this the average length of the calendric year must equal as closely as possible the length of the tropical year.

An important step in this design was undertaken by Julius Caesar in 46 b.c. With the help of the astronomer Sosigenes, he designed a calendar in which the average calendric year was equal to 365.25 days (cf tropical year of 365.24219 days). The ingenious device was the concept of 'leap year', an extra day every fourth year. But even with this better approximation after 15ØØ years the year of the seasons had drifted 12 days with respect to the Julian calender. This change in the date of the coming of winter or spring was becoming widely noticable. The time had come for another refinement. In 1582 Pope Gregory XIII with the help of the astronomer Clavius, established a new calendar, now known as the Gregorian calendar. The rules governing leap years were augmented. Every even century year was not to be a leap year unless divisible by 4ØØ. These rules gave the average Gregorian year a length of 365.2425 days. This is a much better approximation, being in error only about one day in three thousand years.

See
Uspensky + Heaslet
ELEMENTARY NUMBER THEORY
p 206 ff
for Church Calendar
and
Calendar Problems

Solar ~~or~~ LUNAR

Earth
Climate
Plants

Animal

AGRICULTURE

NOMADS - TRIBAL
HUNTERS / FISHERS
HERDSMEN

FIXED

MOVEABLE FEASTS

Two Obscurations of Solar Effect
Rotation of Earth (DAY)
Lunar Calendar (Month)

GLOBAL ~~or~~ TRIBAL

Feel the Moon

FIRST DATES (EPOCHS)

HEBREW	3760 B.C.
MAYAN	3372 B.C.
RUSSIAN	5508 B.C.
	I.P. 6495 ~ 987 A.D.
BISHOP USHER	4004 B.C.
JULIAN DAY	4713 BC

by Joseph Justus Scaliger 1582
See Sci Am Feb 1997 p 107
Copy in Essay Book

Gregorian Calendar
March 1582

Scaliger's (1540-1609)
De Emendatione Temporum 1893
Revolutionized ancient chronology
a sort time in natural units
(Scaliger was a Protestant)

FILMS FOR SELF-OBSERVATION

Using specially selected films, this series of Monday evenings offers an opportunity to observe our experience of archetypal patterns. Condensed and exaggerated, films provide tools for self-reference, that is, tools for changing levels of awarness of who we are and what we are doing.

Facilitators, **Sue Robin** and @font mx9b;Donna Wilson, will offer guidelines for working with this material from their respective backgrounds in family and marriage counseling and inner development.

Possible Film Titles:

Breaking Away	Educating Rita
The Big Chill	Places in the Heart
Terms of Endearment	All That Jazz
Diary of a Mad Housewife	Cries and Whispers
Officer & A Gentleman	Nine to Five
My Dinner with Andre	The Earthling

Monday Evenings 7-10pm Sep 29, Oct 6,20,27 Nov 3
fee $5/evening place 20916 Costanso St, WH

schedules are subject to change - please call the GINKGO LEAF to reserve your space **818/716-6332@font mx9;**

@HISTORY OF CALENDAR AGW Ø2Ø8/18/82Ø8/18/82 6,966 1

CALENDAR

THE RECORDING OF TIME BY USING CYCLES

Selection of units (cycles)

Day: Rotation of earth

Month: Synodic period of moon

Year: Revolution fo the earth

Sub-units: Hours, minutes, seconds.

Selection of starting points

Dawn, Noon, Sunset, Midnight

New Moon, Full Moon

New Years Day

Vernal equinox

January 1,

Rosh Hoshana

Selection of epochs

Christian era: There was no year "Ø".

Hegira: 622 A.D. = Year 1 of the Muslim Calendar.

Hebrew: 376Ø B.C. = Year 1 of the Jewish Calendar.

Greek: The first Olympiad (recorded) 776 B.C.

Roman: From the founding of Rome, 753 B.C.

Mayan: First date referred to, 3372 B.C.

Geologic: Ages of unequal length since the formation of the earth. c 4.5 Billion

Big Bang: Time elapsed since the beginning of expansion. 9 to 15 Billion

OLD RUSSIAN 5508 B.C.

BISHOP USHER 4004 BC

JULIAN DAY 4713 BC

THE COUNTING OF CYCLES

THE PROBLEMS OF CO-MENSURATION

The basic problem of the calendar is that of comensuration, the matching of cycles. How best to measure the length of one cycle in terms of a second cycle when the two are not comensurate. The matching of the month to the day, the year to the day and the year to the month are the three principle problems.

Cycles or waves are characterized by the following parameters:

The period or duration of the cycle.

This must be expressed in some units of time, either a sub-unit based on another cycle or on counts of sub-units of the cycle itself.

The phase.

This relates the beginning of the cycle to some other cycle, like the date of new year's day.

The amplitude.

Generally ignored or considered meaningless in calendaric considerations.

The timbre.

The effect of superposing various cycles.

P

THE LENGTH OF COMMON CYCLES:

Rotation of the earth with respect to fixed stars:

24h ØØm Ø.Ø s in sidereal units
23h 56m 4.Ø9892s in solar units
Rotation of the earth with respect to the vernal equinox:
xx in sidereal units
xx in solar units
The Mean Solar Day:
24h Ø3m 56.555s in sidereal units
24h ØØm ØØ.Ø s in solar units

Synodical Month: (new moon to new moon)
29.53Ø 588 msd's
Sidereal Month: (ref. fixed stars)
27.321 661 msd's
Tropical Month: (equinox to equinox)
27.321 582 msd's
Anomalistic Month: (perigee to perigee)
27.554 551 msd's
Nodical or Draconitic Month: (node to node)
27.212 22Ø msd's

Schuster Period
c. 84 min
→ 7 day week

Transit Interval of the Moon:
24h 5Ø.47m ms units.
Mean daily motion of the Moon:
13 deg 11' east
Period of rotation of the moon's perigee (direct):
8.85 years
Period moon's node (retrograde):
18.61 tropical years.
Inclination of the Moon's Orbit to the Ecliptic:
5 deg 8', but oscillates from 4 deg 59'
to 5 deg 18' with a period of 173 days.

Sidereal year: (ref fixed stars)
365.256 365 msd's
Tropical year: (equinox to equinox)
365.242 199 msd's
$365^d\ 5^h\ 48^m\ 46^s$
Anomalistic year: (perihelion to perihelion)
365.259 641 msd's

The Obliquity of the Ecliptic:
23 deg 27' 8.26"

Period of precession of the earth's node (retrograde)
5Ø.398"/year
25,725 years (fixed ecliptic)
25,784 years (moving ecliptic, effects of planets)

P
THE CALENDAR AND ITS HISTORY:

Julian Year:
365.25 msd's
Gregorian Year:
365.2425 msd's
Mayan Year:
365.242Ø msd's

Tropical Year:
365.2422 msd's

The rules governing the Gregorian Calendar are:
Every year the number of which is divisible by 4 is a Leap Year.
Century years are not leap years unless divisible by 4ØØ.
To convert O.S. to N.S.
Add 11 days for the 18th century (Mar 1 17ØØ to Feb 28 18ØØ)
Add 12 days for the 19th cent;
Add 13 days for the 2Øth cent.
The Gregorian Calendar is off 1 day in 3ØØØ years.

Julian Days:
by J. Scaliger in 1852
Ø for the day at Greenwich mean noon on January 1, 4713 B.C.
January Ød 12h ET 19ØØ is JED 241 5Ø2Ø.Ø

THE CALENDAR AND ITS HISTORY:

In the year 46 B.C., on the advice of the Alexandrian astronomer Sosigenes, Julius Caesar introduced a new calendar. The ingenious feature of this "Julian Calendar" was the concept of a Uleap yearU, a year in every four in which an additional day was added. The best of the older calendars used a year of 365 days, but these calendars were in such error that in about seven centuries seasonal January would occur in July. Since the exact length of year lies between 365 and 366 days, the problem in calendar design is how to take care of the fractional part in excess of 365 days. The Julian calendar's method of one leap year in four rendered an average year of 365.25 days, but even this better approximation resulted in an error of 8 days in 1ØØØ years.

By the 16th century the error in the Julian calendar had become seasonally noticeable. In response, in March of 1582 Pope Gregory XIII, with the assistance of the astronomer Clavius, established a "New Style Calendar", now known as the "Gregorian Calendar". October 4th, 1582 was followed by October 15th, (11 days added) in all Catholic Countries and January 1, was restored as New Year's Day. In Gregory's calendar the Julian rule of making every year whose number is divisible by four a leap year of 366 days was augmented by the rule that even century years are not to be leap years unless divisible by 4ØØ. This resulted in a calendar year of 365.2425 days, in error one day in 3ØØØ years.

In England and the British Colonies, the day after Wednesday, September 2, 1752 was Thursday, September 14, 1752. Prior to this there were two New Years Days celebrated in England--Lady's Day (March 25th) and January 1. The same act of Parliament that adopted the Gregorian Calendar established January 1, as New Years Day, e.g. George Washington was born Feb 11, O.S., or Feb 22, N.S. 1732.

SPECIAL CYCLES

METONIC CYCLE

6939+ DAYS ~ 235 lunations ~ 19 years

Full moon back with solar calendar - same date

235 l = 6939.69
19 y = 6939.75 ~~off 6 mins/century~~

δ = 0.06 days in 19 years

DIONYSIAN CYCLE

532 Years = 19 X 28

~ METONIC, but add same day of week

SOTHIC CYCLE

1461 YEARS
14 60

tropical ~~to~~ sidereal =

SOTHOS = SIRIUS (Greek)
Year as measured by SIRIUS rising ∴ ~sidereal year

SAROS

similar eclipses in cycles of 6585.32 days
18 yr. 11⅓ days
= 223 synodic months
= 19 eclipse years

ECLIPSE YEAR NODE ☊ to ☊
= 346.62 days

SAROS SERIES 50 lunar eclipses in 870 years
70 solar eclipses in 1200 years
eclipses 120° West of preceding, because of ⅓ day

Alternative lunation - solar year synchronizations

Lunar Year 354 days

Use 19 year cycle
7 years with 13 months
12 years with 12 months

~ of Hebrew

Δ = 35 d/cent. ?

lunation = 29.5 d

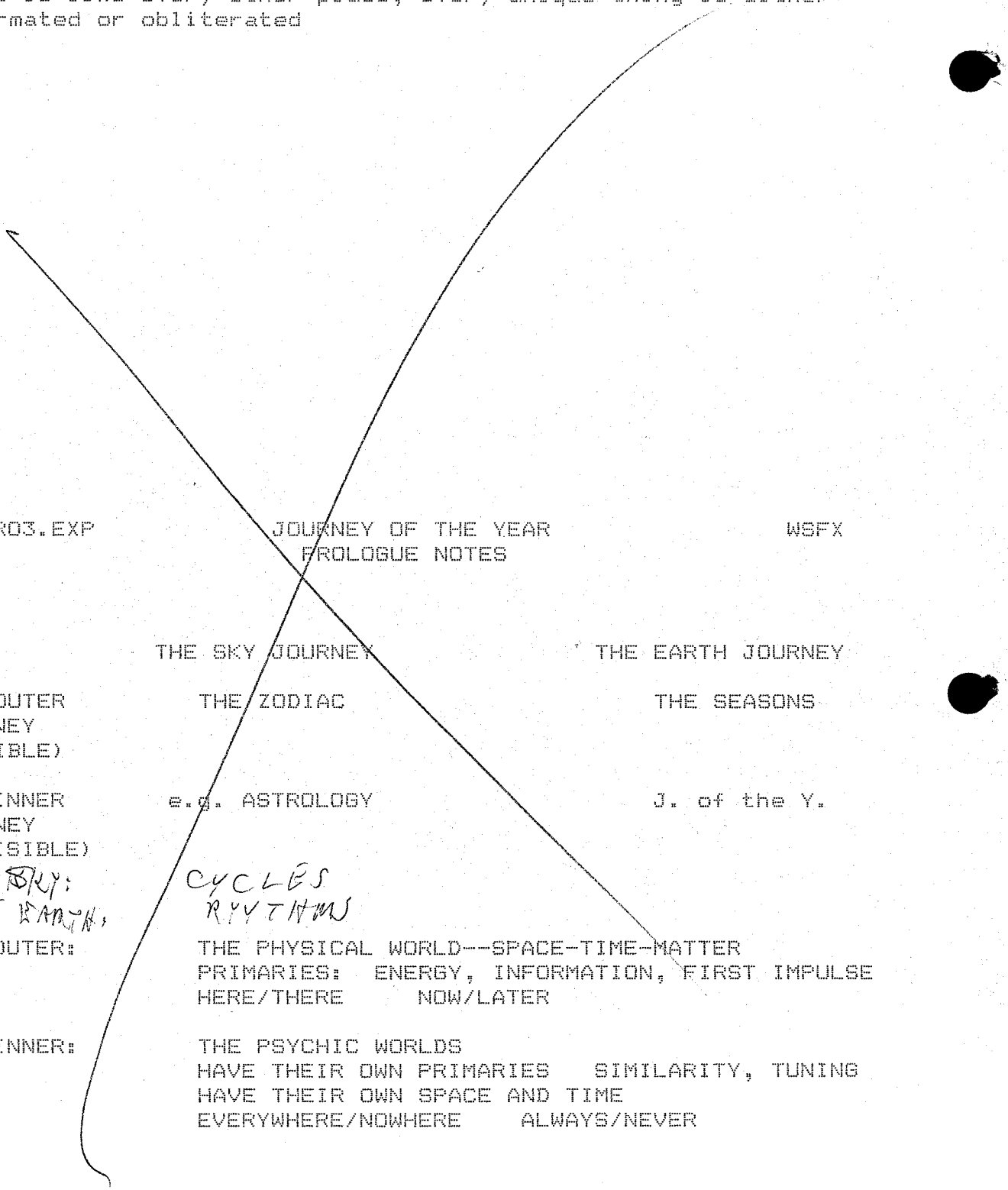
Another (recently discovered)
8 years cycle
5 with 12 months
3 with 13 months.

Δ = 20 d/cent. OK

check addition Fibonacci ratios
e.t. 5.8.13

THE GREAT HOMOGENIZATIONS,EGALITIZATIONS,DEMOCRATIZATIONS

The mountains have been leveled and there exists only a monotonous plain, every time is like every other time, every place is like every other place, every unique thing is either reformated or obliterated



JOYPRO3.EXP JOURNEY OF THE YEAR WSFX
PROLOGUE NOTES

	THE SKY JOURNEY	THE EARTH JOURNEY
THE OUTER JOURNEY (VISIBLE)	THE ZODIAC	THE SEASONS
THE INNER JOURNEY (INVISIBLE)	e.g. ASTROLOGY	J. of the Y.

THE SKY: THE EARTH, CYCLES RHYTHMS

THE OUTER: THE PHYSICAL WORLD--SPACE-TIME-MATTER
PRIMARIES: ENERGY, INFORMATION, FIRST IMPULSE
HERE/THERE NOW/LATER

THE INNER: THE PSYCHIC WORLDS
HAVE THEIR OWN PRIMARIES SIMILARITY, TUNING
HAVE THEIR OWN SPACE AND TIME
EVERYWHERE/NOWHERE ALWAYS/NEVER

THE SKY RELIGIONS OF THE SPIRIT 'CARRY IN OUR HEARTS'
SKY HARMONY WHAT WE BELIEVE --> MAKES REALITY

THE EARTH RELIGIONS OF MATTER 'DUST TO DUST'
EARTH HARMONY WHAT WE DO --> CHANGES REALITY
(cf Quantum Mechanics)

(Belief and Action become the twin dragons)

Modern Western religions are all Sky Religions
Ecosophy would be an Earth Religion.

The 8 year Anglemmic Cycle

13 × 225 = 590.97424

.6180339 × 365.24219 = 225.73187 days

× 13 = 2934.5143

365.24219 × 8 = 2921.9375

12.5768 days in 8 years

i.e. The 13 steps of φ Y are 12.5768 days over 8 Y [or 12.5768 days in 8Y or 157.21 days per century]

So IF we subtract 1 = 224.73187

$(\varphi Y - 1) \times 13$ ≈ 8 Y

we get 13 × 224.73187 = 2921.5143

off 5.29 days per century or 0.4232 short of 8 years.

$n_i Y = a$

$n_{i+1} \varphi Y = b$

as $i \to \infty$ $a \to b$

i.e. these become equal

e.g.

$n_i = 55$ $a = 20088.32$

$n_{i+1} = 89$ $b = 20090.16$

1.84 in 55 years or 3.345 days per century

HEBREW CYCLE

7 × 13 = 91

12 × 12 = 144

235 months

235 × 29.5306 = 6939.691

19 × 365.24219 = 6939.602

.089 days in 19 years or 0.468 days/century

An 8 year cycle

5 × 12 = 60

3 × 13 = 39

99 month × 29.5306 = 2923.5294

8 × 365.24219 = 2921.9375

off 1.5919 days in 8 years

off 19.89875 days/century

A 21 year cycle

8 × 13 = 104

13 × 12 = 156

260 × 29.5306 = 7677.956

21 × 365.24219 = 7670.086

off 7.870 days in 21 years

or 37.476 days/century

J O U R N E Y O F T H E Y E A R

P R O L O G U E

We are children of the Earth. Our destiny is interwoven with the destiny of the Earth. Only with the help of the Earth can we fulfill our cosmic purpose and only with our help can the Earth fulfill its cosmic purpose. It is vital that we understand and appreciate the essence of this shared destiny. One path to such understanding lies in what is called the Journey of the Year-- a journey Awakening us to the nature of our sacred relationship with the Earth through the guidance of one of the most elemental bonds joining us to the Earth: The basic cycle of the year. When the meaning and depth of this cycle are understood, attunement to its seasons constitutes a continuing sacrament enabling the healing, guiding, empowering and transforming of ourselves and the Earth.

To become attuned to both the large and subtle changes that occur in the cycle of the year has always been a purpose-- conscious or tacit--in the religious life of man. It is consequently not surprising that in the Liturgical Years of many religious traditions we find the occurrence of the same motifs, observances, and even dates. Many assume that the times set aside for various festivals and remembrances are somewhat arbitrary. But the temporal coincidences between celebrations in various eclesiastical calendars are neither accidental nor arbitrary, they are derived empirically from patterns in the timbre of time. These patterns manifest great opportunities to those who disciplinedly study and tune to them while they buffet the moods and frustrate the psyches of those who are ignorant and ignore them. [Nor can coincidences be explained as merely convenient emulations. The 25th of December, selected by Christians as the date for one of their most important festivals, was already celebrated as the birthday of the Sun God of Mithraism. This choice was not just a matter of political expediency. It was guideance leading to the period having the quality of time proper for the specific symbolism bestowed on it.]

The Journey of the Year links the mythic heritages and symbolisms of all the peoples of the Earth. It is a great tapestry whose weft and warp are woven from the feasts and fasts of many traditions. Its seasons and celebrations provide a multi-ocular view that permits our diversities to be seen as but facets of the great archetypal journey on which the Earth and its children are embarked. As we discover the deeper meanings of this journey we discover that our differences enrich us rather than divide us and though we shall perhaps always prefer to emphasize the specific tradition into which we were born, focus will cease to be on proselytizing but will turn to internalizing the full spectrum of perspectives afforded us by the variety of cultural traditions in the Journey of the Year.

The Task of the calendar is to solve the problem created by absence of co-mensuration. That is The ~~month~~ cycle of the month is not an exact number of days. The cycle of the year is neither an exact number of days nor an exact number of months.

Sothic Cycle
1461 years
Metonic Cycle
6939 days = 235 months = 19 years
Saros
Dionysian
532 yr.
Moon + day/month return

The tropical year has been determined to be

365.242199 ephemeris days (or mean solar days)

The problem in designing a calendar is in the 0.242199 days
= 5h 48m 46s each year

Keeping the calendar synchronized with the seasons

	Error/y	Error/100 y	Error/1000 y	Error/10 000 y
EGYPTIAN				
365 days	.242199 d short 5h 48m 46s	24 d	242 d	2422 0 d
JULIAN	Caesar + Sosigenes		45 B.C. (odd year with 445 days (error 1 day in 128 years)	
365.25	.0078 d over 11m 14s	0.78 d	7.8 d	78 d
GREGORIAN	Gregory XIII + Clavius		1582 AD (error 1 day in 3330 y)	
365.2425	.0003 d over 25.92s	0.03 d	0.3 d	3 d
EXTENDED-GREGORIAN			(error 1 day in 20,000 y)	
365.24225	.00005 d over 4.32s	0.005 d	0.05 d	.5 d ~~1 day in 20,000 yrs~~

Behrouz 354 day
Hipparchus noted that 365.25 was over by 1 day in 300 years

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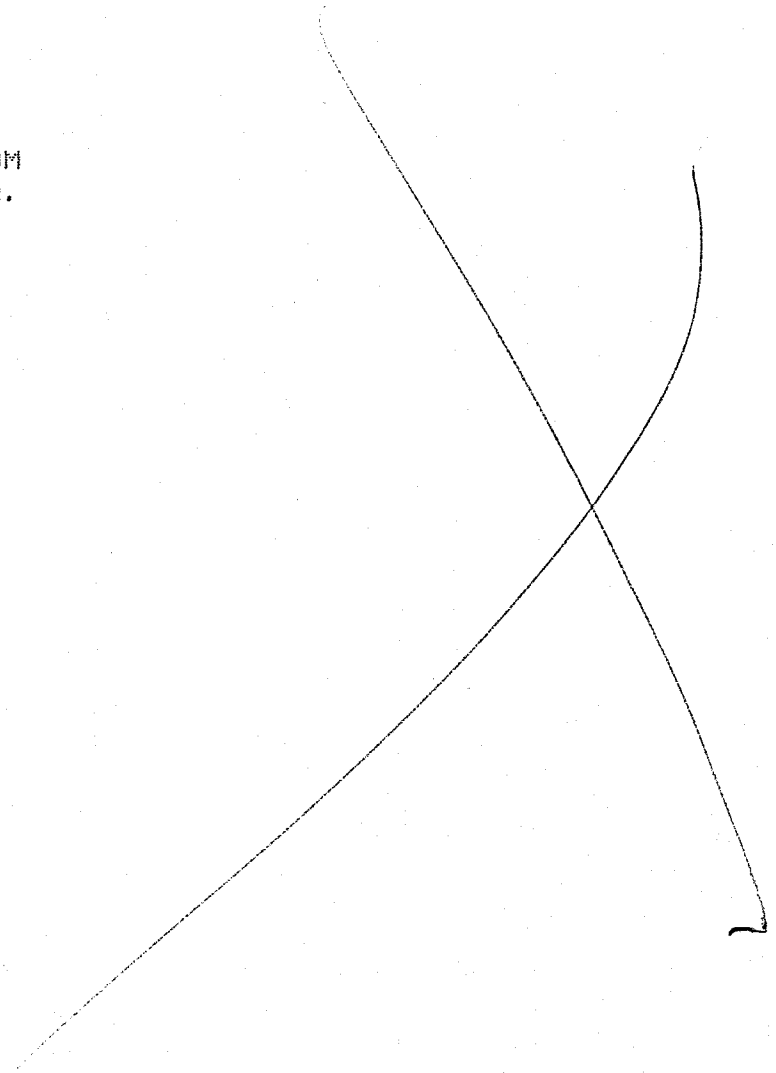

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Julian Rule

1 year in Four add 1 day

i.e. in 100 years add 25 days

Egyptian 36500 days/century

Julian 36525 days/century or 365.25 d/y

Gregorian Rule

Julian Rule modified

Subtract 1 day per century from Julian (even centuries common

Add 1 day every 400 years or 25 days in 100 centuries even centuries ÷ 400 Leap

~~365.25~~ Julian in 10000 years 3652500

subtract 100 −100

added 25 25

Gregorian in 10000 years 365 24 25 or 365.2425

Extended Gregorian

Millennial years divisible by 4000 are common years

i.e. subtract 25 days every 100,000 years

Gregorian 100,000 years = 36524250 days

subtract 25 25

Ext Gregorian = 365 24 225 or 365.24225

error 365.24220

.00005 d/year

or 1 day in 20,000 yrs

1582
325
1257 1257 × 0.78 = 9.8 days

When the Julian Calendar was introduced ♈ at Mar 25

at the Council of Nicea 325 ♈ at Mar 21

in 1582 ♈ at Mar 11

Gregory XIII decreed: The day after 5th Oct. 1582 will be 15th Oct.

♈ 11th Mar → 21 Mar (10 days)

Parliament - England: day after 2nd Sept. 1752 will be 14th Sept. 11 days

Wed Thur

- the heading line is identified by a dot command, .he

- words in **boldface** are marked by "^B"

To continue viewing MATRIX.TST on your screen, try each of the following commands to scroll through the file:

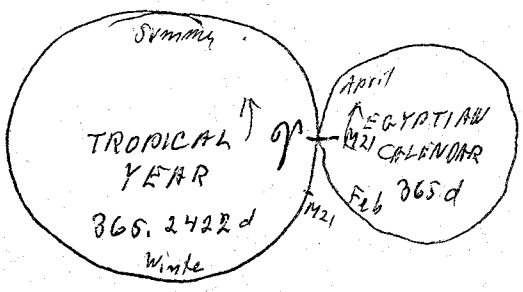
CTRL C to view the NEXT full set of lines

CTRL R to view the PRECEDING full set of lines

NOTE: Hold down the CTRL key while you press the next key.

We think you will find **WordStar** an easy-to-use, essential tool for all your text processing needs.

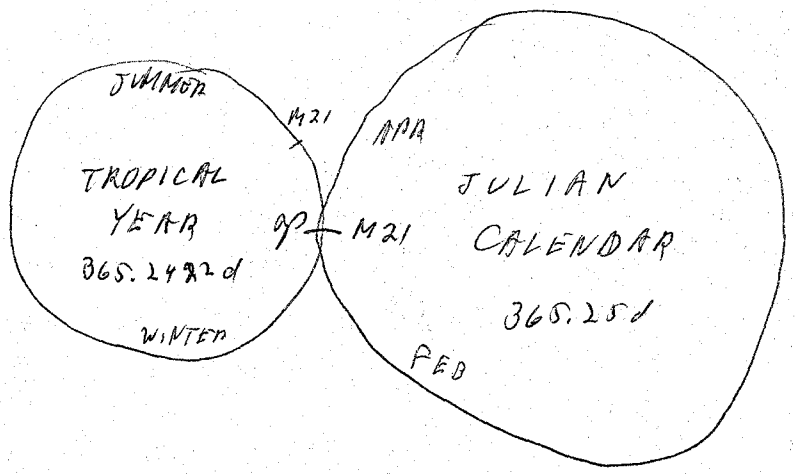
Synchronization - Commensurability



Calendar short

Labeling Winter Mar 21

To correct add days to calendar



Calendar over

Labeling summer Mar 21

To correct drop days from calendar

When the calendric approximation is smaller than the true value of the tropical year, ~~the label → winter~~

Our label Mar 21 → Winter; must add days

~~or ♈ → July ; must add days~~

If approximation is larger than the tropical year

Our label → summer ∴ drop days

(as was done)

WordStar commands now support many matrix printers that allow for variable and alternate character pitch.

(The examples below demonstrate matrix printers with WordStar.)

This shows variable pitch. (^PW)
This shows variable pitch (^PA^PW)
This shows variable pitch. (^PQ^PW)
This shows variable pitch. (^PA)
This shows variable pitch. (^PQ)

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(This text is a printout of the file named MATRIX1.TST)

Some matrix printers can also be set to "toggle" between the standard 10-pitch and alternate 12-pitch printing on the same line:

This sentence is printed with the normal 10-pitch setting, then toggled to 12-pitch then back to normal.

Note that most matrix printers with this version of WordStar require that pitch changes (except for the one set with ^PA) end with the sequence ^PA^PN. This sequence tells WordStar that a pitch change has taken place.

Another feature found in matrix printers is enhanced, or near-letter quality printing. This is toggled with a ^PY. *This sentence may be printed in enhanced mode.*

Underscoring may now continue to following lines without printing underscores in the page offset space (left margin).

To see the embedded commands which produced the text you are now reading, follow this procedure:

- In response to the basic prompt from your system,

  type ws <RETURN>

- When the Opening Menu appears on your screen,

  type D (or d)

  to edit a document.

- Then, in response to the request for file name,

  type print.tst <RETURN>

Notice that the text on the screen includes some characters which do not appear on the printed copy. For example:

Some Notes from the Charles & Ray Eames Exhibit

In England (and the British Colonies), the day after Calendar

September 2, 1752 was September 14, 1752
Wednesday Thursday

Prior to this, there were two New Years Days celebrated in England: Lady's Day - March 25th and Jan 1. The same act that of Parliament that adopted the Gregorian Calendar established January 1, as New Years Day.

George Washington was born Feb 11, O.S., Feb 22 N.S.

There were two methods of dividing the sky.

1. The Zodiac - a division into 12 parts
and
2. The Decans 36 divisions of 10°.
36 bright stars whose heliacal risings could be conveniently observed and which followed each other at 10 day intervals led to the Decans

1582 Oct. 5 → Oct 15

The Sothic Cycle was 1461 years

Easter is named for Eostre, the Anglo-Saxon Goddess of April

Passover occurs on 14 Nisan - begins at the full moon

At first Easter was the first Sunday after 14 Nisan

Next Easter was a sunday but could never be the first day of passover

Finally at the Council of Nicea 324 A.D. Easter was the first Sunday after the Paschal full moon occuring after the Vernal Equinox.

The Golden numbers for the calculation of Easter were due to the Rev. Bradley - the Astronomer Royal

Additional Notes on the Calendar
from the Eames Exhibit.

The Months adopted following the French Revolution

Name	English		
Vendemaire	Vintage	corresponds to	September
Brumaire	Fog		October
Frimaire	Frost		November
Nivose	Snow		December
Pluviose	Rain		January
Ventose	Wind		February
Germinal	Seed		March
Floreal	Flower		April
Prairial	Pasture		May
Messidor	Harvest		June
Thermidor	Heat		July
Fructidor	Fruit		August.

Charles II established the Greenwich Observatory in 1685 to determine better methods of obtaining longitude for ships at sea.

The problem of commensuration
e.g. the day and the year

error ~ tension adjustment like forced oscillation and natural period

The δ period < a fraction of p or worse lock

The tropical-year of seasons – equinox to equinox
is 365.242199 ~~da~~ mean solar days

We can find commensurability by noting
10000 years is 3652422 days

First or Egyptian approximation
1 year = 365 days error .2422 days/yr
or 24 days/century

Second or Sosigenian approximation
1 year = 365.25 dys error .0078 days/year
or 8 days in 1000 years

Third or Clavian approximation
1 year = 365.2425 error .0003 days/year
or 3 days in 10,000 years

The 2nd approximation led to the JULIAN calendar
it was effected by adding a day every fourth year
remaining error 7.8 in 1000

The 3rd approximation led to the GREGORIAN calendar
it was effected by dropping 3 days from the Julian Calendar every 400 years
every 100 J.C.

3 other approximations but continuing with this

1 day in 400 years = .0025 days/year
3 days ~ .0075

365.25 - .0075 = 365.2425
remaining error .0003 3 days in 10,000

A 4th approximation
drop an additional day every 3200 years
every 8 G.C.

every 8th Gregorian Cycle drop another day

1 day in 3200 years ≈ .0003125

2000 leap
2400 leap ÷ 400
:
5800 and leap
less ÷ by 1300
5400
11600

365.2425000
.0003125
365.2421875
24199

9600

remaining error .00001 1 1.1 in 100,000 year

A 5th approxi add 1 day in ~~100,000~~ 96,000 years
every 30 cycles

≈ .0000104
365.2421875
365.2421979 remaining error .000001
1 day in a million years

CALENDAR

THE RECORDING OF TIME BY USING CYCLES

Selection of units (cycles)

Rotation of earth: Day

Synodic period of moon: Month

Tropical Year

Sub-units

Selection of starting points

Dawn, Noon, Sunset, Midnight

New Moon, Full Moon

New Years Day

Vernal equinox

January 1,

Rosh Hoshana

Selection of epochs

Christian era: There was no year "0".

Hegira: 622 A.D. = Year 1 of the Muslim Calendar.

Hebrew: 3760 B.C. = Year 1 of the Jewish Calendar.

Greek: The first Olympiad (recorded) 776 B.C.

Roman: From the founding of Rome, 753 B.C.

Chinese

Mayan: First date referred to, 3372 B.C.

Geologic: Ages of unequal length since the formation of the earth.

Big Bang: Time elapsed since the beginning of expansion.

THE COUNTING OF CYCLES

THE PROBLEMS OF CO-MENSURATION

The relation between cycles

Cycles or waves are characterized by the following parameters:

The period or duration of the cycle.

This must be expressed in some units of time, either a sub-unit based on another cycle or on counts of auto-sub-units or of the cycle itself.

The phase.

This relates the beginning of the cycle to some other cycle, like the date of new year's day.

what is the infrastructure in each case?

The amplitude.

Generally ignored or considered meaningless in calenderic considerations.

The timbre.

The effect of superposing various cycles.

THE LENGTH OF COMMON CYCLES:

Rotation of the earth with respect to fixed stars:

24h 00m 0.0 s in sidereal units

23h 56m 4.09892s in solar units

THE LENGTH OF COMMON CYCLES:

Rotation of the earth with respect to fixed stars:
24h 00m 0.0 s in sidereal units
23h 56m 4.09892s in solar units
Rotation of the earth with respect to the vernal equinox:
xx in sidereal units
xx in solar units
The Mean Solar Day:
24h 03m 56.555s in sidereal units
24h 00m 00.0 s in solar units

Synodical Month: (new moon to new moon)
29.530 588 msd's
Sidereal Month: (ref. fixed stars)
27.321 661 msd's
Tropical Month: (equinox to equinox)
27.321 582 msd's
Anomalistic Month: (perigee to perigee)
27.554 551 msd's
Nodical or Draconitic Month: (node to node)
27.212 220 msd's

Transit Interval of the Moon:
24h 50.47m ms units.
Mean daily motion of the Moon:
13 deg 11' east
Period of rotation of the moon's perigee (direct):
8.85 years
Period moon's node (retrograde):
18.61 tropical years.
Inclination of the Moon's Orbit to the Ecliptic:
5 deg 8', but oscillates from 4 deg 59'
to 5 deg 18' with a period of 173 days.

Sidereal year: (ref fixed stars)
365.256 365 msd's
Tropical year: (equinox to equinox)
365.242 199 msd's
Anomalistic year: (perihelion to perihelion)
365.259 641 msd's

Period of precession of the earth's node (retrograde)
50.398"/year
25,725 years (fixed ecliptic)
25,784 years (moving ecliptic, effects of planets)

THE CALENDAR AND ITS HISTORY:

Julian Year:
365.25 msd's
Gregorian Year:
365.2425 msd's
Mayan Year:
365.2420 msd's

The Seasons
Festivals
- The Seasons of Hipparchus
  - Delimiters
  - The Festivals
    - The Druids
  - Liturgical Years
  - Calendars

physical
The causes
The psychology

Quotation
Diagrams

Misc.
Cycles
Saros
Sothis

The Analemma
The Seasons of the Analemma, physical causes
Delimiters, psychology
The Festivals of the Analemma
Liturgical Years

The Journey of the Year
Meaning of Journey
. Advent - The branch point

	d	y	J. C.	G. C.	S. C.	C. C.	Δ in 10,000 years
d	1	365.2422					
y		1	4	400	3200	9600	
J C			1	100	800	2400	
G C				1	8	24	
S C					1	3	
C C						1	

4 Years = A Julian Cycle
100 J.C. = G.C.
8 G.C. = S.C.
3 S.C. = C.C.
9600

Day
Month
Year
Week

Commensurability & Resonance
Non-Commensurability
Error Signals
Tension
Correction
Leap Days
Years

Solinus
Clavius

10000
4
25

5098
400
12.5

$\frac{10^4}{27.38} = \frac{10^6}{2738} = Y$

365.25 x 4
12422
5
1,2110
10
2.11
5000

365
365
365
366
---

4 JULIAN 365.25
400 GREGORIAN 365.2425
3200 TRANSGREG
EVERY 25 x 400 = 10,000
System Clavian Cycle
9600

3 days in 10 000 yrs

13.692
27.38

400
3200

10,000 years.

3652422 days
5000yr = 1826211 days

$\sqrt{} = 1351.3737$

$\frac{\sqrt{\frac{Y}{2} \times 10^4}}{Y} = 2.7$

$\frac{10^4}{2(3.7)^2} = Y$

$\frac{Y \times 10^4}{2} = (3.7\,Y)^2$

$\frac{3.7}{\sqrt{365.2422}} = 3.6999385 \doteq 3.7$

1582

Tropical Year (Year of the Seasons)

365.242199 msd

Synodical Month (new moon to New Moon)

29.530588 msd

Sidereal Year

365.256365 msd

Trop 365.242199

Δ = .014166 msd/year

or 70.59 years for 1 msd

1461 T = 533618.85

1460 S = 533274.28

Δ = 344

intercalary days

intercalation

also see Calippic cycle

Metonic

6939 d ≈ 235 lunar

≈ 19 years

235 l = 6939.69

19 y = 6939.75

DIONYSIAN CYCLE

532 = 19 × 28

Meton for same day of week

SOTHIC (Sidereal)

Sirius = Sothis

1461

1460 ~ 1461

SOTHIC CYCLE

= No of years for (Trop - Sid) = 1 day

SAROS

6585.32 days

223 syn m

19 ecl yr

Lunar Year

354 days

7 years 13 months

12 years 12 mos

Δ = 35 d/cent

8 years

5 12 m

3 13 m

3m

23h 56m 4.s 098925

56m 4.s1

Δ = 3m 55.s9 / year = 235.s9

for Δ to be 1 day how many years?

or 24 × 3600 = 86400

in 366.25688 years, Δ = 1 day

4

1465

365.25688 × 4

= 1461.0275

Seasons (Northern Hemisphere) - Smart - p153

i = 23° 27'

Spring	92d	20.h2
Summer	93d	14.4
Autumn	89d	18.7
Winter	89d	0.5
	365d	5.h8

Superimpose on the Analemma the lunar phase i.e. sun/moon angle

waxing

waning

19 year cycle

19 analemmas

Live in each season as it passes, breathe the air, drink the drink, Taste the fruit, and resign yourself to the influences of each

Cycles for communication

MOON

2422

$nT = mA$

Synodic Month

29.530588 days

Year ⟺ Month

METONIC CYCLE

235 SM = 6939.6881 days
19 TY = 6939.6018 days
$\Delta = .0863$

1440 min
124.272 min
c. 2 hours 4 m

? YEAR ⟷ WEEK

235 lunations in 19 Tyears
13 or 12

12 x 29.53 = 354.36
13 x 29.53 = 383.89

Hebrew System
Other

DAY ⟷ ROTATION
MSD TIME

SOTHIC CYCLE

12.368267
lunations/TY

Dionysian Cycle

~~Dionysian~~ 532 years
Day of week, Phase of Moon
on same date

365.25
354.36
10.89

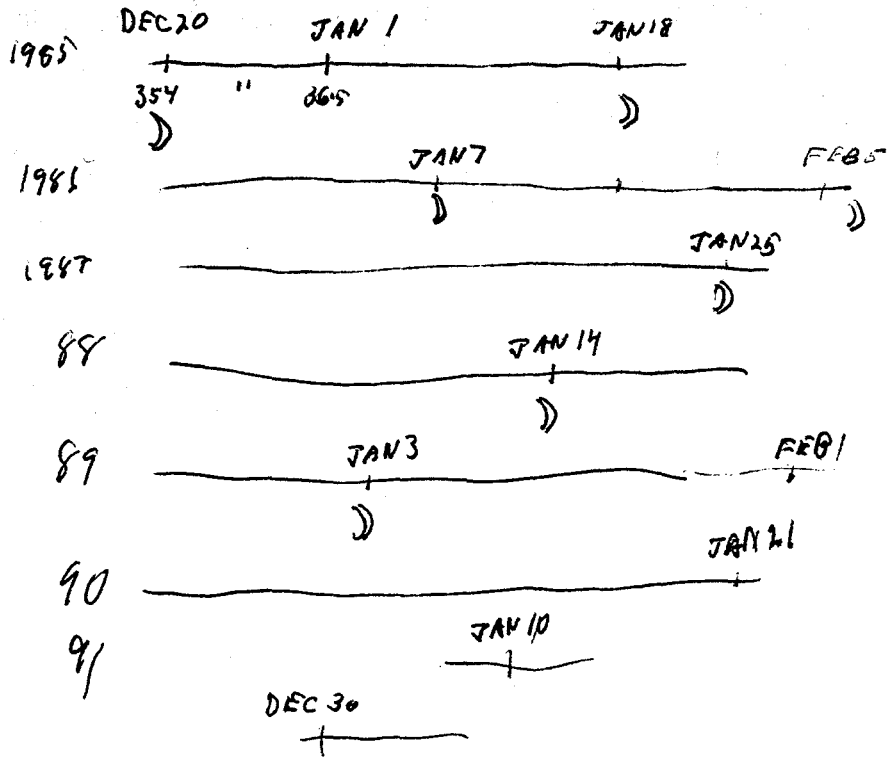
29.53
10.89
18.64 daily

11 days/year

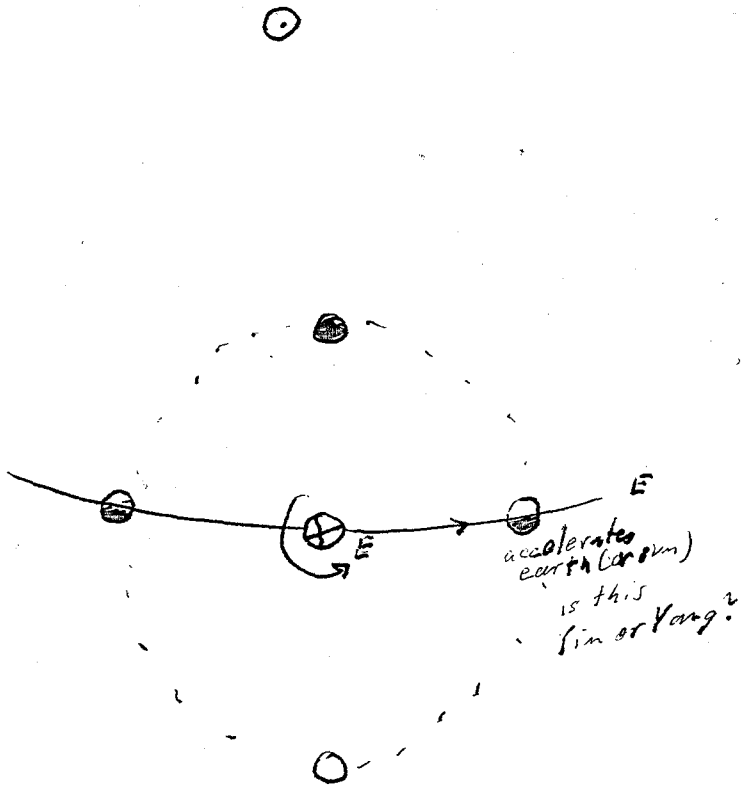
FEB 19

354.16
18.67
372.83

Need 19 animals
not 12
for its 19 different
phases



THE EFFECTS OF THE MOON



radial motion
(distance from sun)
~ light/darkness

a small % of the
solar darkening

orbital motion
ahead or behind
~ yin/yang

what % of E/M motion
in the analemma?

DATA

[redacted]

Astronomical Data (Allen)

Tropical Year	$\gamma - \gamma$	365.242198 78
Sidereal Year	fixed stars	365. 256365 56
Anomalistic (perihelion)		365. 25964134
Eclipse		346. 620 03)
Julian		365.25
Gregorian		365. 2425
Mayan		365. 2420

Syndodical Month (new-new)	29.530 5882
Sidereal (fixed stars)	27. 321 66 10
Nutation	18.61 tropical years

Precession (fixed ecliptic)	25 725	Occult $25,920 = 64 \times 9^2 \times 5$
moving ecliptic	25 784	$= 2^6 \cdot 5 \cdot 3^4$

Length of Seasons (Smart p 154) Hipparchus

Spring	92^d	$20.^h2$
Summer	93	14. 4
Autumn	89	18. 7
Winter	89	0. 5

$365.2422 \times 0.618034 = 225.732$

ANALEMMA
and
Journey of the Year

The north-south motion of the sun effects the outer or ~~natural~~ physical seasons - we usually divide these into four

♈ to summer solstice = spring
summer solstice to ♎ = summer
♎ to winter solstice = autumn
winter solstice to ♈ = winter

The east-west motion of the sun effects the inner or psychic seasons - these are more subtle and less articulated
The key dates are not the solstices and equinoxes, but the days when the equation of time = 0 (~~or~~ equinoxes) or extremes (= solstices)

(The extent of $\overset{n-s}{\text{outer}}$ motion is approximately 6 times the extent of $\overset{e-w}{\text{inner}}$ motion, 6 outer : 1 inner like "six days shalt thou labor — the seventh rest.")

The key "equinoctial" days of the inner seasons turn out to be

June 14 — ~~Ascension~~
Sept 2
Christmas
April 15 or 16 (if we did not calculate Easter from an ancient lunar calendar, the nearest Sunday could be taken as Easter - the Resurrection)

Calculated Intervals

~~June 14 could be taken as Pentecost~~

The key "solstitial" days are

Feb 12 } Major — ~~Annunciation~~
Nov 4 }
May 14 } Minor — ~~Assumption~~

E-W DATES

If Easter is taken as the Sunday ~~next~~ nearest April 16

Easter	April	13 – 19
E-40	Ash Wed	Mar 4 – 10
E+40	Ascension	May 23 – 29
E+49	Pentacost	June 1 – 7

E-W "Equinoctial"

	June 14	$\cdot\varphi^{-1} = 11/1$
	Sept 2	$\cdot\varphi^{-1} = 4/16$
$\cdot\varphi = 8/6$	Dec 24/25	Christmas
	Apr 15/16	"Easter"

φ

Prime	Golden	Sub
4/16 ↓ 5/26	11/28	9/2
	1/6	10/12

i.e. Beginning of Advent
φ · Easter
Epiphany
φ · Ascension

E-W "Solstitial"

Major	Feb 12	
	Nov 4	
Minor	May 14	$\cdot\varphi = 12/25$
	July 27	sequence includes 9/16-17, 12/13, 5/1, 2/2, 6/21, 11/7

The E-W equinoctial days are related to ecclesiastical days directly or by φ or φ^{-1}

$\varphi \doteq 225$
$\varphi^{-1} = 140$

Christmas	Dec 24/25	$\cdot\varphi = 8/6$	= Transfiguration
"Solar Easter"	Apr 15/16	$\cdot\varphi = 11/28$	= Beginning of Advent
"Solar Corpus Christi" = June 16	June 14	$\cdot\varphi^{-1} = 11/1$	= All Saints
	Sept. 2	$\cdot\varphi^{-1} = 4/16$	= Solar Easter

Using the usual rules for Ash Wednesday E-40.

E = 4/16

Ascension	E+40
Pentacost	E+49
Corpus Christi	E+61

5/26 · φ = 1/6 Epiphany

N-S summer solstice 6/21 · φ = 2/2 Candlemas

φ^{-1}, 5/6 = 5/27

THE ANALEMMA

THE UNIQUE DAYS

e = the equation of time (horizontal coordinate)
δ = the declination (vertical coordinate)
r = orbital radius vector

$r = 1.000$ Oct 5 $r \longrightarrow < 1$
$r = 0.983$ Jan 4,2 $= \check{r}$ perihelion
$r = 1.000$ Apr 3/4 $r \longrightarrow > 1$
$r = 1.016$ July 6,4 $= \hat{r}$ aphelion

Δr max $+2939$ Apr 1
Δr min -2949 Oct 8/9

$\hat{\delta} = +23^\circ 26' 31''$	June 22	Summer Solstice
$\delta = 0$	Sept 23	Autumnal Equinox
$\check{\delta} = -23^\circ 26' 28''$	Dec 23	Winter Solstice
$\delta = 0$	March 21	Vernal Equinox

---

e max +	$+16^m 23^s.30$	Nov 4	($\delta = -15^\circ 4' 20''$)
e 2° max +	$+3^m 43^s.82$	May 15	
e max −	$-14^m 19^s.76$	Feb 12	($\delta = -14^\circ 0' 25''$)
e 2° max −	$-6^m 24^s.84$	July 27	

$20^m 7.12$ } also on these dates
$20^m 44.60$ } $\Delta e = 0$

$e = 0$	− → +	Apr 16	e → w
$e = 0$	+ → −	June 14	w → e
$e = 0$	− → +	Sept. 3	e → w
$e = 0$	+ → −	Dec 24	w → e

MAXIMUM ACCELERATIONS
EAST MAY 9
NOV 15
WEST " FEB 1
AUG 6

$\Delta\delta$	max North	$+1422.9''$	MAR 19
$\Delta\delta$	max South	$-1403.1''$	Sept. 27
Δe	max east	-29.95^s	Dec 24/25
Δe	max west	$+21.42^s$	Sept. 17/18
Δe	2° max east	-12.24^s	June 21
Δe	2° max west	$+18.34^s$	March 27

The Crossover

	e	δ
Aug 31	− 0 37.22	+ 8 59 52.6
Apr 14	− 0 35.01	+ 9 03 21.5

$\delta_a = \delta_s$ $e_a = e_s$

$\frac{139.5}{225.75} = .61794$

139+ days
226 days

$\frac{225.75}{365.25} = .618069$

$\therefore \Phi$

Moveable Feasts

From the Book of Common Prayer (1928 ed.)

Easter: 1° sunday after the full moon, which happens on or next after the 21st of March — Full moon = 14th day of a lunar month

if full moon on sunday — Easter the following sunday

Septuagesima = 9 weeks before Easter

Sexagesima 8

Quinquagesima 7

Quadragesima 6

Ascension 40 days after Easter

Whitsunday 7 weeks " " (Pentacost) 49 d

Trinity 8 " " " 56 d

Rogation 5 " " " 35 d

Ash Wednesday 40 days before Easter

Easter March 22 - Apr 25 ∃ 1 to 6 sundays after Epiphany

First day of Lent Feb 4 - March 10

Ascension Apr 30 - June 3

Pentacost. May 10 - June 13

Corpus christi 21 days after Ascension = E + 61 3 weeks after Asc.

Sundays after Trinity ∃ 27 to 22

Advent Sunday Nov 27 - Dec 3

Assume Easter falls on April 16, then		Prime 4/16	golden 11/28	Sib 9/2
Ash Wednesday falls on	March 7	3/7	10/19	7/24
Ascension	May 26	5/26	1/6	10/12
Pentacost (whitsunday)	June 4	6/4	1/15	10/22
Corpus Christi	June 16			

If Easter is taken as the closest Sunday to April 15

		Ash	Asc	Pen
The range of dates for Easter:	April 12 - 18	3-9	22-28	31-6
Closest Sunday to April 16,	'18 - 19	4-10	23-29	1-7
		Mar	May	Jun

Ecliptic Cycle 40,032 years

Analemma

$i = 21°89' \text{ to } 24°36'$

as $i \uparrow$ seasonality $\uparrow$

but climatic zonal contrasts decrease

Orbital Eccentricity Cycle

93,408 anomalistic years

perihelion to season changes

Twice every 40,032 years ? not necessarily

i is 3. the Analemma cross-over

i at ϕ - the Golden Ratio

References

1) Bernard M. Oliver SFT July 1972

e, i and longitude of perihelion

2) NYAS. TIME

3) SKY and TELESCOPE, JULY 1986. p 17, 18

Precession Period 25,800

Eccentricity period 100,000 years. $0 \rightleftarrows 0.06$

Obliquity period 41,000 years i 4° amplitude

$23° \pm 1°$

Milankovitch Orbit Cycles

THE ANALEMMA

EXPANSIVE AND CONTRACTIVE PERIODS

The intervals between meridional passages are expanded when ☉ is moving east, i.e. when e is decreasing

The major expansive period is thus between Nov 4 and Feb 12 with a secondary expansive period between May 15 and July 27

The contractive periods are Feb 12 to May 15 and July 27 to Nov 4

really? *
Dec 25 to Mar 27
June 21 to Sept 17
May 27 to June 21
Sept 18 to Dec 25

The most expansive moment of the year, when Δe is most negative at -29.95 is on Christmas Eve.

The most contractive moment, when Δe is most positive occurs on Sept. 17/18 (Δe = +21.42) (near Yom Kippur) Eleusinian Mysteries

The period between Nov 19 (Δe = -13.0) and Jan 28 (Δe = -12.4) is more expansive than is reached at the summer peak on June 21 (-12.24)

The period Sept 1 (+18.38) to Oct 4 (+18.43) is more contractive than is reached during the spring peak on March 27 (+18.34)

Yin Expansive is like flying West
Yang Contractive is like flying East cf. Jet Lag

The eastward motion of the sun exceeds the N-S motion between Dec 6 and Jan 6 and between June and June

* Decreasing Focus
from Sept 18 to Dec 25
March 27 to June 21

Increasing focus
Dec 25 to March 27
June 21 to Sept. 17

Some notes:

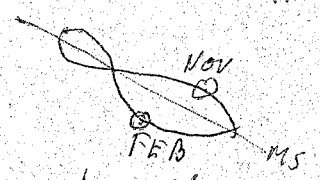
R.A. is measured to the east
H.A. (hour angle) is measured to the west

R.A. + H.A. = 360°

If e = R.A. M.S. − R.A. ⊙ (Smart p. 42)

then e = 360 − H.A.M.S. − (360 − H.A. ⊙) = H.A. ⊙ − H.A.M.S.

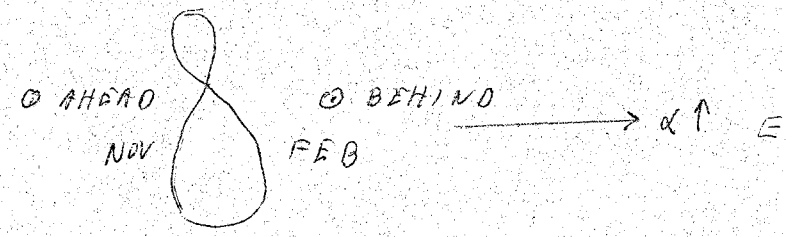
In di Cicco's photo



Looking Up

In Feb the ⊙ is behind
i.e. crosses the meridian after the M.S.
and R.A. ⊙ > R.A.M.S.
∴ e < 0 in Feb

In the almanac on Feb 15, 1959
$e = -14^m 16.45^s$



THIS REPRESENTATION
IS LOOKING DOWN

From Feb 12 to May 14, ⊙ is moving west ∴ e is increasing
(less negative → more positive)

When ⊙ is moving west, the meridian interval
is < 24 hr mean time
This would be like flying east in an airplane, noon to noon is <24

From Nov 4 to Feb 12, ⊙ is moving east and e is decreasing
the ⊙ meridian interval is > 24 h
This is like flying west

THE ANALEMMA

ORIENTATION

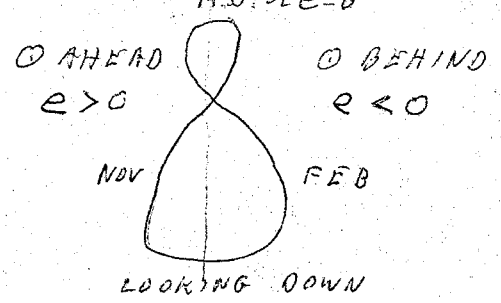
The ecliptic is the great circle path that the sun traces in its yearly motion in the sky. The sun moves eastwards along the ecliptic completing a cycle ♈ to ♈ in one "tropical year", which is approximately 365.2422 days. The position of the sun may be measured along the ecliptic eastward from ♈ by longitude or along the celestial equator eastward from ♈ by right ascension.

The sun ☉ however does not move at a constant rate. In January when the sun is closest the earth, the motion is fastest; it moves in July, when it is furthest, the slowest. But if we imagine a clock sun, an average or mean sun, that moves at a fixed rate, coincides with ♈ in 1 tropical year mean sun's position we can correlate this with our clocks which (hopefully) run at a fixed rate. But only on 4 days a year will the position of the mean sun and ☉ coincide. Another way of saying this is that only on four days in the year will your sun-dial agree with your watch. Sometimes the ☉ is ahead of the clock, sometimes behind the clock. The amount of time ahead or behind is called the "equation of time"

$$e = R.A.M.S. - R.A.\odot$$ Sinnott p 42

If $e > 0$, ☉ is west or running ahead (crosses meridian first ∴ ahead)

HENCE



The analemma is the annual path of ☉ with respect to an origin of $\delta = 0$, $e = 0$

ANALEMMA

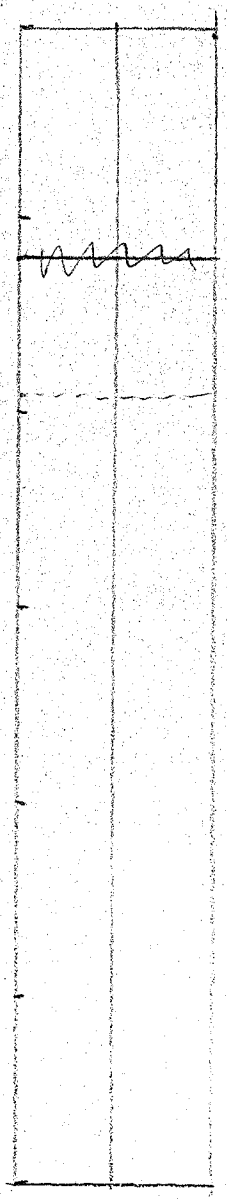
PROPORTIONS OF CIRCUMSCRIBED RECTANGLE

North - South

$+23° 26.5$

$-23° 26.5$ $= 23.4417$

$46° 53' = 46.88 = 187.52^m$



East - West

$16^m 23.30^s$ } an asymmetry toward W

$14^m 19.76^s$ }

$30^m 43.06^s = 30.72^m = 7.68°$

ratio: $\frac{V}{h} = 6.104166 = \frac{187.52}{30.72}$

cross-over at $\delta = +9° = 36^m$

$\frac{57.75}{187.52} = 0.30 = \frac{3}{10}$

The rectangle is approximately 6 times as high as wide.

The crossover is approximately .3 of the way from north to south.

187.52

$93.77 = 23°.4417 \times 4$

$36 = 9° \times 4$

129.77

57.75^m .31

.69

$\frac{46.88}{7.68} = 6.104$

1959

Bruce & Judy
612/698-4266

612/724-7338
4104 E 45th 55406

	δ	δ
Sept 2	−0.00.16	+ 8 16 36
Sept 3	+0.18.82	+ 7 54 46
Apr 16	−0.05.03	+ 9 46 33.0
Apr 17	+0.09.47	+10 07 54.3

Time of Cross-Over

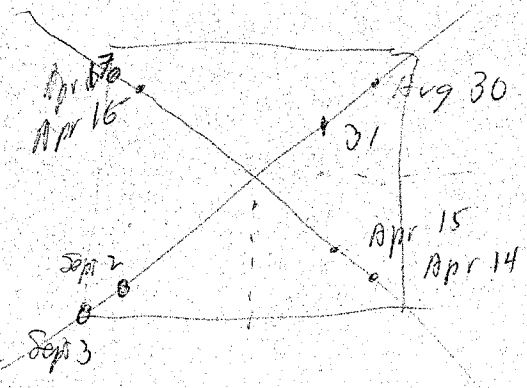
$\delta_a = \delta_s$

$e_a = e_s$

	δ	δ
Aug 30	− 0 55.28	+ 9 21 17.8
Aug 31	− 0. 37.22	+ 8 59 52.6

$\frac{139.50}{225.75} = .6179401$

365.25
225.75
139.50

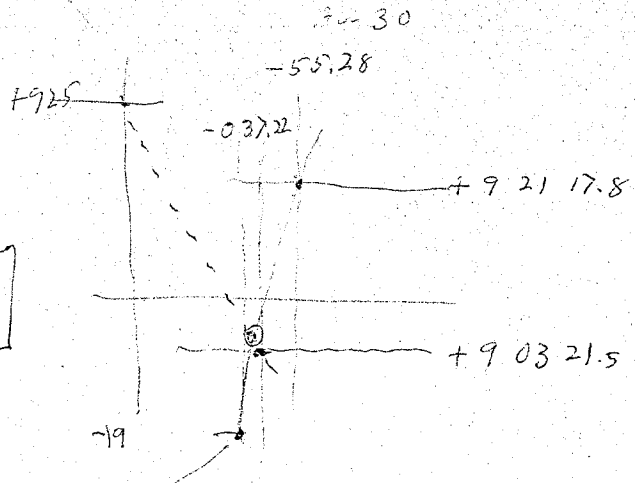


APR 14	−0 35.01	+ 9 03 21.5
APR 15	− 0 19.86	+ 9 25 01.9

17 Apr 14, 15, 16, 17, 18, 19, 20
May 31 21, 22, 23
Jun 30 24, 25, 26
Jul 31 27, 28, 29, 30
Aug 31

20
120
140

139 +
226 −



S	30
O	31
N	30
D	31
J	31
F	28
M	31
A	14

122
90
14
226

.657

$\frac{140}{226} = .619$

$\frac{226}{365.25} = 0.618754$

365.25
226
139.25

$\frac{225.75}{365.25} = .618069$

Definitions q = [redacted] equation of time = H.A. ⊙ − H.A.M.S. = α_M [redacted] $\alpha_\odot$ = $\ell - \alpha$ where ℓ = the sun's mean long., [redacted] α = sun's r.a.

H.A. = angle along equator, westward from meridian to hour circle through object.

Dec Smart p 146

Then M.S. moves on the celestial equator
The ⊙ moves on the ecliptic

⊙ the apparent sun (real)
M.S. the mean sun (fictitious)

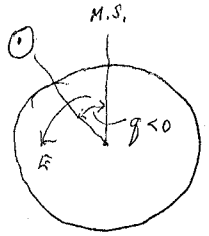
---

q = H.A. ⊙ − H.A.M.S.

If $q > 0$, ⊙ is west of M.S. or the ⊙ is running ~~fast~~ early compared to uniform (atomic) time
$q < 0$, ⊙ is east of M.S. or the ⊙ is running ~~ahead~~ behind of uniform time

When one flies East, the new local time is later than the old local time
taking the old local time as the uniform time
the time further east is ahead

~~We may say that flying east ~ $q < 0$ in the sense that gravity~~



~~If $\Delta q > 0$~~ If q ~~is > 0 and~~ ↑, ~~then~~ $\Delta q > 0$
If q is ↓ ~~and~~ then $\Delta q < 0$

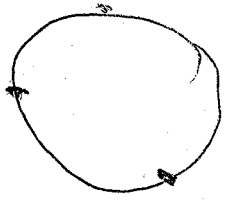
If $\Delta q > 0$, ~~then $|q|$ ↑ if~~ then the ⊙ is moving west with respect to the mean sun.
and If $q < 0$, then $|q|$ ↓ This is like a new local time being
$q > 0$, then q ↑

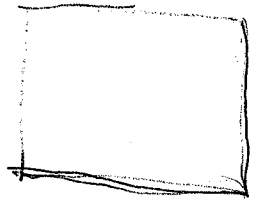
If $\Delta q < 0$, then the ⊙ is moving east with respect to the mean sun
and if $q < 0$, then $|q|$ ↑
$q > 0$, then q ↓

If Δq ↑, then $\Delta^2 q > 0$
If Δq ↓, then $\Delta^2 q < 0$

---

8 Conditions: q ± Δq ± $\Delta^2 q$ ± and 0's
or ~~q ↑ Δq ↑ $\Delta^2 q$~~





$\Delta\delta$

LATEST SUNRISE

λ_0	DATE	TIME	after Jan 15 TIME AM	
20	FEB 12			
25	JAN 13	5.092576	5 6	6 54
30	JAN 9	4.857827	4 51	7 9
35	JAN 5	4.539590	4 32	7 28
40	JAN 2	4.059305	4 4	7 56
45	DEC 29	3.168730	3 10	8 50

LATABLE
EPHJAN
DATAJAN

EARLYEST SUNSET

λ_0	DATE	TIME PM
20	NOV 4 Nov 28	5 14
25	Dec 2	5 3
30	Dec 6	4 48
35	Dec 9	4 29
40	Dec 13	4 0
45	Dec 16	3 7

LATABLE
EPHTABLE
DATATABL

```
      ? TIC
      ? TVN
      ? CATEGORY
      ? PUBLISHER
      ? TITLE
      ? 'Grade Level: ' + GRADELEVEL
      ? DESC
      SELECT 2
      IF VTIC = MTIC
        STORE 1 TO K
        DO WHILE K <= MVN
          STORE STR(RETAIL,6,2) TO RE
STORE TRIM(PRECODE)+' ('+TRIM(CODE)+') '+TRIM(POSTCODE) TO UMB
          STORE LEN(UMB) TO LU
         IF '               '$(CODE)
STORE TRIM(PRECODE)+' '+TRIM(POSTCODE) TO MB
         ELSE
          STORE SPACE(56-LU)+'$'+RE TO RST
          STORE UMB+RST TO MB
         ENDIF
          ? MB
          SKIP
          STORE K+1 TO K
        ENDDO
      ENDIF
      RELEASE MVN, MTIC
      SELECT 1
      ?
      ?
      SKIP
ENDDO
RETURN
```

e = Equation of Time = ⊙ - mean sun

$e = 0$	Max/min e $\Delta e = \dot{e} = 0$	Max/Min $\dot{e}$ $\Delta^2 e = \ddot{e} = 0$	Max/Min $\ddot{e}$ $\Delta^3 e = \dddot{e} = 0$
Sept 3	Feb 12	MAR 27 (inflection)	May 9 or 8
Dec 25	May 14/15	JUN 21	Aug 6
Apr 16	July 27	SEPT 17 (inflection)	Nov 15
Jun 14	Nov 4	DEC 24/25	Feb 2

From 4/16 - 6/14 and 9/3 - 12/25
⊙ ahead (i.e. west of M.S.) $e > 0$
From 6/14 - 9/3 and 12/25 - 4/16
⊙ behind (i.e. east) $e < 0$

e is max + (W)
$+3^m 43.^s82$ 5/15
$+16^m 23.^s30$ 11/4
e is max − (E)
$-6^m 24.^s84$ 7/27
$-14^m 19.^s76$ 2/12

From 2/12 to 5/15 and 7/27 to 11/4
⊙ moves West
$\Delta e > 0$
From 5/15 to 7/27 and 11/4 to 2/12
⊙ moves East.
$\Delta e < 0$

Δe is max + (W)
$+18.^s34$, 3/27
$+21.^s42$, 9/17
Δe is max − (E)
$-12.^s94$, 6/21
$-29.^s95$, 12/24,25

From 9/17 to 12/24 and 3/27 to 6/21
⊙ accelerates to east
$\Delta^2 e < 0$
From 12/24 to 3/27 and 6/21 to 9/17
⊙ accelerates to west
$\Delta^2 e > 0$

$\Delta^2 e$ is max + (W)
+0.86 c 12/24 (12-9)
+0.61 c 8/6 (1-11)
$\Delta^2 e$ is max − (E)
−.86 c. Nov 15 (12-21)
−.58 c 5/4 (27-10)

Max acceleration
- ⊃ Nov 15 } east
- ⊃ May 9
- ⊃ Feb 2 } west
- ⊃ Aug 6

$\delta = 0$	$\dot{\delta} = 0$	$\ddot{\delta} = 0$
MAR 21	DEC 21	MAR 19
SEP 21	JUN 22	SEPT 27

OR ⊙ Moves East 11/4 - 12/25 acc
12/25 - 2/12 dec

5/15 - 6/21 acc
6/21 - 7/27 dec

⊙ Moves West 2/12 - 3/27 acc
3/27 - 5/15 dec

7/27 - 9/17 acc
9/17 - 11/4 dec

North - South	δ			$\dot{\delta}$			$\ddot{\delta}$							
	MAX N	JUN 22		MAX N	MAR 19		0	MAR 19						
	0 → S	SEP 21		0	JUN 22		Max N	DEC 24	28.4	"				
	MAX S	DEC 21		MAX S	SEP 27		0	SEP 27		(26/27)				
	0 → N	MAR 21		0	DEC 21		Max S	JUN 22	24.9	"				
EAST - WEST	e			$\dot{e}$			$\ddot{e}$							
MAJOR	MAX E	FEB 12		MAJOR MAX E	DEC 24/25		MAX W	FEB 2	(2-9)					
MINOR	MAX E	JULY 27		MINOR MAX E	JUN 21		MAX W	AUG 6	(1-11)					
MAJOR	MAX W	NOV 4		MAJOR MAX W	SEP 17		MAX E	MAY 9	(7-10)					
MINOR	MAX W	MAY 15		MINOR MAX W	MAR 27		MAX E	NOV 15	(12-21)					
	0 → E	DEC 25		0	FEB 12		0	DEC 24/25						
	0 → W	APR 16		0	JULY 27		0	JUN 21						
	0 → E	JUN 14		0	NOV 4		0	SEP 17						
	0 → W	SEP 3		0	MAY 15		0	MAR 27						
RADIUS	r			$\dot{r}$										
aphelion	MAX	JULY 5		MAX ↑	APR 1									
perihelion	MIN	JAN 2		MAX ↓	OCT 9									
	→ < 1	OCT 6												
	→ > 1	APR 4												

Dates from the Analemma:

Equation of time = 0

April 16
June 14
Sept. 2
Dec 25/26 → Christmas

Maxima of Eq. of time

May 15	+ 3.73033
July 27	- 6.41400
Nov 4	+16.^{m}38833
Feb 12	-14.^{m}32933

Maximum daily differences (changes) in eq. of time, $\dot{e}$

Mar 27	+18.^{s}34
June 21	-12.94
Sept. 17/18	+21.42
Dec 24/25	-29.95 → Christmas Eve

2nd diff. mean of broad max

2nd differences $\ddot{e}$

Feb 2	0.80 → Candlemas
Mar 27	0
May 8	0.58
June 21	0
Aug 6	0.60 → Transfiguration
Sept 17 → Nov 15	0.86
Dec 24	0 → Christmas Eve

Eq. of time = R.A.M.S. − R.A. ⊙
If t. M.S. east of ⊙, ⊙ crosses meridian first
i.e. ⊙ is fast ~ traveling east.
If − opposite

Solstices δ = + 23.5°
Time 22
−28.5
Dec 21

Crossover c. Apr 15 / Sept 1

Max daily $\Delta\delta$ in inc. of long

Jan 7/8	3670.4	→ Epiphany
June 22/28	3432.6	also latest sunrise at what lat.?

Max daily $\Delta\delta$ in δ

Mar 19	+1422.9
Sept 26/27	-1403.1

2nd differences in δ

Mar 19	0
June 22	24.9
Sept. 26	0.1
Dec 23/23	28.3

~~Radius Ve~~

Unsolved
St. Andrews Day
May 27
Aug 9

Other Dates:

Perihelion c. Jan 2 → New Years
Aphelion c. July 5 → July 4
Vernal Equinox c. Mar 21
Autumnal Equinox c. Sept 22

Radius Vector
Max Change - ⊙

Apr 1.	+2939
Oct 8/9	-2949

Oct. 5/6 r → <1
Apr 3/4 r → >1

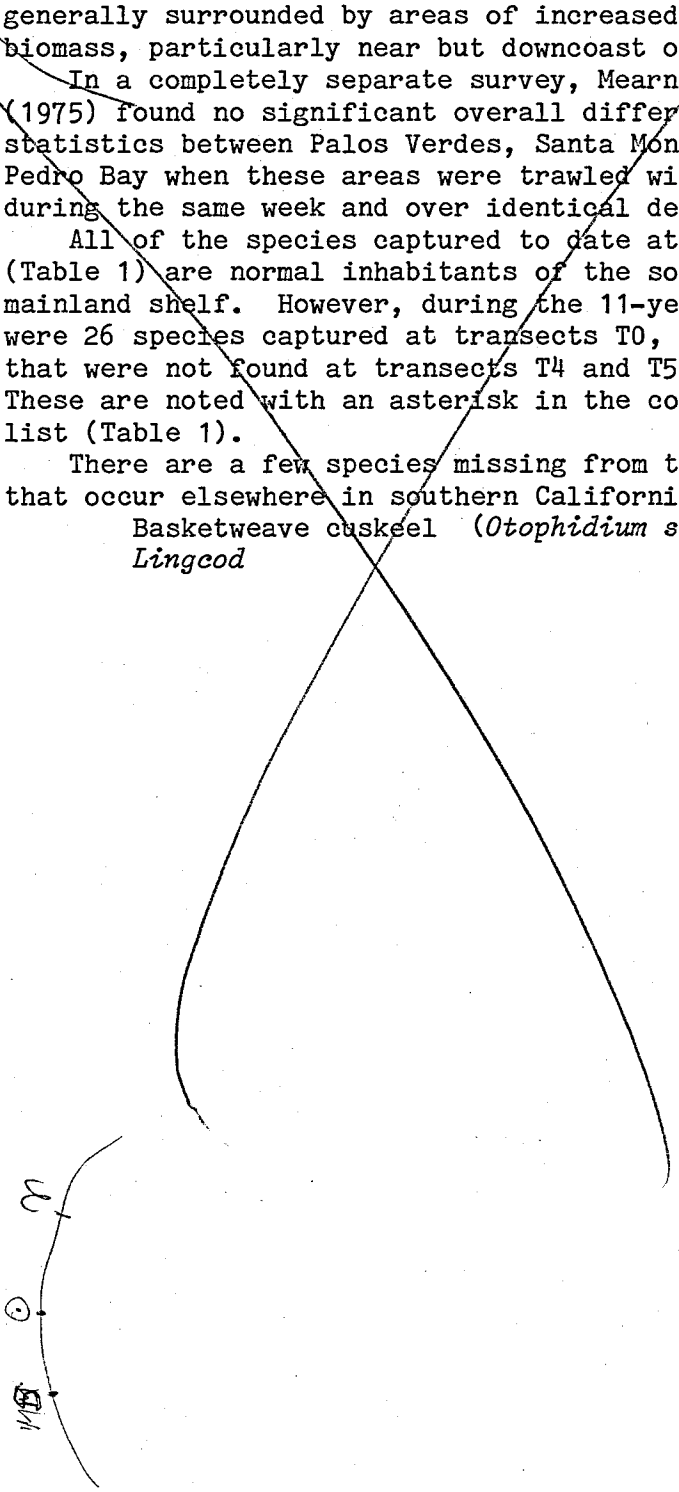
occurred on the Palos Verdes shelf (1971-1975), "there has been an area of depressed fish abundance and diversity" occurring for 1 to 6 km northwest of the outfalls (Whites Point) at depths from 60 to at least 140 m. This area is generally surrounded by areas of increased abundance and biomass, particularly near but downcoast of the outfall.

In a completely separate survey, Mearns and Greene (1975) found no significant overall difference in catch statistics between Palos Verdes, Santa Monica Bay, and San Pedro Bay when these areas were trawled with the same gear during the same week and over identical depth ranges.

All of the species captured to date at Palos Verdes (Table 1) are normal inhabitants of the southern California mainland shelf. However, during the 11-year period, there were 26 species captured at transects T0, T1, T2, T3, and T6 that were not found at transects T4 and T5 near the outfall. These are noted with an asterisk in the complete species list (Table 1).

There are a few species missing from these 485 trawls that occur elsewhere in southern California. These are:

Basketweave cuskeel (*Otophidium scrippsae*)
Lingcod



Physical Changes: δ = declination
q = equation of time
r = orbital radius vector

$\delta = 0$		$q = 0$		$r = 1$	
$\Delta\delta = 0$	δ = max	$\Delta q = 0$	q = max	$\Delta r = 0$	r = max
$\Delta^2\delta = 0$	$\Delta\delta$ = max	$\Delta^2 q = 0$	Δq = max	$\Delta^2 r = 0$	Δr = max
$\Delta^3\delta = 0$	$\Delta^2\delta$ = max	$\Delta^3 q = 0$	$\Delta^2 q$ = max	$\Delta^3 r = 0$	$\Delta^2 r$ = max

Declination

$\delta = 0$	$\Delta\delta = 0$	$\Delta^2\delta = 0$	$\Delta^3\delta = 0$
Mar 21	Jun 22 N	Mar 19 N	Jun 22 S
Sept 21	Dec 21 S	Sept 27 S	Dec 23/24 N

(6)

Equation of Time

$q = 0$	$\Delta q = 0$	$\Delta^2 q = 0$	$\Delta^3 q = 0$
Apr 16	May 15 W	Mar 27 W	Feb 2 W
Jun 14	July 27 E	Jun 21 E	May 9 E
Sept. 2	Nov 4 W	Sept 17 W	Aug 6 W
Dec 24/25	Feb 12 E	Dec 24/25 E	Nov 15 E

(15)

Radius Vector

$r = 1$	$\Delta r = 0$	$\Delta^2 r = 0$	$\Delta^3 r = 0$
Oct 5/6	Jan 2 pm	Apr 1	
Apr 3/4	July 5 aph	Oct 8	

(6)

~~overlaps~~ of the year physical
On 27 days something changes .07 %

5 8 13 21 34

$\sqrt{\delta^2 + q^2}$ $\sqrt{\delta^2 + q^2}$

(This text is a printout of the file named PROMATRX.TST)

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* SUBTScript
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WordStar commands now support many matrix printers that allow for variable and alternate character pitch.

EXPANDED EXAMPLE

COMPRESSED EXAMPLE

ELITE COMPRESSED

EXPANDED COMPRESSED

ELITE EXPANDED COMPRESSED

THIS IS THE PROPORTIONAL MODE TEST:

The purpose of this text is to test Wordstar's capabilities with proportional spacing and micro justification. There are six identical texts. The first is unjustified with neither micro nor proportional spacing. The second is unjustified without micro but with proportional spacing. The third is justified without micro and without proportional spacing, the fourth is justified with micro and without proportional spacing, the fifth is justified without micro but with proportional spacing and the sixth is justified with micro and with proportional spacing.

The purpose of this text is to test Wordstar's capabilities with proportional spacing and micro justification. There are six identical texts. The first is unjustified with neither micro nor proportional spacing. The second is unjustified without micro but with proportional spacing. The third is justified without micro and without proportional spacing, the fourth is justified with micro and without proportional spacing, the fifth is justified without micro but with proportional spacing and the sixth is justified with micro and with proportional spacing.

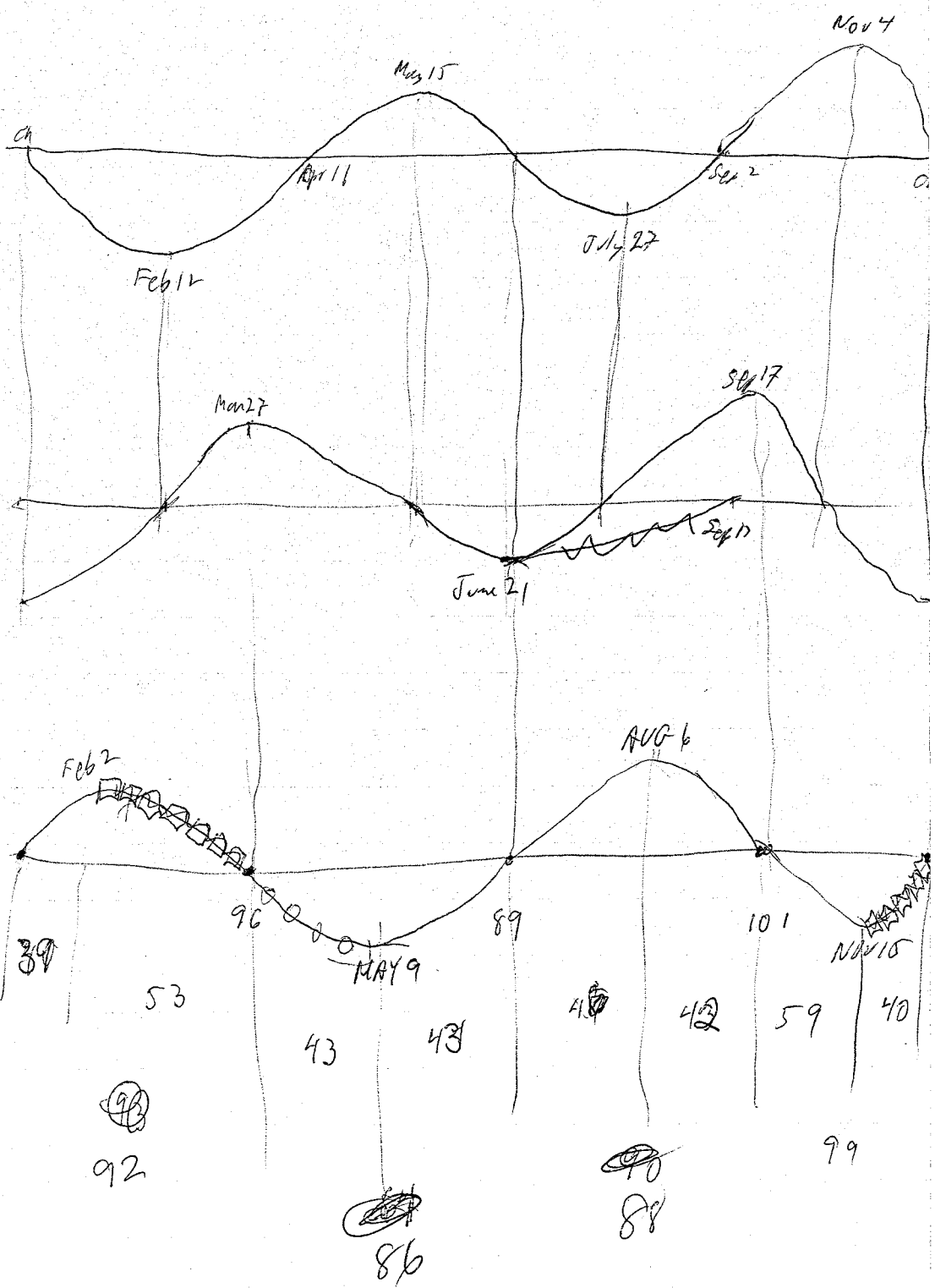
about the equator

$p = N - S$ p = declination

PICKING THE RIGHT DAYS FOR $\ddot{e}$ max, min

	$\|p\|$	p	Δp	$\Delta^2 p$	$\Delta^3 p$
1.	↓	−	↑		
2.	↓	−	↑		
3.	⇕	±	↑		
4.	↑	+	↑		
5	↑	+	↑		
6	↑	+	↑		
7.	↑	+	↑		
8	↑	+	↑		
9.	↓	+	↓		
10	↓	+	↓		
11.	↓	+	↓		
12	↓	+	↓		
13	↕	±	↓		
14	↑	−	↓		
15	↕	−	↕		

E-W acceleration



270

		e	$\dot{e}$ /day	$\ddot{e}$		δ	$\dot{\delta}$	$\ddot{\delta}$
1	MAX	NOV 4	DEC 24/25	NOV 15 (12-21)	MAX	JUN 22	MAR 19	JUN 22
2	~~MAX~~	$16^m\ 23^s.30$ W	$29^s.95$ E	0.86		+23° 26' 31" N	1422.4" N	24.9
3	~~MIN~~	FEB 12	MAR 27	FEB 2 (2-9)	MIN	DEC 21	SEP 27	DEC 22
4	~~MIN~~	$14^m\ 19^s.76$ E	$18^s.34$ W	0.80		-23° 26' 28" S	1403.1" S	28.3
5	max	MAY 15	JUN 21	MAY 9 (7-10)	ZEROS	MAR 21	JUN 22	MAR 19
6		$3^m\ 43^s.82$ W	$12^s.24$ E	0.58		S → N	→ E	
7	min	JULY 27	SEP 17	AUG 6 (1-11)		SEP 21	DEC 21	SEP 27
8		$6^m\ 24^s.84$ E	$21^s.42$ W	0.60		N → S	→ E	
9	ZEROS					r	$\dot{r}$	$\ddot{r}$
10		DEC 25	NOV 4	DEC 24/25	MAX	JUL 5	JUN 22	
11		W → E	N → S			[illegible]	→ E	
12		APR 16	FEB 12	MAR 27	MIN	JAN 2	DEC 21	
13		E → W	S → N			[illegible]	→ E	
14		JUN 14	MAY 15	JUN 21	"ZEROS"	OCT 5	JUL 5	OCT 8
15		W → E	S → N			>1 → <1		
16		SEP 3	JULY 27	SEP 17		APR 4	JAN 2	APR 1
17		E → W	N → S			<1 → >1		
18								

e = equation of time W+, E−

δ = declination N+, S−

r = radius vector of orbit

YANG when $\dot{e}$ is toward W

YIN when $\dot{e}$ is toward E

FOR NORTH TEMPERATE ZONE

Darkening when $\dot{\delta}$ is toward S

Brightening when $\dot{\delta}$ is toward N

Speeding up when $\dot{e}$ is ↑

Slowing down when $\dot{e}$ is ↓

when $\dot{e} = \ddot{e}$ speeds

$\dot{e} \neq \ddot{e}$ slowing

DAYS from Jan 1

		DAYS FROM JAN1	e	$\dot{e}$	$\ddot{e}$	δ	$\dot{\delta}$	$\ddot{\delta}$		r	$\ddot{r}$		MAY 9	128
1	A	DEC 25 - FEB 2	32	E	E	W	S	N	N				SEP 21	263
2	B	FEB 2 - FEB 12	42	E	E	W	S	N	N				SEP 27	269
3	C	FEB 12 - MAR 19	77	E	W	W	S	N	N				NOV 15	318
4	D	MAR 19 - MAR 21	79	E	W	W	S	N	S				DEC 21	354
5	E	MAR 21 - MAR 27	85	E	W	W	N	N	S					
6	F	MAR 27 - APR 16	109	E	W	E	N	N	S					
7	G	APR 16 - MAY 15	134	W	W	E	N	N	S					
8	H	MAY 15 - JUN 14	164	W	E	E	N	N	S					
9	I	JUN 14 - JUN 22	172	E	E	E	N	N	S					
10	J	JUN 22 - JUL 27	207	E	E	W	N	S	S					
11	K	JUL 27 - AUG 6	217	E	W	W	N	S	S					
12	L	AUG 6 - SEP 3	245	E	W	W	N	S	S					
13	M	SEP 3 - SEP 17	259	W	W	W	N	S	S					
14	N	SEP 17 - SEP 21	263	W	W	E	N	S	S					
15	O	SEP 21 - SEP 27	269	W	W	E	S	S	S					
16	P	SEP 27 - NOV 4	307	W	W	E	S	S	N					
17	Q	NOV 4 - DEC 21	354	W	E	E	S	S	N					
18	R	DEC 21 - DEC 25	358	W	E	E	S	N	N					

INTER-RELATED DATES

FEB 2 Candlemas
NOV 11 .. Armistice
JAN 7 Epiphany
MAR 27 Peak
DEC 14

AUG 6

$\delta = +16\ 58\ 16.0$
$\Delta\delta = -970$
$Eq = -0\ 55.52$
$\Delta Eq = +5.92$

Same δ MAY 8/9
$-\delta$ FEB 2/3, NOV 10/11
Same $\Delta\delta$ NOV 13
$-\Delta\delta$ JAN 30, MAY 9
SAME Eq JAN 7, MAR 26/27, JULY 17
$-$ Eq ~~MAR 26/27, JULY 17,~~ SEPT 19/20, DEC 13/14
SAME ΔEq FEB 20, MAY 4, OCT 27
$-\Delta$Eq FEB 5, MAY 26, JULY 16, NOV 11

MAY 27

$\delta = +21\ 07\ 45.7$
$\Delta\delta = +623$
$Eq = +3\ 05.42$
$\Delta Eq = -6.5$

Same δ JULY 18/19
$-\delta$ JAN 15/16, NOV 28
Same $\Delta\delta$ JAN 14
$-\Delta\delta$ JULY 18/19, NOV 29/30
Same Eq MAY 3/4, SEPT 11/12, DEC 19/20
$-$Eq JAN 1, APR 4/5, JUNE 29, AUG 22/23
Same ΔEq FEB 4, JULY 15, NOV 12
$-\Delta$Eq FEB 21, MAY 3/4, AUG 7, OCT 26/27

JAN 1
NOV 29/30

MAY 23

$\delta = +20\ 23\ 20.0$
$\Delta\delta = +709$
$Eq = +3\ 26.71$
$\Delta Eq = -4.28$

Same δ July 22/23
$-\delta$ Jan 19/20, Nov 24, 25
Same $\Delta\delta$ Jan 18,
$-\Delta\delta$ July 23, Nov 26
Same Eq May 7/8, Sept 12/13, Dec 18/19
$-$Eq Jan 1/2, Apr 3/4, June 30/31, Aug 20/21
Same ΔEq FEB 7, JULY 20, NOV 9
$-\Delta$Eq FEB 18, MAY 7, Aug 3, Oct 29

DEC 25

$\delta = -23\ 25\ 08.9$
$\Delta\delta = +54$
$Eq = +0\ 24.89$
$\Delta Eq = -30$

Same δ Dec 20
$-\delta$ JUNE 19/20, JUNE 25
Same $\Delta\delta$ JUNE 20
$-\Delta\delta$ JUNE 24/25, DEC 20
Same Eq Apr 18, JUNE 12/13, Sept. 3/4,
$-$Eq Apr 14/15, JUNE 16/17, Sept 1, Dec 26/27
Same ΔEq } none
$-\Delta$Eq }

Aug 6 → Jan 6 = 153.01 = $\frac{\tau_0 \mu}{24}$ hours

154

$\varphi\gamma$ = 225.732

$\varphi^3\pi = \gamma - \varphi\gamma$ = 139.510 $\qquad \varphi^2\gamma + 13$ = 152.51

153.01 Atomic
139.51 Analemic
13.50 days

$\tau_0 = \frac{2\pi a_0}{\sqrt{G M_H}}^{3/2}$ $\qquad \log_{10}\tau_0 = 3.859702$ sec $\qquad \tau_0 = 7239.3904$

μ = 1836.109 = $6\pi^5$ $\qquad = 2^h\ 39^s.39$

Is this O_{14} or C_{12}?

$6\pi^5 = 1836.1181$

$\tau_0 \mu$ = 13292376 sec

= 3692.3266 hours

= 153.84694 days

CHONK = 364 d

CK = 39 d

$\tau_0 = \frac{2\pi a_0}{\sqrt{G M_H}}^{3/2}$ $\qquad a_0$ = Bohr's Radius

M_H = Mass Hydrogen

ATOMS and the EARTH

SEASONS

THE ANALEMMA AND ITS SEASONS

Although not a universal practice, the most natural division of the year seems to be into four seasons, the seasons delineated by Hipparchus--Spring, Summer, Autumn, and Winter. This division matches well most natural phenomena manifested in the temperate zones. However, this quatenary division does not allow mapping the fine structure exhibited by the physical changes in the cycle of the year. The present solar calendar makes up for this deficiency by superimposing on its basic structure a set of twelve divisions called months, (which are really pseudo-months having no correspondence with the actual cycles of the moon). With the aid of these months it has been possible to relate annualy changing physical phenomena to the calendar. This has not been true, however, for relating the moods, feelings and other quality specific aspects of time to the calendar. There is another way to go: Since the seasons are a solar phenomenon, related to the annual cycle of the sun, it is misleading to try to tie them to cycles of the moon, and even more misleading to pseudo-cycles of the moon. It is important to remain with the motions of the sun.

Hipparchus' contributions to our knowledge of the motions of the sun, great as they were, did not complete the description. It remained for astronomers of later times to develop deeper understanding. The sun's annual cycle from the winter solstice northward through the vernal equinox to the summer solstice, back through the autumnal equinox to the winter solstice causing the lengthening and shortening of days and the bringing of heat and cold, lies in the conscious experience of us all. But few know that in addition to the sun's north-south excursions there are also east-west excursions. This fact is obscured by the daily rotation of the earth. The north-south excursions are brought about because the earth's axis of rotation is not perpendicular to the plane of its orbit. The east-west excursions are caused both by this non-perpendicularity and by the fact that the earth's orbit is not circular. The total annual motion of the sun, when both the north-south and east-west components are combined,is a large figure-eight, extending about 47 degrees north and south and 7 degrees east and west. This figure-eight has been called the analemma.

If in the tradition of Hipparchus, we define seasons in terms of the solstices and equinoxes, that is in terms of the extremes and mid-points of the solar excursions, then the analemma reveals that there are 12 seasons in the year. Referring to Figure I, the horizontal line is the equator, the intersection of the analemma at (D) represents the vernal equinox, March 21. The intersection at (K) represents the autumnal equinox, September 21. The vertical line is the zero-equation-of-time line. When the sun is on this line a sundial and standard clock will indicate the same time. There are four days a year when this is so: April 15 (E), June 14 (G), September 2 (J), and December 25 (B). These dates are the east-west "equinoxes". The northern

POMP7

extreme at (H) represents the summer solstice, the southern extreme at (A), the winter solstice. There are two eastern extremes and two western extremes, major in the southern lobe and minor in the northern. The major eastern "solstice" occurs at (C) on February 12, the minor eastern solstice occurs at (I) on July 27. The major western solstice occurs at (L) on November 4, and the minor western solstice occurs at (F) on May 15. Using the solstice/equinox method of Hipparchus, these 12 dates divide the year into 12 distinct, but unequal seasons.

TABLE 7.1 POSITIONAL SEASONS

BEGINNING DATE	ENDING DATE	LENGTH
Dec 25	Feb 12	49
Feb 12	Mar 21	37
March 21	April 15	25
April 15	May 14	29
May 14	June 14	31
June 14	June 22	8
June 22	July 27	35
July 27	Sept 3	38
Sept 3	Sept 21	18
Sept 21	Nov 4	44
Nov 4	Dec 21	47
Dec 21	Dec 25	4

This is the division of the year based on the extremes and zeros of position in δ and e

(12) seasons

These divisions certainly are not useful for rents, pay roll, interest calculations or most commercial uses of the calendar. But as will be seen, they are useful in delineating the east-west periods of the racing and dragging of time as well as the north-south periods of darkening and brightening. But there are other modes of dividing the year in accordance with the motion of the sun. Instead of the extremes and midpoints of position, as used by Hipparchus, the extremes and midpoints of motion can be used. The next table gives the dates on which the sun is moving fastest and slowest in the four cardinal directions.

Maximum velocity east	Dec 24/25
Maximum velocity west	Sep 16/17
Secondary maximum east	Jun 21/22
Secondary maximum west	Mar 27
Maximum velocity north	Mar 19
Maximum velocity south	Sep 27

Zero velocities occur at the respective solstices, i.e., for east/west:

Feb 12, May 14, July 27, Nov 4

For north/south:

Jun 22, Dec 21

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A division of the year using these dates gives the following seasons:

TABLE 7.2 MOTION SEASONS

Begin	End	Length
Dec 25	Feb 12	50
Feb 12	Mar 19	45
Mar 19	Mar 27	8
Mar 27	May 14	49
May 14	Jun 22	39
Jun 22	Jul 27	35
Jul 27	Sep 17	52
Sep 17	Sep 27	10
Sep 27	Nov 4	39
Nov 4	Dec 21	47
Dec 21	Dec 25	4

The division of the year based on the extremes and zeros of the velocities of e and ξ i.e. on $\dot{e}$ and $\dot{\xi}$

(11) seasons

The loss of a season is due to the fact that June 22 has a double role. It is the date on which the north-south velocity is zero and on which at the same time the eastward velocity is a maximum. This results in there being only 11 instead of 12 seasons. Six days, viz, Dec 25, Feb 12, May 14, Jun 22, Jul 27, Nov 4, and Dec 21 are both positional and motion key days and appear in both arrangements. What would the seasons look like if the positional and velocity dates were combined?

TABLE 7.3 POSITION/MOTION SEASONS
combines 7.1 and 7.2

(16) seasons

@lh 25;
PAMP2.WS1 BHD\WS J of Y PAMPHLET OCTOBER 10, 1986
NOVEMBER 13,1936

DIVISION OF THE YEAR: SEASONS OF THE ANALEMMA

The division of the year into analemmic seasons is based either on the dates in the analemma on which changes take place, viz: DEC 21, DEC 25, FEB 12, MAR 21, MAR 27, APR 15, MAY 14, JUN 14, JUN 22, JUL 27, SEP 2, SEP 17, SEP 21, and NOV 4, or on dates from one of the Golden Cycles (see below).

THE ANALEMMIC SEASONS ARE:

ADVENT	NOV 27	DEC 21
YULE	DEC 22	DEC 24
CHRISTMAS	DEC 25	JAN 5
EPIPHANY	JAN 6	FEB 2
CARNIVAL	FEB 3	FEB 11
LENT	FEB 12	MAR 20
PASCAL	MAR 21	MAR 27
BELTAIN	MAR 28	MAY 14
PENTACOST	MAY 15	JUN 14
LITHA	JUN 15	JUL 27
LAMMAS	JUL 28	SEP 16
GATHERING	SEP 17	OCT 30
HALLOWS	OCT 31	NOV 3
HARVEST	NOV 4	NOV 26

Four of the above seasons--YULE/CHRISTMAS, CARNIVAL, PASCAL, AND HALLOWS--are Seasons of Celebration i.e. periods of special observance.

In addition to the Seasons of Celebration there are Festivals or individual days of observance. These are days contained in one of the two "Golden Cycles", derived by means of the Golden Section from either the major east maximum change date (DEC 24/25) or the minor east maximum change date (JUN 21/22).

Primary Golden Cycle The Masculine or Christ Cycle		Secondary Golden Cycle The Feminine or Virgin Cycle	
DEC 25	INCARNATION	JUN 22	MIDSUMMER
AUG 6	TRANSFIGURATION	FEB 2	PURIFICATION
MAR 21	RESURECTION	SEP 17	ATONEMENT HOLY CROSS, ROODMAS
NOV 1	ALL HALLOWS	MAY 1	ASCENSION
JUN 14	CORPUS CHRISTI	DEC 13	ST. LUCIA
JAN 25	CONV. ST. PAUL	JUL 27	
SEP 3	[LABOR DAY]	MAR 8	
APR 15	[IRS DAY]	OCT 18	ST. LUKE
NOV 27	ADVENT(30)	MAY 30	VISITATION (31)
JUL 6	[4th OF JULY]	JAN 6	EPIPHANY
FEB 12	ASH WEDNESDAY	AUG 15	ASSUMPTION
SEP 29	MICHAELMAS	MAR 27	ANNUNCIATION (25)
MAY 14	PENTACOST	NOV 7	[OKTYABR]
DEC 25	INCARNATION	JUN 22	MIDSUMMER'

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The principal currently observed Festivals taken from the two Golden Cycles are:

CHRISTMAS	DEC 25
EPIPHANY	JAN 6
CANDLEMAS	FEB 2
ASH WEDNESDAY	FEB 12
EASTER	MAR 21
ASCENSION	MAY 1
PENTACOST	MAY 15
CORPUS CHRISTI	JUN 14
MIDSUMMER	JUN 22
TRANSFIGURATION	AUG 6
ATONEMENT	SEP 17
MICHAELMAS	SEP 29
HALLOWMAS	NOV 1
[THANKSGIVING]	NOV 26
ST. LUCIA	DEC 13

(15)

Methods of Delineating the Seasons

1) Solstice/Equinox Method
   Extremes of e, δ, zeros of $\dot{e}$, $\dot{\delta}$

2) Extremes of $\dot{e}$, $\dot{\delta}$, zeros of $\ddot{e}$, $\ddot{\delta}$
   Note that zeros of $\dot{e}$, $\dot{\delta}$ are the extremes of e, δ

3) Extremes of $\ddot{e}$, $\ddot{\delta}$, zeros of $\dddot{e}$, $\dddot{\delta}$
   Note that zeros of $\ddot{e}$, $\ddot{\delta}$ are the extremes of $\dot{e}$, $\dot{\delta}$

Delineation of Seasons
By Method 1)

Extremes of e, δ, zeros of e, δ

Key Dates:

e Max W	Nov 4 ✓	e max W	May 14 ✓
e Max E	Feb 12 ✓	e max E	Jul 27 ✓
δ Max N	Jun 22 ✓		
δ Max S	Dec 21 ✓		

zeros of e
Dec 25, ✓ Apr 15 ✓
Jun 14, ✓ Sep 2 ✓

zeros of δ
Mar 21 ✓
Sep 21 ✓

(12)

Seasons	Length
Nov 4 – Dec 21	47
Dec 22 – Dec 24	3
Dec 25 – Feb 12	50
Feb 13 – Mar 21	37
Mar 22 – Apr 15	26
Apr 16 – May 14	29
May 15 – Jun 14	30
Jun 15 – Jun 21	7
Jun 22 – Jul 27	35
Jul 28 – Sep 2	37
Sep 3 – Sep 21	18
Sep 22 – Nov 3	42

Harvest / Advent
Yule
Christmas / Epiphany
Lent

Annlemmic Days

Nov 4 – Dec 24	50	
Dec 24 – Feb 12	50	
Feb 12 – Mar 22	39	
Mar 22 – Mar 27	5	24
Mar 27 – Apr 15	19	
Apr 15 – May 14	29	
May 14 – Jun 14	31	
Jun 14 – Jun 22	8	
Jun 22 – July 27	35	
July 27 – Sept 2	37	
Sept 2 – Sept 17	15	29
Sept 17 – Sept 22	14	
Sept 22 – Nov 4	43	

From St. Andrew's Day, Nov 30
To Feb 2 Candlemas
= 25 + 12 + 28 = 64 days

Nov 30 inc – Dec 25 exc = 25 d
Dec 25 inc – Jan 6 exc = 12 d
Jan 6 inc – Feb 2 exc = 27 d

Christmas to Candlemas = 40 d
Roman Cans

40 days Advent to Epiphany

Delineation of Seasons
By Method 2)
Extremes of $\dot{e}, \dot{\delta}$, zeros of $\dot{e}, \dot{\delta}$

Key Dates.

$\dot{e}$ Max E	Dec 25	$\dot{e}$ max E	Jun 22
$\dot{e}$ Max W	Sep 17	$\dot{e}$ max W	Mar 27
$\dot{\delta}$ Max N	Mar 19		
$\dot{\delta}$ Max S	Sep 27		

zeros of $\dot{e}$ (extremes of e)
Nov 4, Feb 12, May 14, July

zeros of $\dot{\delta}$ (extremes of δ)
Dec 21
Jun 22

(11) SEASONS

NOV 4 - DEC 21	47	HARVEST/ADVENT
DEC 22 - DEC 24	3	YULE
DEC 25 - FEB 12	50	CHRISTMAS/EPIPHANY
FEB 13 - MAR 19	35	LENT
MAR 20 - MAR 27	8	EASTER
MAR 28 - MAY 14	47	
MAY 15 - JUN 22	39	
JUN 23 - JUL 27	35	
JUL 28 - SEP 16	50	
SEP 17 - Sep 27	10	
SEP 28 - NOV 3	39	

DELINEATION OF SEASONS

By METHOD 3)

Extremes of $\ddot{e}$, $\ddot{\delta}$, zeros of $\dot{e}$, $\dot{\delta}$

KEY DATES

$\ddot{e}$ MAX W	Feb 2	$\dot{e}$ max W	Aug 6
$\ddot{e}$ MAX E	Nov 15	$\dot{e}$ max E	May 9
$\ddot{\delta}$ Max N	Dec 22		
$\ddot{\delta}$ Max S	Jun 22		

zeros of $\dot{e}$
Dec 25, Sep 17
Jun 22, Mar 27

zeros of $\dot{\delta}$
Mar 19
Sep 27

(11) SEASONS

NOV 15 - DEC 21	36	ADVENT
DEC 22 - DEC 24	3	YULE
DEC 25 - FEB 2	40	CHRISTMAS/EPIPHANY
FEB 3 - MAR 19	45	LENT
MAR 20 - MAR 27	7	EASTER
MAR 28 - MAY 8	42	
MAY 9 - JUN 21	44	
JUN 22 - AUG 6	45	
AUG 7 - SEP 16	42	
SEP 17 - SEP 27	10	MICHAELMAS
SEP 28 - NOV 14	39	HARVEST

		OR
DEC 21 - BANS	YULE / CHRISTMAS	LAMMAS
FEB 2 - FEB 12	CARNIVAL	MIDSUMMER
SEP 16 - 27	MICHAELMAS	ALL HALLOWS
MAR 19 - 27	EASTER	

YANG when $\dot{e}$ is toward W

YIN when $\dot{e}$ is toward E

Darkening when $\dot{\delta}$ is toward S

Brightening when $\dot{\delta}$ is toward N

Speeding up when $\dot{e}$ is ↑ when $\dot{e} = \ddot{e}$ or $\dot{\delta} = \ddot{\delta}$

Slowing down when $\dot{e}$ is ↓ when $\dot{e} \neq \ddot{e}$

when $\dot{e} = \ddot{e}$ speeds

$\dot{e} \neq \ddot{e}$ slowing

G. Parameters

			e	$\dot{e}$	$\ddot{e}$	δ	$\dot{\delta}$	$\ddot{\delta}$	r	$\dot{r}$
1	A	DEC 25 - FEB 2	E	E	W	S	N	N	no change	
2	B	FEB 2 - FEB 12	E	E	W	S	N	N		
3	C	FEB 12 - MAR 19	E	W	W	S	N	N		
4	D	MAR 19 - MAR 21	E	W	W	S	N	S		
5	E	MAR 21 - MAR 27	E	W	W	N	N	S		
6	F	MAR 27 - APR 16	E	W	E	N	N	S		
7	G	APR 16 - MAY 15	W	W	E	N	N	S		
8	H	MAY 15 - JUN 14	W	E	E	N	N	S		
9	I	JUN 14 - JUN 22	E	E	E	N	N	S		
10	J	JUN 22 - JUL 27	E	E	W	N	S	S		
11	K	JUL 27 - AUG 6	E	W	W	N	S	S	no change	
12	L	AUG 6 - SEP 3	E	W	W	N	S	S		
13	M	SEP 3 - SEP 17	W	W	W	N	S	S		
14	N	SEP 17 - SEP 21	W	W	E	N	S	S		
15	O	SEP 21 - SEP 27	W	W	E	S	S	S		
16	P	SEP 27 - NOV 4	W	W	E	S	S	N		
17	Q	NOV 4 - DEC 21	W	E	E	S	S	N		
18	R	DEC 21 - DEC 25	W	E	E	S	N	N		

FOR NORTH TEMPERATE ZONE

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ANALEMMA.LS2 XPCHD\WS2000 JULY 8,1986

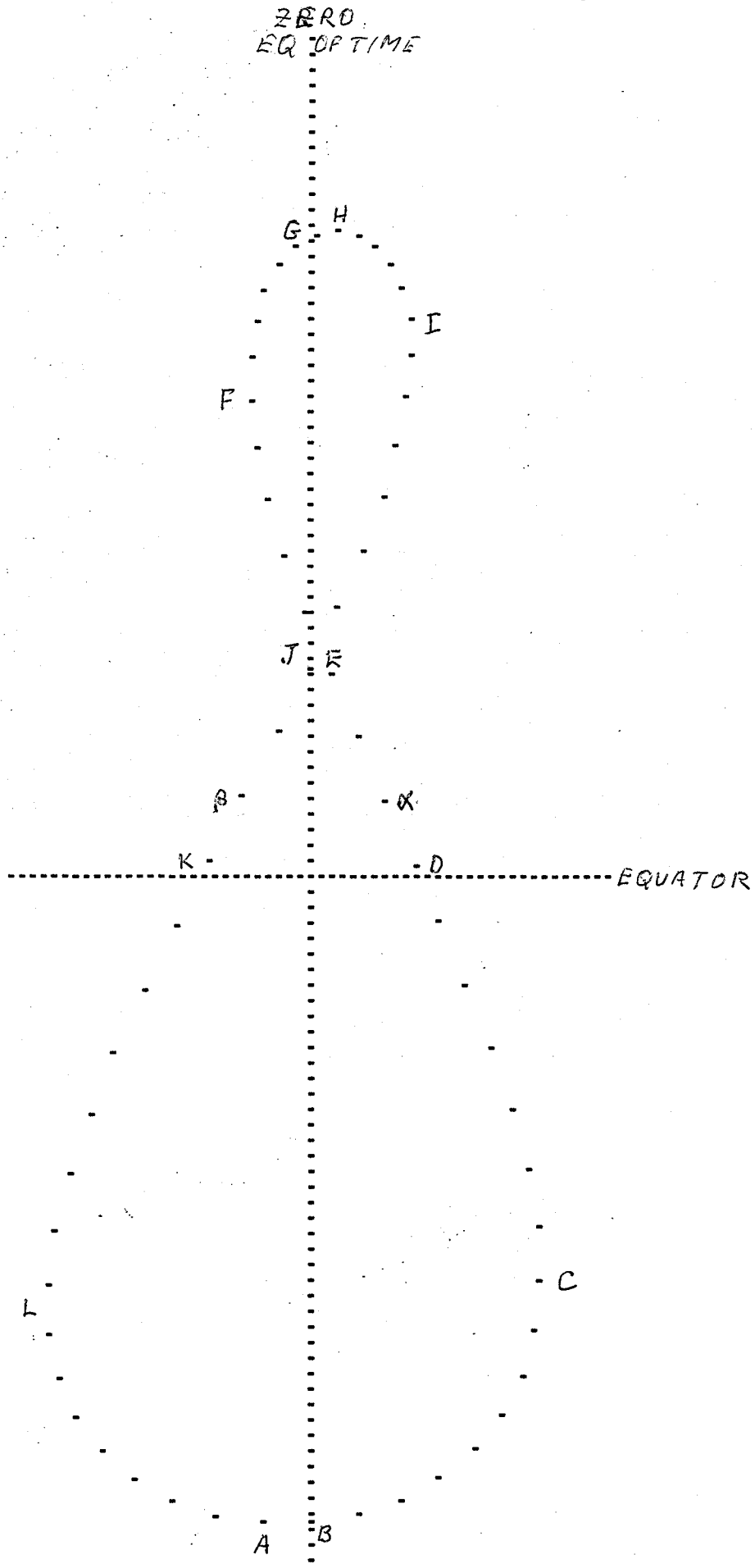
THE ANALEMMA AND ITS SEASONS

~~Although not a universal practice~~, The most natural and simplest division of the year ~~seems to be~~ into four seasons ~~the seasons~~ delineated by the solstices and equinoxes ~~by Hipparchus~~--Spring, Summer, Autumn, and Winter. This division matches well most natural phenomena manifested in the temperate zones. However, this quatenary division does not allow mapping of the fine structure ~~exhibited~~ of the physical changes in the cycle of the year. The present solar calendar makes up for this deficiency by superimposing on its basic structure a set of twelve divisions called months, (which are really pseudo-months having no correspondence with the actual cycles of the moon). With the aid of these months it has been possible to relate annualy changing physical phenomena to the calendar. This has not been true, however, for relating the moods, feelings and other quality specific aspects of time to the calendar. There is another way to go: Since the seasons are a solar phenomenon, related to the annual cycle of the sun, it is misleading to try to tie them to cycles of the moon, and even more misleading to pseudo-cycles of the moon. It is important to remain with the motions of the sun.

Hipparchus' contributions to our knowledge of the motions of the sun, great as they were, did not complete the description. It remained for astronomers of later times to develop deeper understanding. The sun's annual cycle from the winter solstice northward through the vernal equinox to the summer solstice, back through the autumnal equinox to the winter solstice causing the lengthening and shortening of days and the bringing of heat and cold, lies in the conscious experience of us all. But few know that in addition to the sun's north-south excursions there are also east-west excursions. This fact is obscured by the daily rotation of the earth. The north-south excursions are brought about because the earth's axis of rotation is not perpendicular to the plane of its orbit. The east-west excursions are caused both by this non-perpendicularity and by the fact that the earth's orbit is not circular. The total annual motion of the sun, when both the north-south and east-west components are combined,is a large figure-eight, extending about 47 degrees north and south and 7 degrees east and west. This figure-eight has been called the analemma.

If, in the tradition of Hipparchus, we define seasons in terms of the solstices and equinoxes, that is in terms of the extremes and ~~mid-points~~ zero-values of the solar excursions, then the analemma reveals that there are 12 seasons in the year. Referring to Figure I, the horizontal line is the equator, the intersection of the analemma at (D) represents the vernal equinox, March 21. The intersection at (K) represents the autumnal equinox, September 21. The vertical line is the zero-equation-of-time line. When the sun is on this line a sundial and standard clock will indicate the same time. There are four days a year when this is so: April 15 (E), June 14 (G), September 2 (J), and December 25 (B). These dates are the east-west "equinoxes". The northern

FIGURE I



extreme at (H) represents the summer solstice, the southern extreme at (A), the winter solstice. There are two eastern extremes and two western extremes, major in the southern lobe and minor in the northern. The major eastern "solstice" occurs at (C) on February 12, the minor eastern solstice occurs at (I) on July 27. The major western solstice occurs at (L) on November 4, and the minor western solstice occurs at (F) on May 15. Using the solstice/equinox method of Hipparchus, these 12 dates divide the year into 12 distinct, but unequal seasons.

TABLE 7.1 ~~SOLSTITIAL-EQUINOCTIAL~~ POSITIONAL SEASONS
THE POSITIONAL SEASONS

BEGINNING DATE	ENDING DATE	LENGTH
Dec 25	Feb 12	49
Feb 12	Mar 21	37
March 21	April 15	25
April 15	May 14	29
May 14	June 14	31
June 14	June 22	8
June 22	July 27	35
July 27	Sept 3	38
Sept 3	Sept 21	18
Sept 21	Nov 4	44
Nov 4	Dec 21	47
Dec 21	Dec 25	4

(12)

~~MAX-MIN POSITION~~

~~e/δ Division~~
~~Max and min of e and δ~~
~~(min = 0)~~

The division of the year based on the extremes and zeros of position in e and δ

365

These divisions certainly are not useful for rents, pay roll, interest calculations or most commercial uses of the calendar. But as will be seen, they are useful in delineating the east-west periods of the racing and dragging of time as well as the north-south periods of darkening and brightening. But there are other modes of dividing the year in accordance with the motion of the sun. Instead of the extremes and ~~midpoints~~ zeros of position, as used by Hipparchus, the extremes and ~~midpoints~~ zeros of motion, or velocity, can be used. The next table gives the dates on which the sun is moving fastest and slowest in the four cardinal directions. (or velocity)

Maximum velocity east	Dec 24/25	
Maximum velocity west	Sep 16/17	(at β)
Secondary maximum east	Jun 21/22	
Secondary maximum west	Mar 27	(at α)
Maximum velocity north	Mar 19	
Maximum velocity south	Sep 27	

Zero velocities occur at the respective solstices, i.e., for east/west:

Feb 12, May 14, July 27, Nov 4

For north/south:

Jun 22, Dec 21

A division of the year using these dates gives the following eleven seasons:

~~MAX MIN~~

TABLE 7.2 The MOTION SEASONS The $\dot{e}, \dot{\delta}$ DIVISION Max-Min of $\dot{e}$ and $\dot{\delta}$ (min = 0)

Begin	End	Length
Dec 25	Feb 12	~~50~~ 49
Feb 12	Mar 19	~~45~~ 35
Mar 19	Mar 27	8
Mar 27	May 14	~~49~~ 48
May 14	Jun 22	39
Jun 22	Jul 27	35
Jul 27	Sep 17	52
Sep 17	Sep 27	10
Sep 27	Nov 4	~~37~~ 38
Nov 4	Dec 21	47
Dec 21	Dec 25	4

~~366~~ 365

The division of the year based on the extremes and zeros of the velocities of e and δ (i.e. $\dot{e}$ and $\dot{\delta}$)

(11)

The loss of a season is due to the fact that June 22 has a double role. It is the date on which the north-south velocity is zero and on which at the same time the eastward velocity is a maximum. This results in there being only 11 instead of 12 seasons. Six days, viz, Dec 25, Feb 12, May 14, Jun 22, Jul 27, Nov 4, and Dec 21 are both positional and motion key days and appear in both ~~arrangements~~ divisions. What would the seasons look like if the positional and ~~velocity~~ motion dates were combined?

~~MAX MIN~~

TABLE 7.3 The POSITION-MOTION SEASONS The e, $\dot{e}$ δ, $\dot{\delta}$ DIVISION

BEGIN	END	LENGTH
DEC 25	FEB 12	49
FEB 12	MAR 19	35
MAR 19	MAR 21	2
MAR 21	MAR 27	6
MAR 27	APR 15	19
APR 15	MAY 14	29
MAY 14	JUN 14	31
JUN 14	JUN 22	8
JUN 22	JUL 27	35
JUL 27	SEP 3	38
SEP 3	SEP 17	14
SEP 17	SEP 21	~~10~~ 4
SEP 21	SEP 27	6
SEP 27	NOV 4	~~39~~ 38
NOV 4	DEC 21	47
DEC 21	DEC 25	4

365

The division of R year based on R extremes and zeros of e, $\dot{e}$, δ, and $\dot{\delta}$

(16)

~~SIXTEEN SEASONS CHARACTERIZED WITH POSITIONS OF MOTION CHANGE~~
~~MAX-MIN OF POSITIONS OR MOTIONS.~~

PAMP2.WS1 BHD•WS J of Y PAMPHLET OCTOBER 10, 1986
NOVEMBER 13,1936

DIVISION OF THE YEAR: SEASONS OF THE ANALEMMA

The division of the year into analemmic seasons is based either on the dates in the analemma on which changes take place, viz: DEC 21, DEC 25, FEB 12, MAR 21, MAR 27, APR 15, MAY 14, JUN 14, JUN 22, JUL 27, SEP 2, SEP 17, SEP 21, and NOV 4, or on dates from one of the Golden Cycles (see below).

THE ANALEMMIC SEASONS ARE:

ADVENT	NOV 27	DEC 21
YULE	DEC 22	DEC 24
CHRISTMAS	DEC 25	JAN 5
EPIPHANY	JAN 6	FEB 2
CARNIVAL	FEB 3	FEB 11
LENT	FEB 12	MAR 20
PASCAL	MAR 21	MAR 27
BELTAIN	MAR 28	MAY 14
PENTACOST	MAY 15	JUN 14
LITHA	JUN 15	JUL 27
LAMMAS	JUL 28	SEP 16
GATHERING	SEP 17	OCT 30
HALLOWS	OCT 31	NOV 3
HARVEST	NOV 4	NOV 26

Four of the above seasons--YULE/CHRISTMAS, CARNIVAL, PASCAL, AND HALLOWS--are Seasons of Celebration i.e. periods of special observance.

In addition to the Seasons of Celebration there are Festivals or individual days of observance. These are days contained in one of the two "Golden Cycles", derived by means of the Golden Section from either the major east maximum change date (DEC 24/25) or the minor east maximum change date (JUN 21/22).

FESTIVAL CYCLES

Primary Golden Cycle The Masculine or Christ Cycle		Secondary Golden Cycle The Feminine or Virgin Cycle	
DEC 25	INCARNATION	JUN 22	MIDSUMMER
AUG 6	TRANSFIGURATION	FEB 2	PURIFICATION
MAR 21	RESURECTION	SEP 17	ATONEMENT HOLY CROSS
NOV 1	ALL HALLOWS	MAY 1	ASCENSION
JUN 14	CORPUS CHRISTI	DEC 13	ST. LUCIA 12th Lady of Guadalupe
JAN 25	CONV. ST. PAUL	JUL 27	
SEP 3	[LABOR DAY]	MAR 8	
APR 15	[IRS DAY]	OCT 18	ST. LUKE
NOV 27	ADVENT(30)	MAY 30	VISITATION (31)
JUL 6	[4th OF JULY]	JAN 6	EPIPHANY OSIRIS
FEB 12	ASH WEDNESDAY	AUG 15	ASSUMPTION
SEP 29	MICHAELMAS	MAR 27	ANNUNCIATION (25)
MAY 14	PENTACOST	NOV 7	[OKTYABR]
DEC 25	INCARNATION	JUN 22	MIDSUMMER

SEASONS2.WS2 ~~BHDAWS2000~~ JOURNEYBOOK J of Y PAMPHLET NOVEMBER 12, 1986
SEASONS2.WS2 SEPTEMBER 8,1986

	SEASON	FESTIVAL	DATE
length			
22	ADVENT		
	YULE		
p	CHRISTMAS	CHRISTMAS	DEC 25
	EPIPHANY		
	CARNIVAL		
	LENT		
(14)	PASSIONTIDE	EASTER	[MAR 21]
	BELTANE	BELTANE	MAY1
	PENTACOST		
	LITHA	MIDSUMMER	JUN 22
	LAMMAS	TRANSFIGURATION	AUG 6
	GATHERING	MICHAELMAS	SEP 29
	HALLOWS		
	HARVEST	THANKSGIVING	NOV 27

TRANSITION		DATE
ST ANDREWS (30)	c	NOV 27
SOLSTICE	a,b	DEC 22
CHRISTMAS	a,b	DEC 25
EPIPHANY	c	JAN 6
CANDLEMAS/BRIDGIT	c	FEB 2
ASH WEDNESDAY	a,b	[FEB 12]
PALM SUNDAY	c	[MAR 14]
	b	MAR 28 27
PENTACOST	a,b	MAY 15
E = O	a,b	JUN 14
MAX EAST	a,b	JUL 27
	b	SEP 16
HALLOWEEN	c	OCT 31
E MAX W	a,b	NOV 4
ST. ANDREWS	c	NOV 30

In This Division
a is an e, δ
b is an ė, δ
c is other

!!

SEASONS2.WS2 SEPTEMBER 8,1986

LENGTH	SEASON	FESTIVAL	DATE	TRANSITION	DATE
22	ADVENT				
				YULE/SOLSTICE	DEC 22
16	CHRISTMAS	CHRISTMAS	DEC 25		
				EPIPHANY	JAN 6
26	WINTER				
				CANDLEMAS/BRIDGIT	FEB 2
8	CARNIVAL				
				ASH WEDNESDAY	[FEB 12]
30	LENT				
				PALM SUNDAY	[MAR 14]
32	PASSIONTIDE	EASTER	[MAR 21]		
				E = Ø	APR 15
30	BELTANE	BELTANE	MAY1		
				PENTACOST	MAY 15
30	SPRING				
				E = Ø	JUN 14
43	SUMMER	LITHA	JUN 22		
				MAX EAST	JUL 27
37	LAMMAS	TRANSFIGURATION	AUG 6		
				E = Ø	SEP 2
63	AUTUMN	MICHAELMAS	SEP 29 or ~~sept 17th~~		
				HALLOWS	NOV 4
26	HARVEST	THANKSGIVING			
				ST. ANDREWS	NOV 30 or 27th

or AUTUMN
FALL
GIVING 13

SEP 2 – OCT 5 33
OCT 5 – NOV 4 30

!

THE SEASONS

INTERFACE DATES

WINTER	NOV 27	ADVENT
	DEC 21	CHRISTMAS — DEC 21 – 25 YULE
	JAN 6	~~WINTER~~ EPIPHANY
	FEB 2	CARNIVAL
	FEB 12	LENT
	MAR 21	EASTER
SPRING	MAR 27 (MAR 15)	~~SPRING~~ BELTANE
	MAY 15	
	JUN 14	LITHA
	JUN 22	
SUMMER	JUL 27	LAMMAS
	AUG 6	
	SEP 17 (SEP 9)	
AUTUMN	NOV 4	HARVEST
	NOV 27	

FESTIVALS

DEC 25
MAR 21
MAY 1
JUN 22
AUG 6
SEP 17
NOV 1

INTERSTITIALS

Feb 1 IMBOLG or BRIGHID
May 1 BELTANE or CETSHAMHAIN
Aug 1 LUGHNASADH
Nov 1 SAMHAIN

SEP 17
OCT 31 > HALLOWS or SAMHAIN
NOV 4

Book of Season

SEASONS OF HIPPARCHUS - commonly the 4 SEASONS

CELTIC CROSS-QUARTERS

EARTH - AIR - FIRE - WATER PERIODS

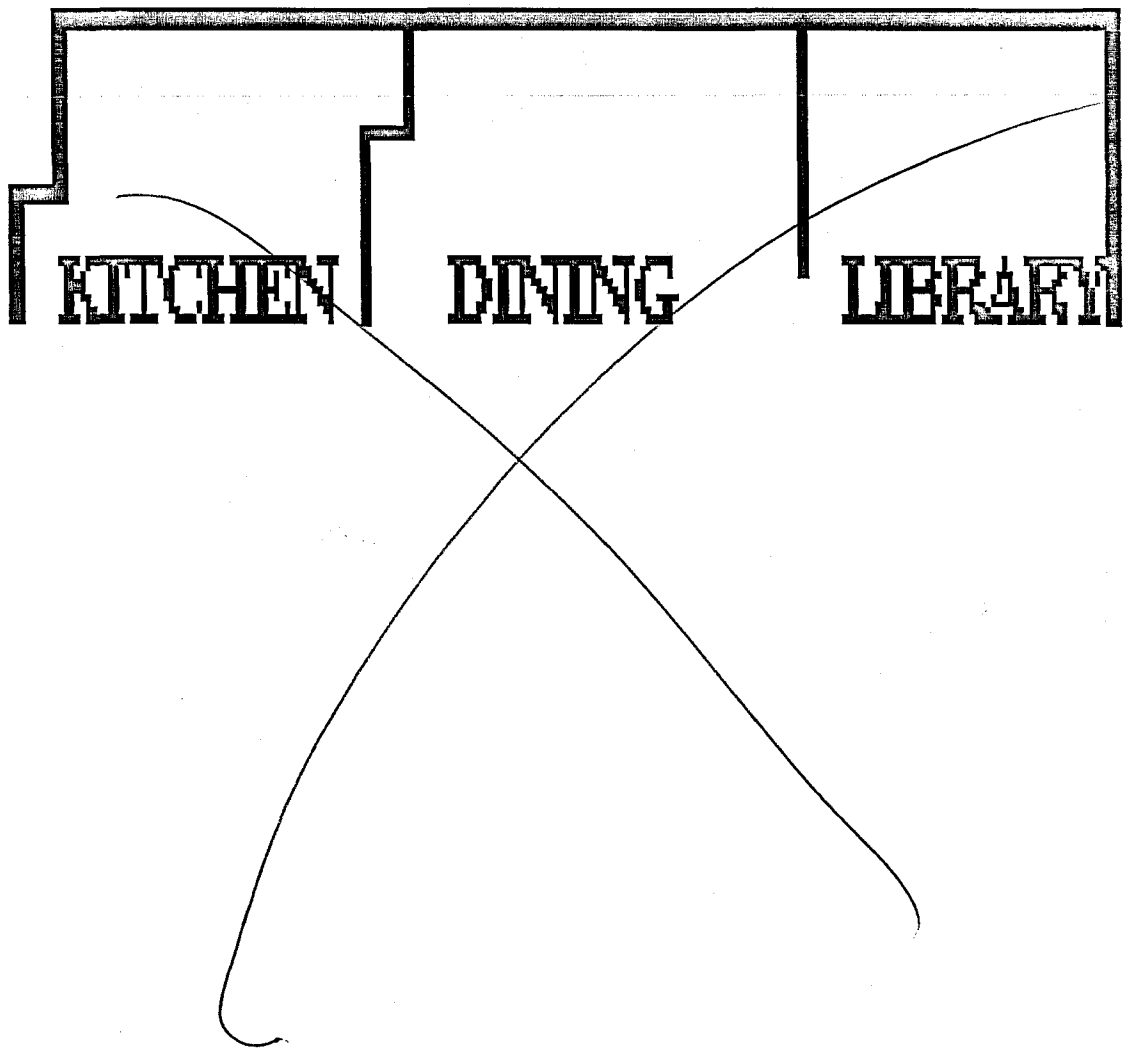
ANALEMMIC DATES
E/W and N/S · darkness/delay

2 GOLDEN CYCLES

THE FESTIVALS (SEVERAL DAYS)

THE CELEBRATIONS SINGLE DAYS

THE TRANSITIONS


KITCHEN
DINING
LIBRARY

North-South dominant

DEBBONS

Winter Dec 25 - Feb 2 Christmas - Epiphany

Spring March 27 - May 15 Easter - Pentecost

Summer Jun 14 - Jul 27

Autumn Sep 27 - Nov 4

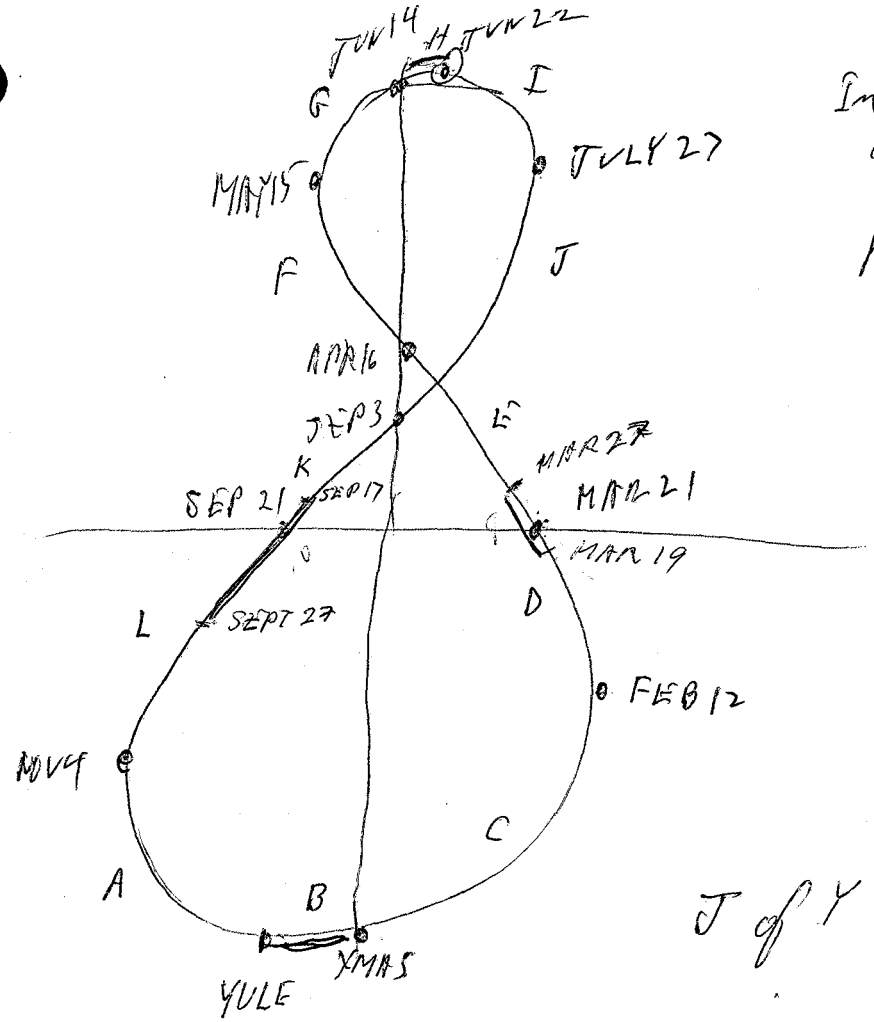
EAST-WEST dominate

Advent Nov 27 - Dec 21
Christmas Dec 21 - Dec 26

Passiontide Mar 19 - Mar 27
Pentecost May 15 - Jun 14

Michaelmas Sep 17 - Sep 29
Harvest Nov 4 - Nov 27

12 seasons



In addition aphelion & perihelion

$\ddot{e} = 0$ AUG 8 FEB 2

Use
$\dot{e}$, δ
$\ddot{e}$, $\ddot{\delta}$

MAX accel $\dddot{e} = 0$

EAST NOV 15 MAY 9

WEST FEB 2 AUG 6

or max $\dot{\delta}$

SEPT 17/16 } MAX W
MAR 27

MAR 19 $\dot{\delta}$ N
SEPT 27 $\dot{\delta}$ S

J of Y ≠ Astrology
≠ Lunar Calendar

e E or W δ N or S
↓ or ↑ ↓ or ↑

A liturgical Year is like a musical composition

16

	$\dot{e}$	e	δ
A	E	↓W	S ↑
B	E	↓W	N ↓
C	E	↑E	N ↓
D	W	↓E	N ↓
E	W	↓W	N ↑
F	W	↑	N ↑

	e	δ
G	E ↓	N ↑
H	E ↑	N ↑
I	E ↑	S ↓
J	W ↓	S ↓
K	W ↑	S ↓
L	W ↑	S ↑

Maybe $\dot{e}$, $\dot{\delta}$ or $\ddot{e}$ $\ddot{\delta}$ more important than ↑ ↓ --
4 unrealized values

E ↑ S ↑
E ↓ S ↓
W ↓ S ↑
W ↑ N ↓

e $\dot{e}$ δ $\dot{\delta}$

$\dot{e}$ E Y I N
$\dot{e}$ W Y A N G

$\ddot{e}$ + speeding
- slowing

At Math Temp
$\dot{\delta}$ S
$\dot{\delta}$ N

darkening $\ddot{\delta}$ speeding
brightening $\dot{\delta}$ slowing

~~Loose as hell~~

~~Dizzy [illegible]~~

~~→ more laugh~~

THE SEASONS OF THE ANALEMMA

A	N	E
T	S	W

8 seasons

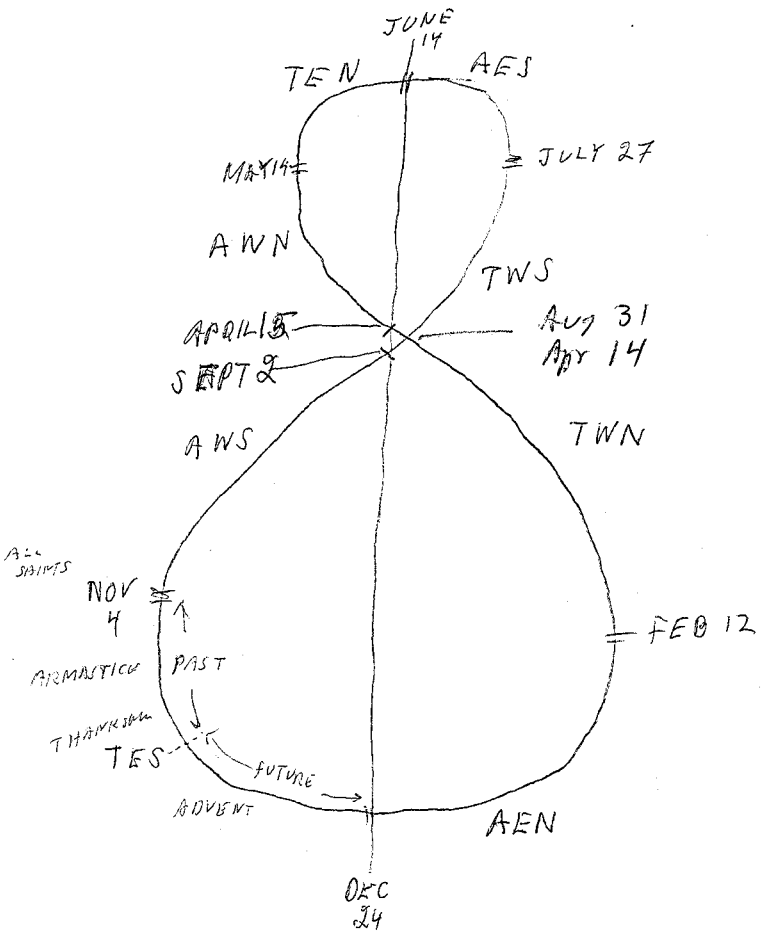
In Search of the Analemma

A = away
T = toward

N = North
S = South
} polar with limits

E = East
W = West
} Directions with no poles or limits

When E > S or E > N etc.



N/S is a cycle used for E/W motion we must have a pawl so that E/W is not cyclical but truly growth

innovating
repairing

2

W X E Future - imagining - Anticipation - Planning
E X W PAST - Evaluation - Recollection - Integration

INHALING
EXHALING

saving - storing - T introversion - single - resting - centralizing containing
spending - releasing - A extroversion - collective - acting - diffusing

sowing - teleological N - brightening - clarifying - optimism - hopeful
reaping - deterministic S - darkening - mystifying - pessimism - resigned

ANE Epiphany - Candlemas
~~Carnival~~

TNW Mardi Gras, Lent

ANW Easter

TNE PENTACOST MEMORIA DAY
CORPUS CHRISTI
ASCENSION

ASE JULY, JULY 14

TSW TRANSFIGURATION

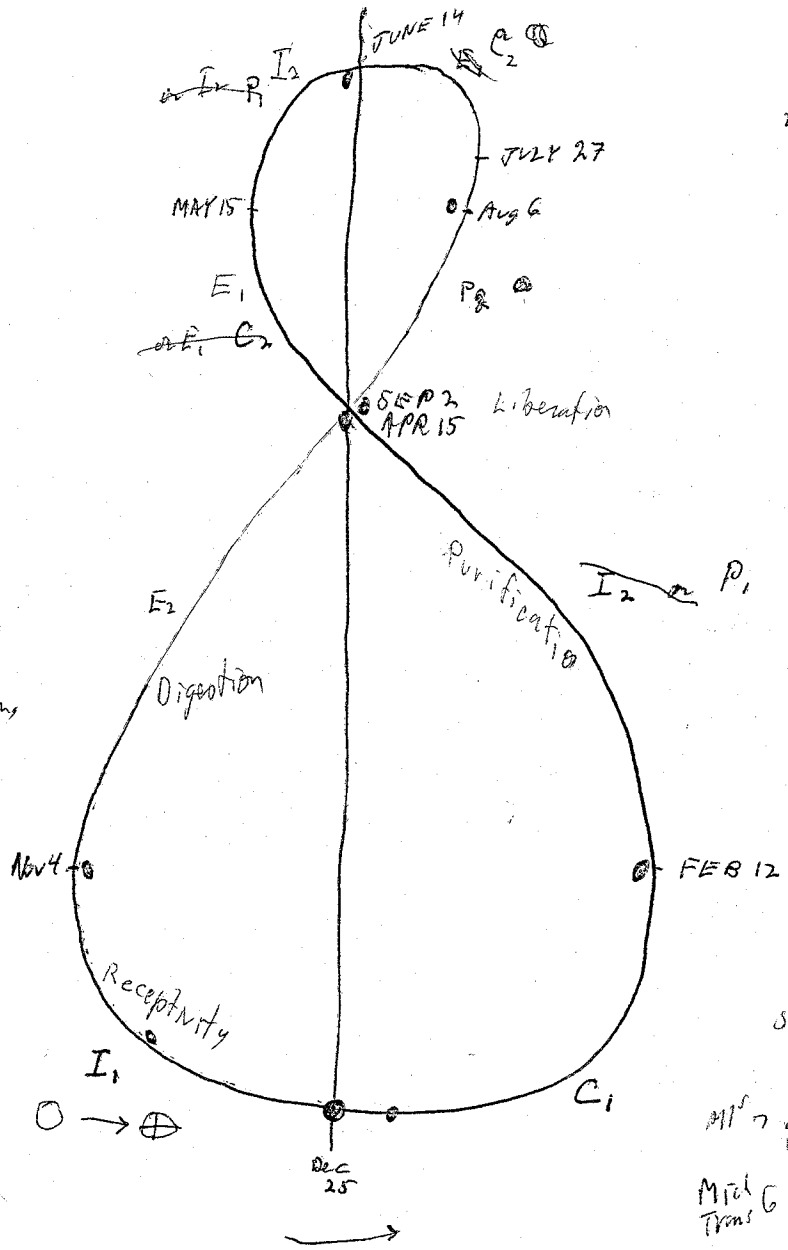
ASW MICHAELMASS
HALLOWEEN

TSE ARMISTICE
THANKSGIVING
ADVENT

Some other parameter is involved

3. $\frac{dS}{dE}$

Find Dates for Hocktide
St. Swithins
St. Agnes Jan 21?
Lady Day



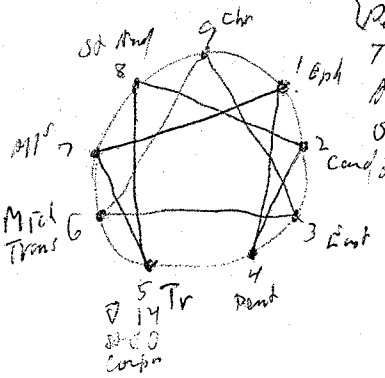
1 ⊖ → ⊕
2 ⊕ → ⊖

Assume
I_1, C_1, I_2
are correct.

or Should
we have
$C_2 P_2 E_2 P_1 E_1 I_1$
cf. Enneagram
3 fixed
6 interlock

Fixed
Easter
Christmas
June 14 or Michaelmas
Epiph
Candlemas
{Whitsunday
Pentecost}
Transfig
All Saints
St. Andrew

1 4 2 8 5 7



1 is cosmic
2 is terrestial

Lost what is occurring
in ⊕ in ⊖
in each period
I_1 ⊖ → ⊕
C_1 begin I_1
P_1 ~

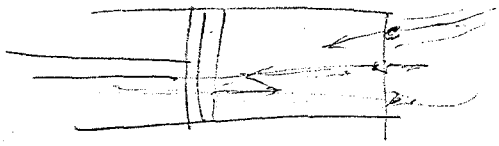
OTTO CYCLE

→ East
Motion East is ~ Yin
West is ~ Yang

I = Intake
C = Compression
P = Power
E = Exhaust

Receptivity

Motion toward Eq=0 is ~ expanding cylinder in Otto Cycle
Motion from Eq=0 is ~ compressing cylinder in Otto Cycle



Psychological Attributes: SEASONS OF CHANGE

δ S ≁ δ N — δ S Jun 22 – Dec 21, δ N Dec 21 – Jun 22

Light/Dark

δ̈ ↑ ≁ δ̈ ↓ — δ̈ ↑ ~~Sep 27 – Mar 19, δ̈~~

δ̈ ↑ i.e. δ̈ = δ̇
Dec 21 – Mar 19 and Jun 22 – Sep 27

δ̈ ↓ i.e. δ̈ ≠ δ̇
Mar 19 – Jun 22 and Sep 27 – Dec 21

Masculine/Feminine

ė E ≁ ė W — ė E Nov 4 – Feb 12, and May 15 – Jul 27
ė W Feb 12 – May 15, and Jul 27 – Nov 4

ë ↑ ≁ ë ↓ — ë ↑ i.e. ë = ė
WW Feb 12 – Mar 27, EE May 15 – Jun 22
WW Jul 27 – Sep 17, EE Nov 4 – Dec 25

CODE: ė ë / EW

ë ↓ i.e. ë ≠ ė
EW DEC 25 – FEB 12, EW Jun 22 – JUL 27
WE MAR 27 – MAY 15, WE SEP 17 – NOV 4

TABLE I

ë ↑ and δ̈ ↑
WW Feb 12 – Mar 19 ✓ LENT
EE Dec 21 – Dec 25 ✓ YULE
WW Jul 27 – Sep 17 ✓

ë ↓ and δ̈ ↓
WE MAR 27 – MAY 15 ✓
WE SEP 27 – NOV 4 ✓

ë ↑ and δ̈ ↓
WW MAR 19 – MAR 27 ✓ EASTER
EE MAY 15 – JUN 22 ✓
EE NOV 4 – DEC 21 ✓ HARVEST/ADVENT

ë ↓ and δ̈ ↑
EW DEC 25 – FEB 12 ✓ CHRISTMAS/EPIPHANY
EW JUN 22 – JUL 27 ✓
WE SEP 17 – SEP 27 ✓ MICHAELMAS

ë ↑ or δ̈ ↑
~~NOV 27~~ – MAR ~~27~~ 27
~~MAR 27~~ – MAY 15 – SEP 27
~~JUN 22 – SEP 27 NOV 4~~

ë ↓ OR δ̈ ↓
SEP 17 – DEC 21
DEC 25 – FEB 12
MAR 19 – JUL 27

ë ↑ or δ̈ ↓
FEB 12 – JUN 22
JUL 27 – SEP 17
SEP 27 – DEC 25

ë ↓ and δ̈ ↑
DEC 21 – MAR 19
MAR 27 – MAY 15
JUN 22 – NOV 4

AMINOHEALTH is a free form amino acid formula containing 19 naturally occuring amino acids. Amino acids can be likened to "building blocks" which make up larger polypeptides and proteins. Included in these 19 are the ten essential amino acids, which the body cannot biosynthesize and must obtain from external sources such as food stuffs or supplements. Each Aminohealth capsule contains 815 or 407 milligrams of free form amino acids in the form of a free flowing powder. There are no fillers, binders, preservatives, sugars or food colorings in Aminohealth. Because each amino acid is represented in its singular free form (free meaning not within longer protein chains) no predigestion is required by the body, thus facilitating rapid absorption into the blood stream which then bathes the surrounding tissues. The tissues can absorb only those amino acids which possess the L-configuration; by starting with a free amino acid mixture in which all amino acids are in their L-conformation absorption and utilization is further accentuated, unlike that of a predigested powder. Each amino acid has been isolated to its purest form as a result they have none of the potentially allergenic features of the sources from which they were derived. These are pure, individual amino acids and should not be confused with animal, milk, or vegetable hydrolysates. These hydrolysates, proteins hydrolyzed with heat, acids or enzymes, retain the characteristics of their sources and must be further predigested, via one's individual body chemistry, down into their constitutent amino acids before being completely absorbed into the blood stream. The DL form of the predigested protein molecules with the exception of DL-Methionine cannot be absorbed by the body. Because all amino acids are in the L-form in Aminohealth complete absorption and utilization is possible. Once into the body Aminohealth goes on to aid in the formation of tissues, enzymes, vitamins, neurotransmitters, and in a broad sense participates in every major body process. Aminohealth provides the optimum therapeutic level of the 19 amino acids for most individuals, within certain limits of variation, to assist in maintaining the body functions.

INDIVIDUAL FREE FORM AMINO ACIDS are as their names imply represented as seperate molecules (L-Free form only) opposed to a balanced formula such as Aminohealth. Each of the amino acids are in the form of a loose (non-encapsulated) powder. In special cases, as recommended by a consulting nutritionist, these individuals serve as a specialized accessory to the Aminohealth formula.

Vitamin and mineral therapy in conjunction with amino acid therapy is very important in that the former serve as catalysts for many of the biochemical reactions occuring in the body. In many cases they promote the uptake and function of the amino acids in the body.

As Rosenberg observed in 1959:

> "Amino acid supplementation of foods and feeds brings about many beneficial results. Of practical importance in the attainment of a better balanced protein and, thereby of a better balanced diet, an extension of savings of the available protein supply, and an improvement in the efficiency of protein and food utilization."

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SEASONS OF CHANGE (~~W~~ SEASONS OF MAX-MAN)

~~Hipparchus~~ — δ only: MAR 21, SEP 21 — δ̇ only: JUN 22, DEC 21

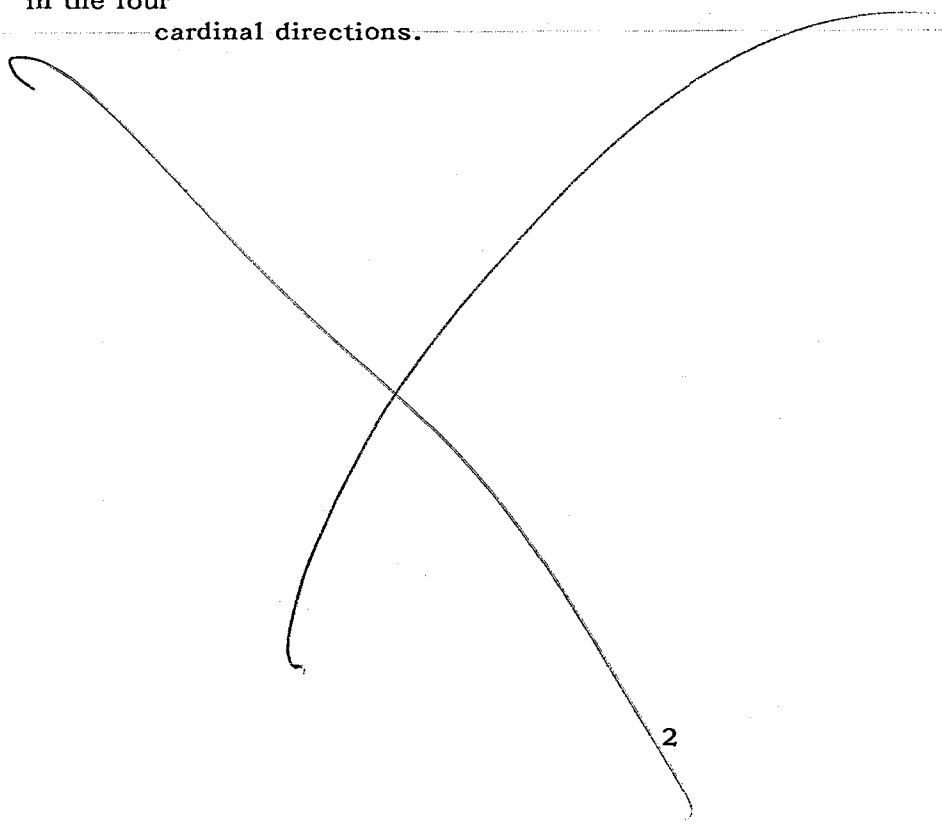
I — δ ~~and~~ δ̇ — HIPPARCHUS SEASONS
MAR 21
JUN 22
SEP 21
DEC 21

e only: APR 15, JUN 14, SEP 3, DEC 25 — ė only: FEB 12, MAY 15, JUL 27, NOV 4

II — e or ė
FEB 12
APR 15
MAY 15
JUN 14
JUL 27
SEP 3
NOV 4
DEC 25

III — e or δ: MAR 21, APR 15, JUN 14, SEP 3, SEP 21, DEC 25 — ė or δ̇: FEB 12, MAY 15, JUN 22, JUL 27, NOV 4, DEC 21

and brightening. But there are other modes of dividing the year in accordance with the position, the motion of the sun. Instead of the extremes of gives the dates extremes of motion can be used. The next table in the four on which the sun is moving fastest and slowest cardinal directions.



SEASONS OF CHANGE

change in ɐ or ɛ or ɔ

(12)

FEB 12
MAR 21
APR 16
MAY 15
JUN 14
JUN 22
JUL 27
SEP 3
SEP 21
NOV 4
DEC 21
DEC 25

SAME AS MAX-MIN POSITION

ë	ë or e	ë or é	e or é or ë
MAR 27	MAR 27	FEB 12	FEB 12
~~SEP 17~~	APR 15	MAR 27	MAR 27
~~JUN 22~~	(7) JUN 14	(8) MAY 15	APR 15
SEP 17	JUN 22	JUN 22	MAY 15
DEC 25	SEP 3	JUL 27	(12) JUN 14
	SEP 17	SEP 17	JUN 22
	DEC 25	NOV 4	JUL 27
		DEC 25	SEP 3
			SEP 17
			NOV 4
			DEC 21
			DEC 25

ð	ð or ð	ð or ð	ð or ð or ð
MAR 19	MAR 19	MAR 19	MAR 19
SEP 27	MAR 21	JUN 22	(6) MAR 21
	SEP 21	SEP 27	JUN 22
	SEP 27	DEC 21	SEP 21
			SEP 27
			DEC 21

ë or ð

MAR 19 } EASTER
MAR 27 }
JUN 22 MIDSUMMER
SEP 17 } MICHAELMAS
SEP 27 }
DEC 25 CHRISTMAS

⇒ .. are the significant ones

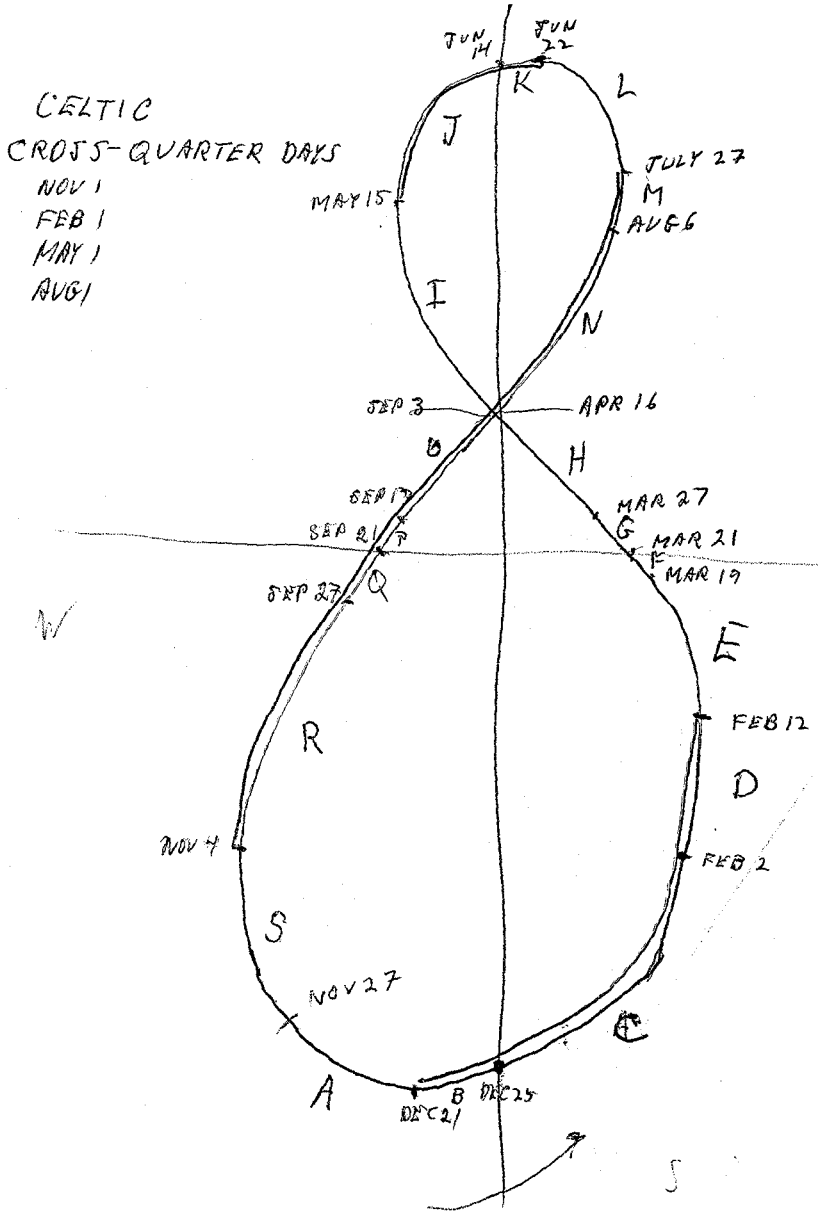
If in the tradition of Hipparchus, we define seasons in terms of the solstices and equinoxes, that is in terms of the extremes and mid-points of the solar excursions, then the analemma reveals that there are 12 seasons in the year. Referring to Figure I, the horizontal line is the equator, the intersection of the analemma at (D) represents the vernal equinox, March 21. The intersection at (K) represents the autumnal equinox, September 21. The vertical line is the zero-equation-of-time line. When the sun is on this line a sundial and standard clock will indicate the same time. There are four days a year when this is so: April 15 (E), June 14 (G), September 2 (J), and December 25 (B). These dates are the east-west "equinoxes". The northern

extreme at (H) represents the summer solstice, the southern extreme at (A), the winter solstice. There are two eastern extremes and two western extremes, major in the southern lobe and minor in the northern. The major eastern "solstice" occurs at (C) on February 12, the minor eastern solstice occurs at (I) on July 27. The major western solstice occurs at (L) on November 4, and the minor western solstice occurs at (F) on May 15. Using the solstice/equinox method of Hipparchus, these 12 dates divide the year into the following seasons:

BEGINNING DATE	ENDING DATE	LENGTH
March 22	April 14	24
April 15	May 14	30
May 15	June 14	31
June 15	June 21	7
June 22	July 26	35
July 27	Sept 2	38
Sept 3	Sept 21	19
Sept 22	Nov 3	43
Nov 4	Dec 21	48
Dec 22	Dec 24	3
Dec 25	Feb 11	49
Feb 12	March 21	38

These divisions certainly are not useful for rents, pay roll, interest calculations or most commercial uses of the calendar. But as will be seen, they are useful in delineating the east-west periods of the spurting and dragging of time as well as the north-south periods of darkening

THE SEASONS and THE FESTIVALS ṡ, ė Golden Ratio



CELTIC CROSS-QUARTER DAYS
NOV 1
FEB 1
MAY 1
AUG 1

notate
Zones of Conflict/Neutral/Barrier
rotation
A Advent
G Lent
F PASSIONTIDE and EASTER are in conflict, tension
H SPRING FEVER
I " "
L SUMMER ODORUMS
S Remembrance/Nostalgia Harvest

translate
Zones of Reinforcement, intensified in RED
B
C
D carnival
J Pentecost
K Baptism
M Transfiguration
N "
O High Holy Days
P
Q
R Halloween

A Advent
B Christmas
C Winter
D Carnival
E Lent
F Passiontide
G Easter
H Spring
I ~~Beltaine~~ or Spring
J Pentecost
K Summer
L Summer

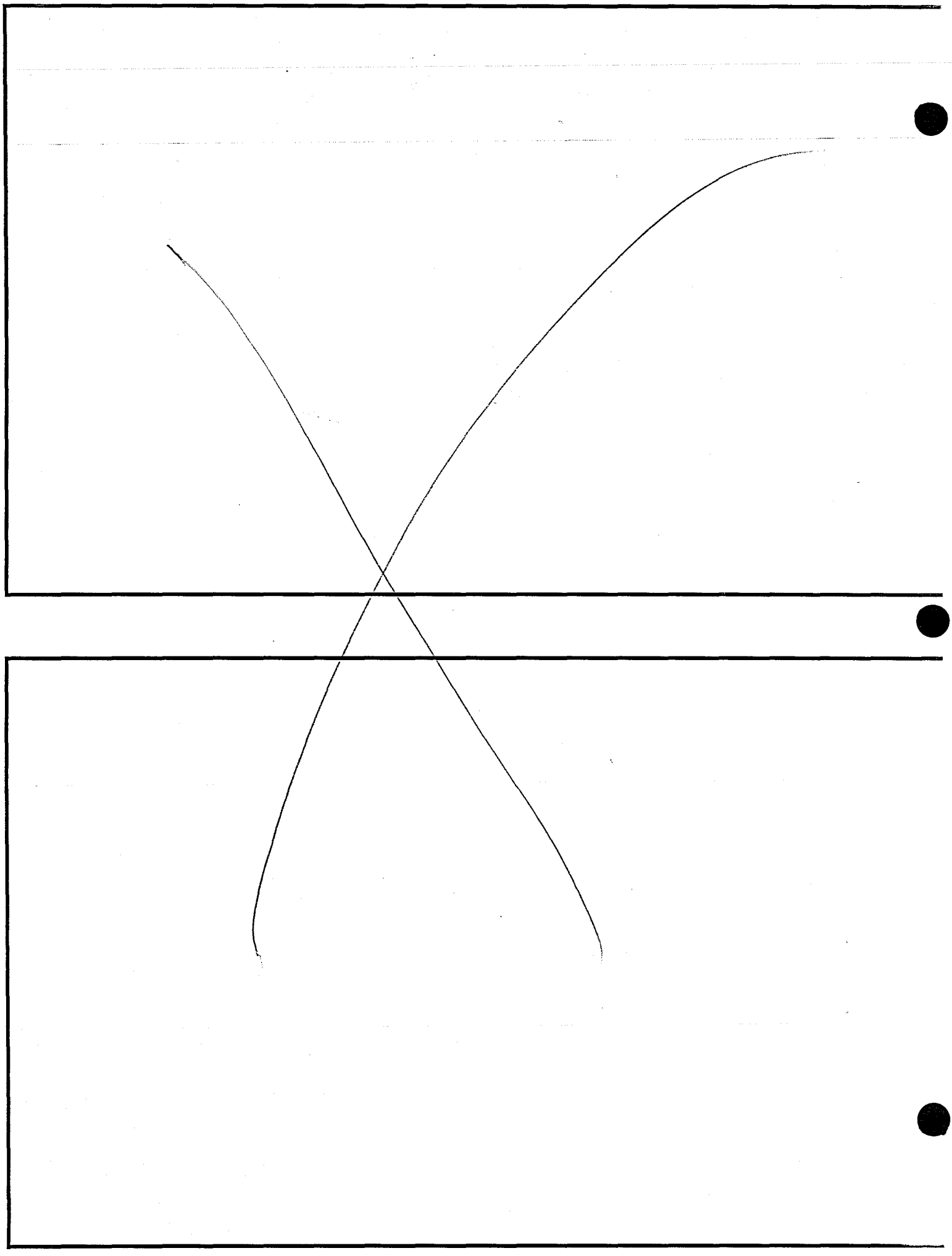
M Lammas
N Lammas
O Lammas
P Michaelmas
Q Michaelmas
R Autumn
19 S Harvest

Most Vital Periods for action or Reflection in RED

Vital Action B, C, D and M, N, O, P, Q, R

Vital Reflection Evaluation J K

Others are Neutral



	days from Jan 1	no Jan C
Feb 2	32	
Feb 12	42	
Mar 27	85	
Apr 16	105	
May 9	128	
May 15	134	
June 14	164	
June 21	171	doub
July 27	207	
Aug 6	217	
Sept 2	244	
Sept 17	259	
Nov 4	307	
Nov 15	318	
Dec 25	358	doub
Jan 1	365	
Feb 2	397	

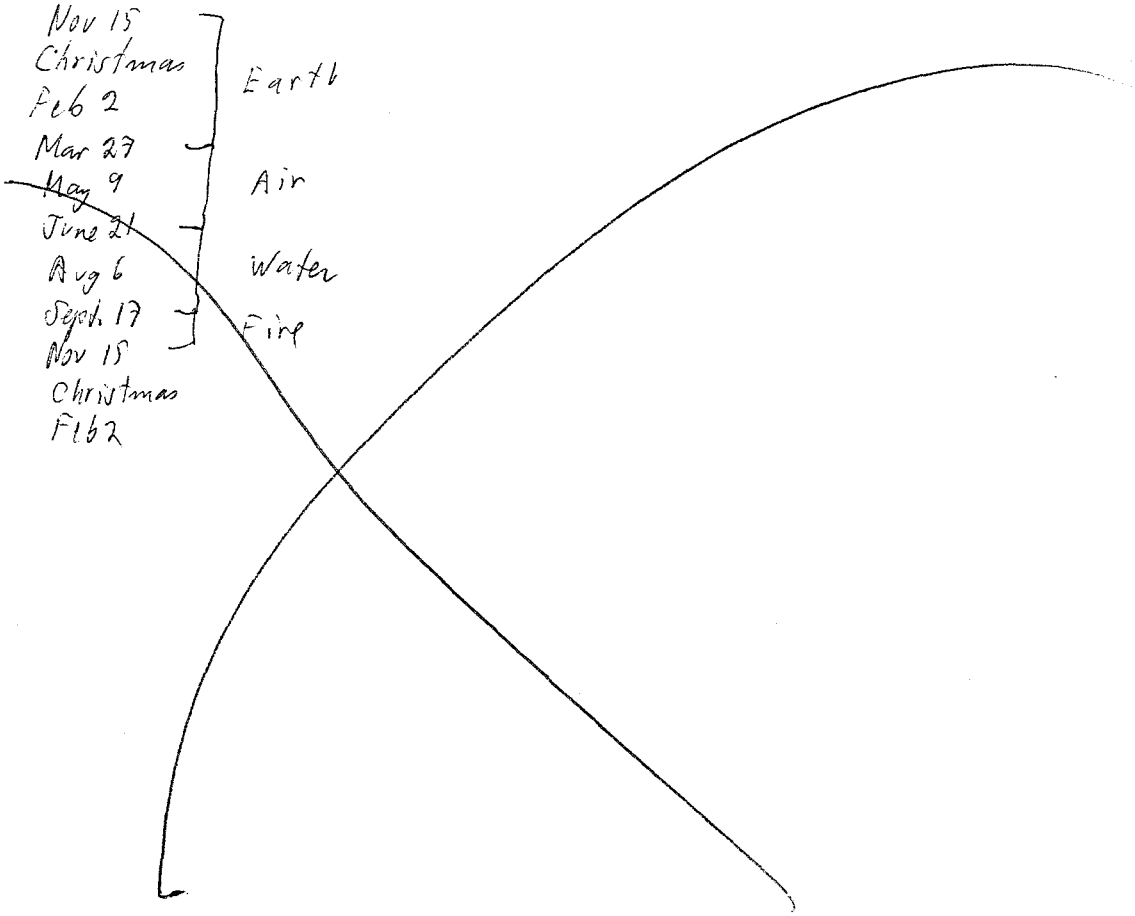
$\Delta^2 q = 0$	June 21 – Aug 6	46	$\Delta^3 q = 0$
$\Delta^3 q = 0$	Aug 6 – Sept 17	42	$\Delta^2 q = 0$
$\Delta^2 q = 0$	Sept 17 – Nov 4	48	$\Delta q = 0$
$\Delta q = 0$ May qW	Nov 4 – Nov 15	11	$\Delta^2 q = 0$
$\Delta^3 q = 0$ old Advent	Nov 15 – Dec 25	40	$\Delta^2 q = 0$ Earth
$\Delta^n q = 0$	Dec 25 – Feb 2	39	presentation
$\Delta^3 q = 0$	Feb 2 – Feb 12	10	Max E $\Delta q = 0$
$\Delta q = 0$	Feb 12 – Mar 27	43	$\Delta^2 q = 0$
$\Delta^2 q = 0$	Mar 27 – May 9	43	$\Delta^3 q = 0$
$\Delta^3 q = 0$	May 9 – June 21	43	$\Delta^2 q = 0$

Nov 15 – Dec 25	40	132	Earth
Dec 25 – Feb 2	39		
Feb 2 – Mar 27	53		Air
Mar 27 – June 21	86		Water
June 21 – Sep 2	73		Fire
Sep 2 – Nov 15	74		

365

Nov 15 – Dec 25	40	Earth
Dec 25 – Feb 2	39	Feb 2 – Feb 12 10
Feb 2 – Mar 27	53	Earth Feb 12 – Mar 27 43
Mar 27 – May 9	43	Air
May 9 – June 21	43	
June 21 – July 27	46	Water
July 27 – Aug 6		
Aug 6 – Sep 17	42	
Sep 17 – Nov 4	48	
Nov 4 – Nov 15	11	
Nov 15 – Dec 25	40	

AUG 6 – SEP 2	WATER
SEP 2 – SEP 17	FIRE
SEP 17 – NOV 4	AIR
NOV 4 – NOV 15	~~WATER~~ EARTH – FIRE
NOV 15 – DEC 25	EARTH – EARTH
DEC 25 – JAN 6	~~FIRE~~ – AIR
JAN 6 – FEB 2	~~WATER~~ – ~~AIR~~
FEB 2 – FEB 12	FIRE
FEB 12 – MAR 27	EARTH


Nov 15
Christmas
Feb 2
Mar 27
May 9
June 21
Aug 6
Sept. 17
Nov 15
Christmas
Feb 2
Earth
Air
Water
Fire

[0q@LH 255;

A D V E N T

Present Rule

The first sunday of Advent occurs on the sunday closest St. Andrew's Day (November 30). Thus the first sunday can occur as early as November 27th and as late as December 3rd, causing the fourth (last) sunday of Advent to occur as early as December 18th and as late as December 24th. Hence, no sundays occur between the last sunday of Advent and Christmas.

Proposed Rule

The first sunday of Advent to fall on St. Andrew's Day or the sunday preceding St. Andrew's Day. Thus the first sunday of Advent could occur as early as November 24th or as late as November 30th, causing the last (4th) sunday to fall as early as December 15th and as late as December 21st. Whenever the first sunday of Advent occurs on November 24, 25, or 26, there will be a fifth sunday before Christmas. In this event, these sundays falling on December 22, 23 or 24 should not belong to Advent but be called "Yule Sunday". This rule would prevent Advent from ever overlapping Yule, which begins at the Winter Solstice on December 22. The moods of these seasons are quite distinct.

FESTIVALS

$225 = Y\varphi$

$140 = Y\varphi^2$

$202 = M/\varphi^4 = \frac{M}{\varphi^4} + \frac{M}{\varphi^3}$

$112 = M/\varphi^3 - Y\varphi^7 = \frac{1}{2}(M/\varphi^4 - M/\varphi^2) = \frac{1}{2} Y\varphi = 112.86$

$101 = Y\varphi^4 + M/\varphi = \frac{1}{2}(202) = \frac{1}{2}\frac{M}{\varphi^4}$

$62 = Y\varphi^2 - M/\varphi^2 = \varphi(101) = \frac{1}{2}\frac{M}{\varphi^3}$

$50 = M + Y\varphi^6 = \frac{1}{2}(101) = \frac{1}{4}\frac{M}{\varphi^4}$

$Y = 365.2425$

$M = 29.53$

$\varphi = 0,6180034$

$Y = 365,2425$ $\quad Z = \frac{M}{\varphi^4} = 202.40$

φ^4 225 $\quad \frac{Z}{2} = 101$

$\varphi^2 Y$ 140 $\quad \frac{Z}{2^2} = 50$

$\frac{\varphi Y}{2} = 112 \qquad \frac{\varphi Z}{2} = 62$

$\frac{Z}{2^2} + \frac{\varphi Z}{2} = \frac{\varphi Y}{2}$

$\rightarrow Y = (\varphi + 3)\frac{M}{2\varphi^4} = 366.1739$

$\frac{1}{2}\left(\frac{M}{\varphi^4} - \frac{M}{\varphi^2}\right) = \frac{1}{2}\frac{M}{\varphi^3}$

202.40
77.31
125.09
62.54

225,323
112,86

$\frac{1}{\varphi^4} - \frac{1}{\varphi^2} = \frac{1}{\varphi^3}$

$\frac{1}{\varphi^{15}} = 1364,000000$

$= 4.11.31$

φ seems to play a role in the integration of the year and the month

$225 = Y\varphi = 225,323$

$140 = Y\varphi^2 = 139.5102$

$202 = M/\varphi^4 = 202.40 = 139 + 62$

$112 = \frac{1}{2} Y\varphi = 112.87 = \frac{1}{4}\frac{M}{\varphi^4} + \frac{1}{2}\frac{M}{\varphi^3} = M/\varphi^3 - Y\varphi^7 = 62 + 50 = \frac{1}{2}\frac{M}{\varphi^4} - \frac{1}{2}\frac{M}{\varphi^2}$

$101 = \frac{1}{2} M/\varphi^4 = 101.20 = \varphi Y - M/\varphi^3 = Y\varphi^4 + M/\varphi$

$62 = \frac{1}{2} M/\varphi^3 = 62.54 = \varphi^2 Y - M/\varphi^2 = M/\varphi^4 - Y\varphi^2 = Y\varphi^5 + M =$

$50 = \frac{1}{4} M/\varphi^4 = 50.60 = Y\varphi^6 + M =$

φ^5 327,49264
φ^6 163,74632
529,89421
366,14789

$\frac{M}{\varphi^6} - \frac{1}{2}\frac{M}{\varphi^5} = Y$

$= 366.14$

$\frac{1}{2}\frac{M}{\varphi^4} + \frac{M}{\varphi^3} = \varphi Y$

$\frac{M}{\varphi^4} + \frac{M}{\varphi^3} + \frac{1}{2}\frac{M}{\varphi^2} = Y$

$\frac{M}{\varphi^4} - \frac{1}{2}\frac{M}{\varphi^3} = \varphi^2 Y$

M	29.53
M/φ	47.78
M/φ^2	77.31
M/φ^3	125.09
M/φ^4	202.40
M/φ^5	327.49
M/φ^6	529,89
M/φ^7	857,39

Y	365,25
φY	225.73
$\varphi^2 Y$	139.51
$\varphi^3 Y$	86.22
$\varphi^4 Y$	53.29
$\varphi^5 Y$	32.93
$\varphi^6 Y$	20.35
$\varphi^7 Y$	12.58

202,40
86,22
116,18

327,49
163,75

529,89
163,75
366,14

163,75
202,40
366,15

$\frac{M}{\varphi^5}\left[\frac{1}{\varphi} - \frac{1}{2}\right] = Y$

205,37

365
327
38,6

163,75 365
202,40
366,15

857
365
492
140
352

365
202
163

$63 + \frac{63}{\varphi} = 163$

0u1p8v0s0b5t2Q
THIS IS TESTER.TXT, a file created with Edlin
for the purpose of testing the Deskjet printer
This is an ASCII file and will be sent from DOS
It will be used primarily to test type faces.

$225 = \varphi 4$

$140 = \varphi^2 4$ or $4 - \varphi 4$

$112 = \frac{1}{2}\varphi 4$

$140 + 63 = 203$

$\frac{1}{2}\,203 = 101 = \frac{63}{\varphi}$

whence 62: $112 - 62 = 50$

$\frac{202}{2} = 101$

$140 + 63 = 202$
$= 2 \cdot 101$
$= \frac{2 \cdot 63}{\varphi}$

$140 + 63 = 203$

$\frac{1}{2}\,203 = 101 = \frac{63}{\varphi}$

$\varphi^3 4 + 63\varphi = 2 \cdot 63$

$\varphi^3 4 = 63(2 - \varphi)$

$63 = \frac{\varphi^3 4}{2 - \varphi}$

.309
.691

$p = 4$?

$X^p + X - 1 = 0$

$140 + \frac{1}{2}\,202\,\varphi = 202$

$140 = \varphi^2 4 = 202 - \frac{\varphi}{2}\,202$

$= 202\left(1 - \frac{\varphi}{2}\right)$

1.309

$\varphi = .618$

$\frac{2\varphi^2 4}{2 - \varphi} = \frac{\varphi^2 4}{1 - \frac{\varphi}{2}} = 202$

$\frac{\varphi^2 4}{\frac{1}{2} - \frac{\varphi}{4}} = 101$

$\frac{\varphi^3 4}{\frac{1}{2} - \frac{\varphi}{4}} = 63$

$\varphi + 1 = \frac{1}{\varphi}$

$\frac{1}{\frac{1}{\varphi} - 1} = \frac{1}{\varphi}$

$+\varphi = \frac{1}{\varphi} - 1$

$2 - \varphi = 3 - \frac{1}{\varphi}$

$50 = \frac{1}{2}\,101$

.618
3
1.854

$\frac{1}{\varphi} =$

$\sum = \frac{\varphi}{1 - \varphi} = \frac{1}{\varphi}$

TOPY DISK #1

G O L D E N C H A I N S

THESE ARE COMPUTED FROM THE TABLES (225d)

THE RECEPTIVE CHAIN

e = equation of time d = declination
de = ė dd = ḋ

10/1	
5/14,15	de=0 west
12/24,25	e=0, de max East
8/6,7	Transfiguration
3/19	dd max north
10/31,11/1	Halloween
6/14	e=0, St. Basil
1/25	Conversion St. Paul
9/8	

400 6 mos →

THE INITIATIVE CHAIN

8/14	
3/27	de max west
11/7	October Revolution
6/21	d max north Midsummer
2/2	Candlemas
9/16,17	de max West Eleusius
4/30,5/1	Walpurgis,Beltane
12/13	St. Lucia
7/27	de=0 east
3/10	

CROSSING CHAIN

6/10	
1/21	St. Agnes
9/3	e=0 crossing
4/16	e=0 crossing
11/27	Advent
7/11	

MINOR CHAIN

r = radius vector ☉–⊕

10/13	
5/26	Solar Ascension
1/6	Epiphany
8/19	
4/1	dr max
11/12	

December 24/25
1) Golden Day of a de=0 day
2) de max East
3) e=0
4) Bisect 11/4 – 2/12

June 21
1) d max north
2) de max east

In the Golden Chains de=max,min or 0 is the most important feature.

East = major east = minor
West = " west = "

8/6 bisects 6/21 – 9/21

S Y M M E T R I E S

11/4--12/24	= 50
12/24--2/12	= 50
2/12--4/16	= 63
9/2--11/4	= 63
11/4--1/6	= 63
1/6--4/16	= 100
4/16--7/27	= 102
7/27--11/4	= 100
11/4--2/12	= 100
2/2--5/14	= 101
5/14--12/25	= 225
9/3--4/16	= 225
11/1--6/14	= 225

50+63 = 113

$\frac{\tau_{\odot\oplus}}{24} = 153.01$
= 8/6 – 1/6
= 4/16 – 9/17
= 12/25 – 5/27

$\frac{200}{2}$
63 × φ = 102

4/16--11/4	= 202
2/12--9/2	= 202
12/25--4/16	= 112
9/3--12/25	= 112
4/16--8/6	= 112
5/14--9/3	= 112
4/16--9/3	= 140
6/14--11/1	= 140
8/6--12/24	= 140
12/25--5/14	= 140
12/25--8/6	= 225
3/21--11/1	= 225

= 225/2

See above

202 – 140 = 62

See above

Y = 365.2422
φ = 0.618034

φY = 225.732
φ²Y = Y – φY = 139.510

φY – 1 → 13 steps 8 year closed cycle

JOYNOTE1.WS4 AGW 11/11/87

INTERVALS IN DAYS (COUNT THE FIRST DAY, NOT THE LAST)

INTERVALS: ANALEMMA DAYS

NOVEMBER 4
51
DECEMBER 25 > 100
49
FEBRUARY 12 > 101
62
APRIL 15 > 91
29
MAY 14 > 60
31
JUNE 14 > 74
43
JULY 27 > 80
37
SEPTEMBER 2 > 100
63
NOVEMBER 4 > 114
51
DECEMBER 25

LITURGICAL DAYS — Sept 29

> 36
NOVEMBER 4 > 62
> 26
NOVEMBER 30 > 51
> 25
DECEMBER 25 > 37
> 12
JANUARY 6 > 39
> 27
FEBRUARY 2 > 37
> 10
FEBRUARY 12 > 47
> 37
MARCH 21 > 63
> 26
APRIL 15 > 55
> 29
MAY 14 > 60
> 31
JUNE 14 > 74
> 43
JULY 27 > 53
> 10
AUGUST 6 > 37
> 27
SEPTEMBER 21 > 54
> 27
SEPTEMBER 29 > 63
> 36
NOVEMBER 4

JOYNOTE1.WS4 AGW 11/11/87

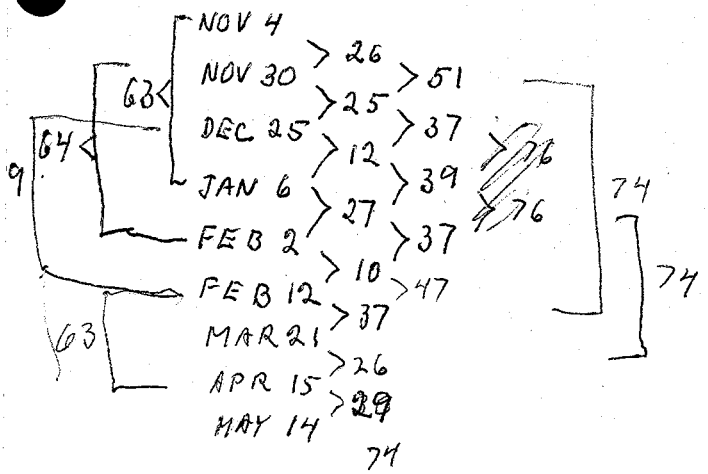
INTERVALS ANALEMMA OAKS

INTERVAL IN OAKS
COUNT FIRST, NOT LAST

NOVEMBER 4			
	51		
DECEMBER 25		> 100	
	49		
FEBRUARY 12		> 101	
	62		
APRIL 15		> 91	
	29		
MAY 14		> 60	
	31		> 103
JUNE 14		> 74	
	43		
JULY 27		> 80	
	37		
SEPTEMBER 2		> 100	
	63		
NOVEMBER 4		> 114	
	51		
DECEMBER 25			

63

WINTER
LITURGICAL DAYS



74
NOV 30 – FEB 12 = 74
MAY 14 – JUL 27 = 74
JAN 6 – MAR 21 = 74

37
NOV 30 – JAN 6
JAN 6 – FEB 12
JUL 27 – SEP 2

MAY 14 > 31
JUN 14 > 43
JUL 27 > 10
AUG 6 > 27
SEP 2
SEP

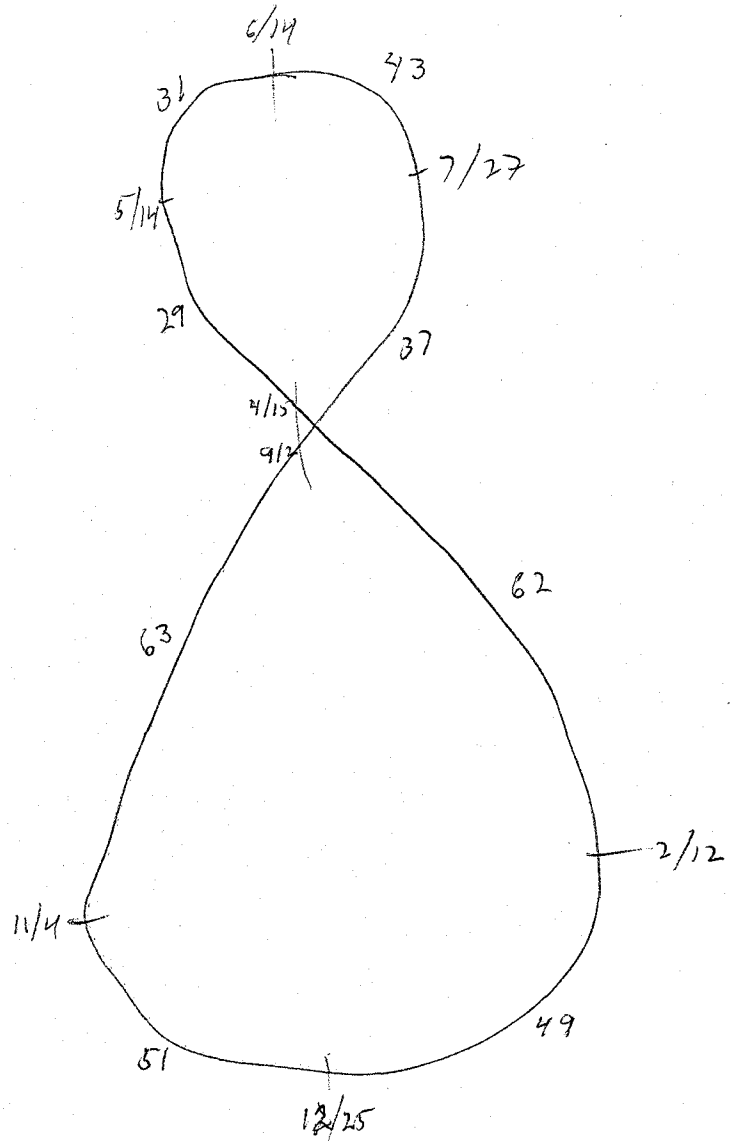
140 = Y-ΦY
DEC 29 – MAY 14 = 140 d
APR 15 – SEP 2 = 140 d
AUG 6 – DEC 25 = 140 d
JUN 14 – NOV 4 = 143
NOV 4 – MAR 21 = 137

26
NOV 4 – NOV 30
NOV 30 – DEC 25 (25)
MAR 21 – APR 15

26
37 > 11 – CLIFTON?
63 > 26 – AL?
74 > 11
100 > 26

91 60
61 74
74 80
225 214
74
140

100
4 example
✓ NOV 4 – FEB 12 100
✓ JAN 6 – APR 15 100
✓ JUL 27 – NOV 4 103
✓ APR 15 – JUL 27 102
✓ FEB – MAY 14



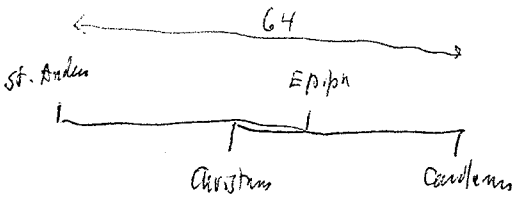
CHRISTMAS
DEC 24 DIVIDES THE 100 days Nov 4 – Feb 12 into 2 equal divisions of 50d

EPIPHANY
JANG DIVIDES THE 74 DAYS NOV 30 – FEB 12 into 2 equal parts of 37 d

ST. ANDREW's → EPIPHANY 37 d
CHRISTMAS → CANDLEMAS 39 d
EPIPHANY → FEB 12 37 d

63
NOV 30 – FEB 2 = 64 d
NOV 4 – JANG = 63 d
FEB 12 – APR 15 = 63 d
SEP 2 – NOV 4 = 63 d

NOV 30 – FEB 2 = 64



63 + 63 + 13 = 139

$e \to x$
$\delta \to y$

FESTIVALS $\quad \varphi Y = 225.74$

			No. of Festivals (C = No. of Terms)	Cycle of Years
1)	$J = \frac{3}{5} Y = 219.15$	$\Delta = 6.59$	5	3
2)	$J = \frac{5}{8} Y = 228.30$	$\Delta = 2.56$	8	5
3)	$J = \frac{8}{13} Y = 224.77$	$\Delta = 0.97$	13	8
4)	$J = \frac{13}{21} Y = 226.11$	$\Delta = 0.37$	21	13
	. . . . .			
10)	$J = \frac{233}{377} Y = 225.74$	$\Delta = 0$	377 daily	233
	⋮	⋮	⋮	⋮
∞)	$J = \varphi Y = 225.74$	$\Delta = 0$	∞	∞

I HIPPARCHUS 4

II CELTIC 8 but does not use 2) rather uses 3)

of These approximations to those of calendar to tropical year

FILMS FOR SELF-OBSERVATION

Using specially selected films, this series of Monday evenings offers an opportunity to observe our experience of archetypal patterns. Condensed and exaggerated, films provide tools for self-reference, that is, tools for changing levels of awarness of who we are and what we are doing.

Facilitators, Sue Robin and Donna Wilson, will offer guidelines for working with this material from their respective backgrounds in family and marriage counseling and inner development.

Possible Film Titles:

Breaking Away	Educating Rita
The Big Chill	Places in the Heart
Terms of Endearment	All That Jazz
Diary of a Mad Housewife	Cries and Whispers
Officer & A Gentleman	Nine to Five
My Dinner with Andre	The Earthling

Monday Evenings 7-10pm Sep 29, Oct 6,20,27 Nov 3
fee $5/evening place 20916 Costanso St, WH

schedules are subject to change - please call the GINKGO LEAF to reserve your space 818/716-6332

e = eq of time, δ = declination

SEQUENCES

					M		F	
					A	L	A	L
1	DEC 25 224	← 186 + + 179 →	JUNE 22 225		DEC 25 e=0 ė MAX E, ė=0	DEC 25 CHRISTMAS	JUNE 22 ė=0 δ MAX N, ė max E	JUN 22 MIDSUMMER
2	AUG 6 227	← 185 180 →	FEB 2 227		AUG 6 ë Max W	AUG 6 TRANSFIGURATION	FEB 2	FEB 2 PRESENTATION
3	MAR 21 225	← 185 180 →	SEP 17 226		MAR 21 δ=0 N	MAR 21 EOSTAR	SEP 17 ë=0	SEP 17 QUETZELCOATL ELEUSENIAN
4	NOV 1 225	← 184 181 →	MAY 1 226		(NOV 4) e MAX W	NOV 1 HALLOWS	MAY 1	MAY 1 MAY DAY
5	JUN 14 225	← 183 182 →	DEC 13 226		JUNE 14 e=0 E	JUNE 14 FLAG DAY	DEC 13	DEC 13 LADY OF GUADALUPE ST. LUCIA
6	JAN 25 221	← 182 183 →	JULY 27 224		JAN 25	JAN 25 CONV. ST. PAUL	JULY 27 e max E	JULY 27 PARENTS OF ST MARY
7	SEP 3 225	← 179 186 →	MAR 8 224		SEP 3 e=0 W	SEP 3	MAR 8	MAR 8
8	APR 16 225	← 180 185 →	OCT 18 225		APR 16 e=0 W	APR 16	OCT 18	OCT 18 ST LUKE
9	NOV 27 220	← 180 185 →	MAY 31 220		NOV 27	NOV 27 BEGIN ADVENT	MAY 31	MAY 31 VISITATION
10	JULY 5 222	← 180 185 →	JAN 6 221		JULY 5 V MAX	JULY 4 4th OF JULY	JAN 6 r min (2nd)	JAN 6 EPIPHANY
11	FEB 12 229	← 181 184 →	AUG 15 224		FEB 12 e MAX E	FEB 12 ANA-ASH WEDNESDAY	AUG 15	AUG 15 ST. MARY (ASSUMPTION)
12	SEP 29 227	← 186 179 →	MAR 27 220		(SEP 27) δ MAX S	SEP 29 MICHAELMAS	MAR 27 ë=0	MAR 27 ANNUNCIATION (23)
13	MAY 14 225	← 188 177 →	NOV 7 227		MAY 14 e max W	MAY 14	NOV 7	NOV 7 USSR
14	DEC 25	← 186 179 →	JUNE 22		DEC 25 e=0 E, ė MAX E	DEC 25 XMAS	JUN 22	JUNE 22 NO 180
15								
16						FIRE		WATER
17						CYCLE		CYCLE
18								

ROSE MAS. Sep 1

A = Analemma
L = Liturgical

→ PAMP4.WS (not a good WS1 file) print double space
requires

ANALEMMA.LS2 BHD\WS2000 J of Y PAMPHLET NOVEMBER 12, 1986
ANALEMMA.LS2 XPCHD\WS2000 JULY 8,1986

~~@HEIGHT 2700;~~ LH 25 FESTIVAL OF THE ANALEMMA
~~@font TAYL10B;~~

THE SEASONS AND THEIR HARMONICS

~~@FONT TAYL9;~~

Hipparchus

The physical seasons--Spring, Summer, Autumn and Winter--are the natural divisions in the fundamental cycle of the year. But for the year, as with many other cycles, an accurate description must include not only the fundamental, but higher harmonics. In the case of the year, the most important higher harmonics are those manifested in the analemma, whose examination reveals many important clues to the 'psychological seasons' contained in the cultural traditions of many societies. To illustrate this TABLE 1. displays relationships between properties of the analemma and some of the important festivals celebrated in many Western countries.

TABLE 1.

DATE	ANALEMMA	SECULAR	ECLESIASTICAL
DEC 25 224	e=0 E,de max E	CHRISTMAS	CHRISTMAS
AUG 6 227	d2e max W	HIROSHIMA	TRANSFIGURATION
MAR 21 225	dec=0 N	1st DAY SPRING	ANA-EASTER
NOV 1 225	(e max W)	(HALLOWEEN)	ALL SAINTS
JUN 14 225	e=0, E	FLAG DAY	ANA-CRPS CHRSTI
JAN 25 221			CONV ST PAUL
SEP 3 225	e=0, W	(LABOR DAY)	
APR 16 225	e=0, W	INCOME TAX	
NOV 27 221		(THANKSGIVING)	ANA-ADVENT
JUL 6 221	(aphelion)	(INDEPENDENCE)	
FEB 12 229	e max E	LINCOLN	ANA-LENT
SEP 29 227	(ddec max S)		MICHAELMAS
MAY 14 225	e 2nd max W		ANA-PENTACOST
DEC 25			

Nov 27th = Earliest First Sunday of Adv
St Andrew = Nov

Form Easy
Justified
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THE FESTIVALS OF THE ANALEMMA

One of the most astonishing features of the analemma is the presence of the Golden Ratio in its basic structure. The two loops of the figure-eight have the property that the length of the northern loop is to the length of the southern loop as the length of the southern loop is to the entire year. In other words, the cross-over point of the figure-eight divides the year in the Golden Ratio. This is all the more remarkable because the structure of the analemma depends on the value of certain numbers defining the earth's orbit (particularly the obliquity of the ecliptic and the eccentricity) and these values change with time with cyclic periods of several tens of thousands of years. Thus the analemmic division by the Golden Section is peculiar to our own times and makes the present period in history one that is unique.

But the Golden Ratio is not only manifested in the location of the cross-over date, it is intricately interwoven into the structure of the entire analemma. Specifically, if we select one of the critical dates on the analemma as an initial point, and advance through the year in steps containing the same number of days as the large loop, a remarkable set of dates is encountered consisting of important religious and secular holidays as well as other critical days on the analemma. This set is given in Table 1. Now the number of days in the large loop is equal to the length of the tropical year (365.2422 days) times the value of the Golden Ratio (0.618034) which equals 225.732 days, a non integral quantity. Because of such fractional parts, calendric constructions must frequently contain insertions and deletions to effect commensurability, TABLE 1. is based on the Fibonacci 8: 13 approximation to the Golden Ratio. This approximation, using an average step of 224.61 days instead of the Golden Ratio value eight year cycle. Enclosure of an entry in parenthesis indicates But most of the alterations in date have to do with the fact that the day is defined in such a way that it does not fall on the same calendric date each year. For example Labor Day is the first Monday in September and Thanksgiving is the last Thursday in redefinition of a traditional lunar festival. Traditionally Easter is the first sunday after the first Pascal full moon occurring after the vernal equinox. If we leave out the full moon and take the date of Easter as the first sunday after the from this date ANA-PENTACOST, ANA-ASH WEDNESDAY etc. are derived by the usual rules. Details are given in the TABLE 2.

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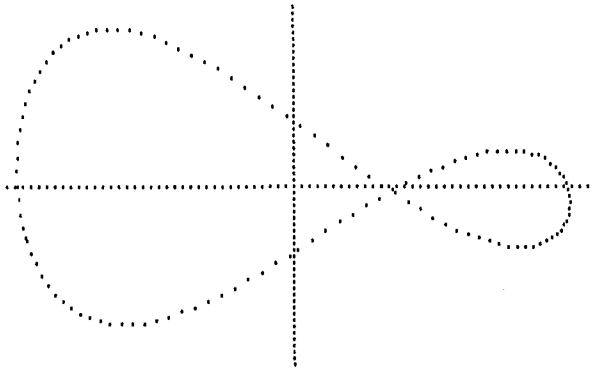
◇ = 1D



THIS IS AN ANALEMMA

The Analemma was generated in BasicA
KEY OFF
using program PAL.BAS

The screen image was saved
as AL3.BAS

The Text is from PRAMPT.NS1

is a line that divides the east and the west. When the sun is on the north-south equator, the length of day and night are equal. When the sun is on the east-west "equator", clock time and sun-dial time are the same. This happens four times a year, on April 15th, June 14th, September 2nd and December 25th. These four dates are our east-west "equinoxes". There are also four east-west "solstices". These occur on February 12, May 15th, July 27th and November 4th.

The relation between the earth's climate and the north-south positions and motions of the sun is fairly well understood. What we shall call the outer seasons are attributable to the amount of sun light falling on each square foot of the earth's surface. This is determined both by the length of the day, short in winter and long in summer, and the angle between the sun and the earth's surface, small in winter and large in summer. But what is the relation be tween the earth and the east-west positions and motions of the sun? Are there possibly east-west "seasons" in addition to the well recognized ones? In searching for an answer to this question we can begin by asking 'what is physically changing when the sun moves east or west?'

The answer lies in the length of the day. When the sun is moving east it rises later each morning. This has the effect of dilating or expanding the essential unit of time. When the sun is moving west it rises sooner each morning, shrinking or compacting the day. This phenomenon is similar to what is known as "jet-lag". When one flies east the sun is encountered sooner, the unit of time is compacted. When one flies west the day is dilated, (note that flying east corresponds to the sun moving west and vice versa). While jet-lag is a large compaction or expansion of the day taking place in a few hours, the east-west motions of the sun involve very small compactions or expansions of the day, but the process takes place over a period of weeks. We should consequently expect the ef fects to be, not physically debilitating like jet-lag, but of a more subtle nature, gently modifying our moods and feelings.

That there is a close tie between our feelings and moods and our physical circumstance and environment was remarked by Aristotle and has been elaborated by poets, philosophers and psychologists ever since. It is this tie that has made the seasons a center piece of all art with the mood of each month and season captured in painting, music, and literature. Is it possible to make some concrete connec tions between these seasonal moods and the corresponding physical states that prevail? Let us consider two: How do we respond to darkness and the increase of darkness? And how do we respond to continuing postponements and delays?

PAMP4.WS1 JOURNYEAR01 J of Y PAMPHLET 11/13/86 11/18/86
ANALEMMA.LS2 XPCHD\WS2000 JULY 8,1986

THE FESTIVALS OF THE ANALEMMA

One of the most astonishing properties of the analemma is the presence of the Golden Ratio in its basic structure. The two loops of the figure-eight have the property that the length of the northern loop is to the length of the southern loop as the length of the southern loop is to the entire year. In other words, the cross-over point of the figure-eight divides the year in the Golden Ratio. This is all the more remarkable because the structure of the analemma depends on the value of certain numbers defining the earth's orbit (particularly the obliquity of the ecliptic and the eccentricity) and these values change with time with cyclic periods of several tens of thousands of years. Thus the analemmic division by the Golden Section is peculiar to our own times and makes the present period in history one that is unique.

But the Golden Ratio is not only manifested in the location of the cross-over date, it is intricately interwoven into the structure of the entire analemma. Specifically, if we select one of the critical dates on the analemma as an initial point, and advance through the year in steps containing the same number of days as the large loop, a remarkable set of dates is encountered consisting of important religious and secular holidays as well as other critical days on the analemma. This is the set given in Table 1.

Now the number of days in the large loop is equal to the length of the tropical year (365.2422 days) times the value of the Golden Ratio (0.618034) which equals 225.732 days, a non integral quantity. Because of such fractional parts, calendric constructions must frequently contain insertions and deletions of 'leap days' in order to preserve the consistency of the length of the basic cycle of the year. For reasons of commensurability, TABLE 1. is based on the Fibonacci 8:13 approximation to the Golden Ratio. This approximation, using an average step of 224.61 days instead of the Golden Ratio value gives the dates of 13 major festivals and repeats itself in an eight year cycle. Enclosure of an entry in parenthesis indicates that the date is not the exact date. For example, the maximum daily change in declination occurs on September 26 some years and September 27 on others and Halloween is October 31 not November 1. But most of the alterations in date have to do with the fact that the day is defined in such a way that it does not fall on the same calendric date each year. For example Labor Day is the first Monday in September and Thanksgiving is the last Thursday in November.

PAMP4

But even less traditional is the revision in definition of festivals that are based on ancient lunar calendars--the so called 'moveable feasts'. Easter and those days whose dates are derived from it are primary examples. The prefix 'ANA-' is used to relabel a day based on a solar redefinition of a traditional lunar festival. Traditionally Easter is the first sunday after the first Pascal full moon occurring after the vernal equinox. If we leave out the full moon and take the date of Easter as the first sunday after the vernal equinox, we obtain the festival designated ANA-EASTER, and from this date ANA-PENTACOST, ANA-ASH WEDNESDAY etc. are derived by the usual rules. Details are given in the TABLE 2.

TABLE 2.

		TRADITIONAL	ANA REDEFINITION
Ash Wednesday	-40	Feb4-Mar10	Feb4-Feb10 or nearest Feb12
Easter		Mar22-Apr25	Mar22-Mar28
Ascension	+40	Apr30-Jun3	May1-May7 or May1
Pentacost	+49	May10-Jun13	May10-May16 or May15
Corpus Christi	+61	May22-Jun25	May22-May28 or May23

It must be emphasized, however, that the lunar Easter derived from Pesach or the Passover of the Hebrews is not the only tradition on which Easter is based. The Celtic peoples had a spring festival called Eostar dedicated to the Goddess of the Dawn. This festival was always celebrated on the day of the Vernal Equinox, and is the source of the word Easter used in English and some other languages. Nor is the presence of the Golden Section novel to the liturgical calendar of Christians. The Druids celebrated eight annual festivals, the two solstices, the two equinoxes, and the four days following them as determined by the Golden Section. These relationships are summarized in TABLE 3.

TABLE 3

February 1	Bridgit or Imbolc	Litha + 224days
March 21	Eostar	
May 1	Beltane	Mabon + 222days
June 22	Litha	
August 1	Lammas or Lughnasegh	Yule + 223days
September 21	Mabon	
November 1	Samain	Eostar + 225days

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The physical seasons--Spring, Summer, Autumn and Winter--are the natural divisions in the fundamental cycle of the year. But for the year, as with many other cycles, an accurate description must include not only the fundamental, but higher harmonics. In the case of the year, the most important higher harmonics are those manifested in the analemma, whose examination reveals many important clues to the 'psychological seasons' contained in the cultural traditions of many societies. To illustrate this TABLE 1. displays relationships between properties of the analemma and some of the important festivals celebrated in many Western countries.

TABLE 1.

DATE	ANALEMMA	SECULAR	ECLESIASTICAL
DEC 25 224	e=0 E,de max E	CHRISTMAS	CHRISTMAS
AUG 6 227	d2e max W	HIROSHIMA	TRANSFIGURATION
MAR 21 225	dec=0 N	1st DAY SPRING	ANA-EASTER
NOV 1 225	(e max W)	(HALLOWEEN)	ALL SAINTS
JUN 14 225	e=0, E	FLAG DAY	ANA-CRPS CHRSTI
JAN 25 221			CONV ST PAUL
SEP 3 225	e=0, W	(LABOR DAY)	
APR 16 225	e=0, W	INCOME TAX	
NOV 27 221		(THANKSGIVING)	ANA-ADVENT
JUL 6 221	(aphelion)	(INDEPENDENCE)	
FEB 12 229	e max E	LINCOLN	ANA-LENT
SEP 29 227	(ddec max S)		MICHAELMAS
MAY 14 225	e 2nd max W		ANA-PENTACOST
DEC 25			

pamp 4

December 21 Yule

Most of these festivals have survived to modern times, though with altered names and forms. Bridgit has become Candlemas or The Presentation celebrated on February 2. Eostar has become Easter. Beltane is still celebrated as May Day, Litha as Midsummer, and Samain as Hallows or All Saints Day, while Yule has moved over to December 25th and become Christmas. Mabon and Lammas on the other hand have no modern counterparts although Mabon might be considered as the predecessor of Michaelmas and Lammas the predecessor of Transfiguration.

A second cycle of 13 festivals generated over eight years by means of the Golden Ratio complements the cycle given in TABLE 1. The new cycle is symmetrically placed in the year with respect to the first cycle. Each of the corresponding pair of dates are separated from one another by one-half year. This cycle is listed in TABLE 4.

TABLE 4.

DATE	ANALEMMA	SECULAR	ECLESIASTICAL
JUN22	e=0 E,dec max N	MIDSUMMER	
FEB2		GROUND HOG DAY	PURIFICATION
SEP17	de max W		ATONEMENT
MAY1		MAY DAY	BELTANE
DEC13			ST. LUCIA
JUL27	e 2nd max E		
MAR8			
OCT18			ST. LUKE
MAY31			VISITATION
JAN6	(perihelion)		EPIPHANY
AUG16			ASSUMPTION
MAR25			ANNUNCIATION
NOV7		OCTOBER REV	
JUN22			

The festivals in the two cycles given within square brackets are secular rather than ecclesiastical celebrations. In the Primary Cycle are two dates significant in the secular calendar of the United States: June 14 [FLAG DAY] and July 4. In the Secondary Cycle are two dates significant in the secular calendar of the Soviet Union: May 1 [INTERNATIONAL LABOR DAY] and November 7, the Gregorian date of the 1917 October Revolution.

Four dates in the analemmic cycles are unmarked with liturgical or secular celebrations. September 3 and April 15 are the crossover dates on the analemma, and dates on which the equation of time is zero. July 27 is the minor eastern maximum. March 8 is the only date in either golden cycle which is not also either an analemmic date or a festival.

In the foregoing table the following days are transferred from their lunar calendar assignments to the solar calendar and given dates conforming to both their traditional lunar ranges and the analemma.

MAR 21 RESURECTION

Traditionally Easter falls on the Sunday next after the full moon immediately following the vernal equinox. In present calendars this means any date from March 22 to April 25. The 'ANA-EASTER' or 'ANA-RESURECTION' would occur on the first Sunday after the vernal equinox, and would fall on any date from March 22 to March 28.

FEB 12 ASH WEDNESDAY

Traditionally 40 days before Easter, occuring any date from Feb 4 to March 10. 'ANA-ASH WEDNESDAY' would occur Feb 4 to Feb 10 or on the nearest Wednesday to Feb 12.

MAY 1 ASCENSION

Traditionally 40 days after Easter, occuring any date from April 30 to June 3. 'ANA-ASCENSION' would occur May 1 to May 7 or to set a fixed date on May 1. The latter date would be in six month counter-position to ALL HALLOWS, and VALPURGIA (Norse May 1) would be in six month counter-position to HALLOWEEN.

MAY 14 PENTACOST

Traditionally ~~49~~ 50 days after Easter, occuring any date from May 10 to Jun 13. 'ANA-PENTACOST' would occur any date from May 10 to May 16 or to set a fixed date on May 15. The latter date would be on the analemmic minor maximum west.

One other moveable feast should be mentioned in making transforms from lunar to solar calendars. This is CORPUS CHRISTI, traditionally 61 days after Easter, falling on any date from May 22 to Jun 25. The solar or ANA Corpus Christi could occur consistently from May 22 to May 28 (to set a fixed date, May 23). An alternative would be to shift the festival to June 14, one of the four analemmic dates for zero equation of time (the others being April 15, Sept 3, and Dec 25). If June 14 were selected, Corpus Christi would be in six month counter-position to Christmas.

[Oq@LH 255;

@LH 255;
@LH 170;

Advent

Present Rule

The first sunday of Advent occurs on the sunday closest St. Andrew's Day (November 3Ø). Thus the first sunday can occur as early as November 27th and as late as December 3rd, causing the fourth (last) sunday of Advent to occur as early as December 18th and as late as December 24th. Hence, no sundays occur between the last sunday of Advent and Christmas.

Proposed Rule

The first sunday of Advent to fall on St. Andrew's Day or the sunday preceding St. Andrew's Day. Thus the first sunday of Advent could occur as early as November 24th or as late as November 3Øth, causing the last (4th) sunday to fall as early as December 15th and as late as December 21st. Whenever the first sunday of Advent occurs on November 24, 25, or 26, there will be a fifth sunday before Christmas. In this event, these sundays falling on December 22, 23 or 24 should not belong to Advent but be called "Yule Sunday". This rule would prevent Advent from ever overlapping Yule, which begins at the Winter Solstice on December 22. The moods of these seasons are quite distinct.

The principal currently observed Festivals taken from the two Golden Cycles are:

CHRISTMAS	DEC 25
EPIPHANY	JAN 6
CANDLEMAS	FEB 2
ASH WEDNESDAY	FEB 12
EASTER	MAR 21
ASCENSION	MAY 1
PENTACOST	MAY 15
CORPUS CHRISTI	JUN 14
MIDSUMMER	JUN 22
TRANSFIGURATION	AUG 6
ATONEMENT/HOLY CROSS	SEP 17
MICHAELMAS	SEP 29
HALLOWMAS	NOV 1
[THANKSGIVING]	NOV 26
ST. LUCIA	DEC 13

15

15

The closed 13-step 8 year cycle is 224.77 days

The closed 13-step 1 year cycle is $\frac{224.77}{8} = 28.09625$ days

The Golden value is 225.7321 days = $\varphi \times 365.2422 = G$

$\times\varphi = 139.5101$

$365.2422 \times \varphi^{-7} = 12.5796$ days

$\varphi^{-7} = 29.034484$ = The "1 year Golden value"

$28 \times 13 = 364$

$29.034484 \times 12.5796 = 365.2422$

A value of about $G - 1 = 225.73 - 1 = 224.77$ will close the cycle in 13 steps
G itself will not close.

Going from an absolute to a local frame

cf no. of days in year vs. no. of sidereal days (rev.)

$R - 1 = D$
$366 - 1 = 365$

The two cycles - Initiative/Yang and Receptive/Yin are 6 months apart - interweaving by the Golden "Jump" Like Richard Brits dragons

Actually this is the result of modulating the 2 harmonic curves (CR i.e. the analemma which is composed of 2 component) with a cycle ≐ 28 days which is the magnetic cycle attributable to the sun's rotation.

Rotation Period of the Sun

Varies with latitude

$\varphi = 0$ $\frac{365}{13.04}$ = 28.0 days

Do cancelled

SET PRINT OFF

FESTIVALS

JUN 22 — EQUINOX — 5 max N, 5e max E — LITHA
225

FEB 2 — PRESENTATION ~~PURIFICATION~~ — BRIGID
227

SEP 17 — de Max W — ~(MABON)
226

MAY 1 — BELTANE (WALPURGAS) — BELTANE — ST PHILIP & ST JAMES
226

DEC 13 — ST. LUCIA — FOLLOWED BY EMBER DAYS
226

JUL 27 — 2nd max E
225

MAR 8 — ? MAR 7 — ST THOMAS AQUINAS (1225-1274) ~~ST GREGORY MAR 12~~
224

OCT 18 — ST LUKE — CLEOPAS — ST LUKE'S SUMMER
225

MAY 31 — VISITATION (MAY 31)
220

JAN 6 — EPIPHANY — (PERIHELION) — ST DISTAFF
221

AUG 15 — ST. MARY — ASSUMPTION
224

MAR 27 — 2nd 5e max W ~ ANNUNCIATION — RAPHAEL
225

NOV 7 — Oct Rev
227

JUN 22

4 DAYS ~ MARY

wedding half-year

JUN22 + 186 = DEC25 + 179 = JUNE22
225 225
FEB2 + 185 = AUG6 + 180 = FEB2
227 224 229
SEPT 17 + 185 = MAR21 + 180 = SEPT 17
226 225 227
MAY 1 + 184 = NOV 1 + 181 = MAY 1
226 225 226
DEC 13 + 183 = JUN 14 + 182 = DEC 13
226 225 226
JUL 27 + 182 = ~~JAN~~ JAN 25 + 183 = JUL 27
224 221 224
MAR 8 + 179 = SEP 3 + 186 = MAR 8
224 225 224
OCT 18 + 180 = APR 16 + 185 = OCT 18
225 225 225
MAY 31 + 180 = NOV 27 + 185 = MAY 31
220 220 220
JAN 6 + 180 = JULY 5 + 185 = JAN 6
221 222 221
AUG 15 + 181 = FEB 12 + 184 = AUG 15
224 229 224
MAR 27 + 186 = SEP 29 + 179 = MAR 27
225 227 225
NOV 7 + 185 = MAY 14 + 177 = NOV 7
227 225 227
JUN 22 + 186 = DEC 25 + 179 = JUNE 22

ANALEMMIC DAYS
NOT INCLUDED

NOV 4 MAX W BUT ~ NOV 1
MAR 19 Max ë N BUT ~ MAR 21
SEP 27 Max ë S BUT ~ SEP 29
↑ SS COSMO and DAMIAN

NOV 15 ë max E
MAY 9 ë max E

(Aug 6 and Feb 2 the ë max W are included)

THE TWO SERIES INCLUDE MOST LITURGICAL AND ANALEMMIC DAYS

NOT INCLUDED

- YULE = DEC 22 BUT ~ DEC 25
- LAMMAS = AUG 1 BUT half way between AUG 6 and JULY 27
- MABON = SEP 22 BUT half way between SEP 17 and SEP 29

FIBONACCI NUMBERS

N	f_N	PHI_N	EXP(N*LN(PHI))/SQRT(5)
1	1	1.62	.72
2	1	2.62	1.17
3	2	4.24	1.89
4	3	6.85	3.07
5	5	11.09	4.96
6	8	17.94	8.02
7	13	29.03	12.98
8	21	46.98	21.01
9	34	76.01	33.99
10	55	122.99	55.00
11	89	199.01	89.00
12	144	322.00	144.00
13	233	521.00	233.00
14	377	843.00	377.00
15	610	1364.00	610.00
16	987	2207.00	987.00
17	1597	3571.00	1597.00
18	2584	5778.00	2584.00
19	4181	9349.00	4181.00
20	6765	15127.00	6765.00
21	10946	24476.00	10946.00
22	17711	39603.00	17711.00
23	28657	64079.00	28657.00
24	46368	103682.00	46368.00
25	75025	167761.00	75025.00
26	121393	271443.00	121393.00
27	196418	439204.00	196418.00
28	317811	710647.00	317811.00
29	514229	1149851.00	514229.00
30	832040	1860498.00	832040.00
31	1346269	3010349.00	1346269.00
32	2178309	4870847.00	2178309.00
33	3524578	7881196.00	3524578.00
34	5702887	12752043.00	5702887.00
35	9227465	20633239.00	9227465.00
36	14930352	33385282.00	14930352.00
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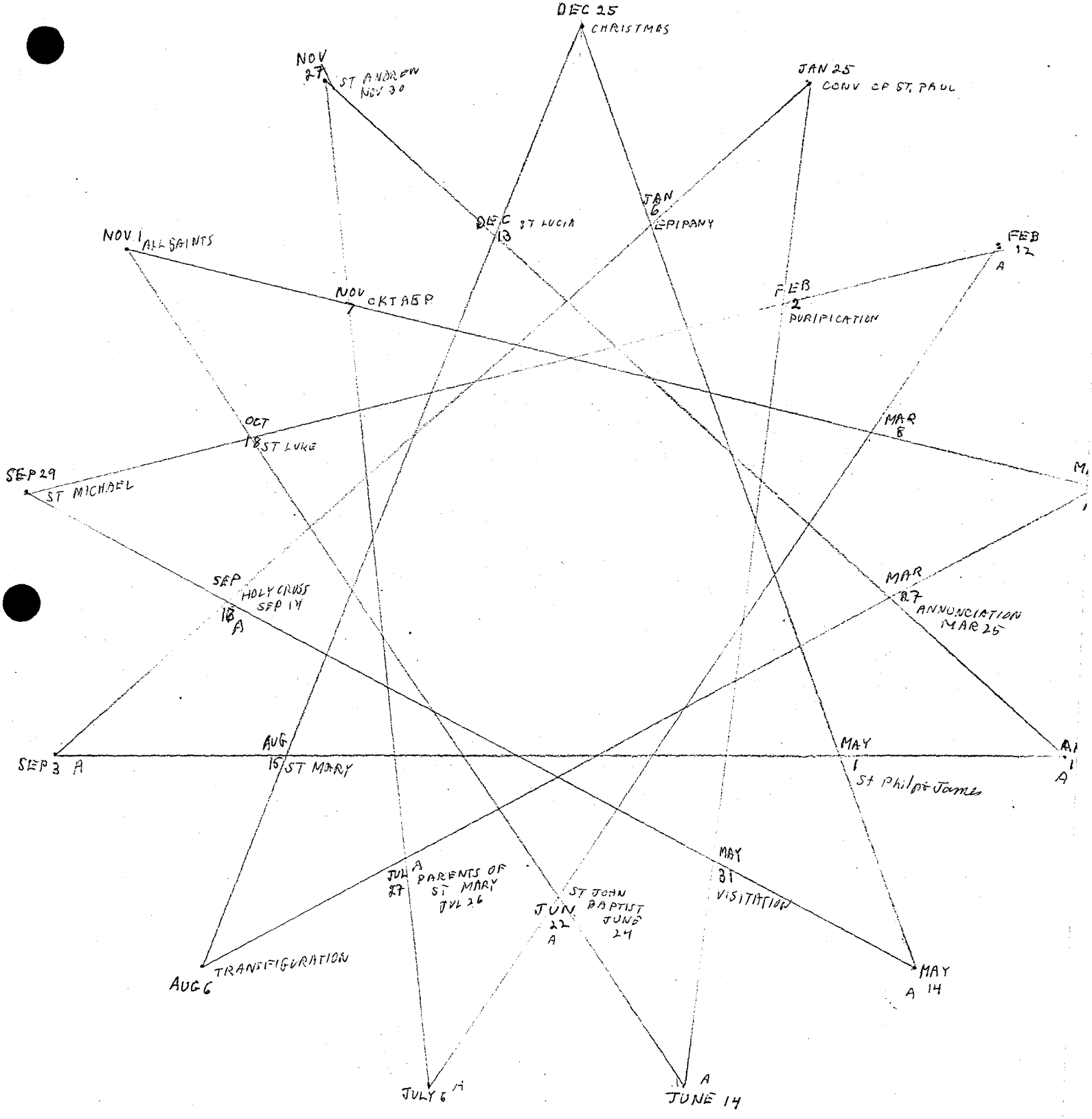

THE INNER DATES ARE NOT DIA IN THIS DIAGRAM

EARLIEST AND LATEST DAYS

ADVENT
- EARLIEST FIRST SUNDAY OF ADVENT NOV 27th (CHRISTMAS THEN FALLS ON SUNDAY)
- LATEST FIRST SUNDAY IN ADVENT DEC 3rd

ASH WEDNESDAY
Easter -40 FEB 4 - MAR 10

If we were to use a solar calendar
ASH WED
FEB 4 - FEB 10
IMBOLC FEB 1
BRIGIT

EASTER MAR 22 to APR 25

Easter Mar 22 - Mar 2
EOSTAR = MAR 22

ASCENSION
Easter +40 APR 30 to JUN 3

Ascension May 1 - May 7
BELTANE = MAY 1

PENTACOST
Easter + 49
(Pentacost means fifty) MAY 10 - JUN 13

Pentacost May 10 - May 16

Corpus christi
Easter +61 MAY 22 - JUN 25

Corpus Christi
May 22 - May 28
Select May 23

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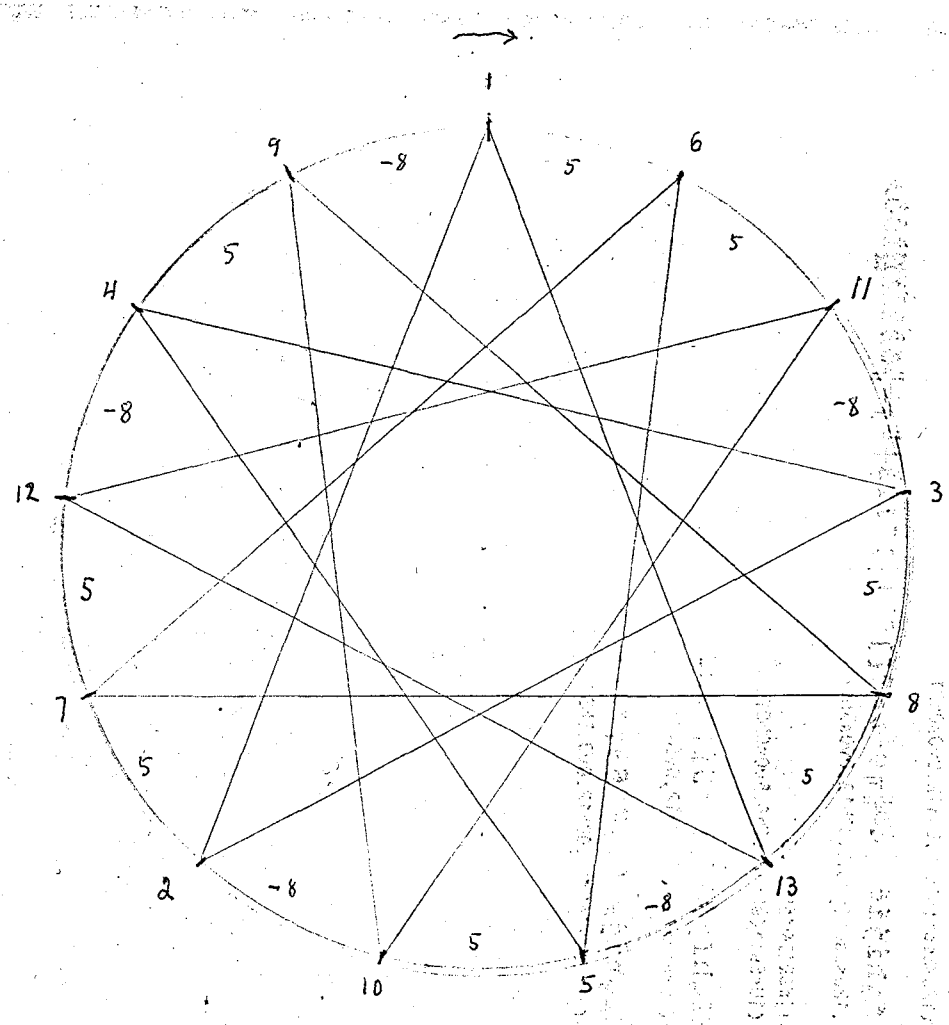
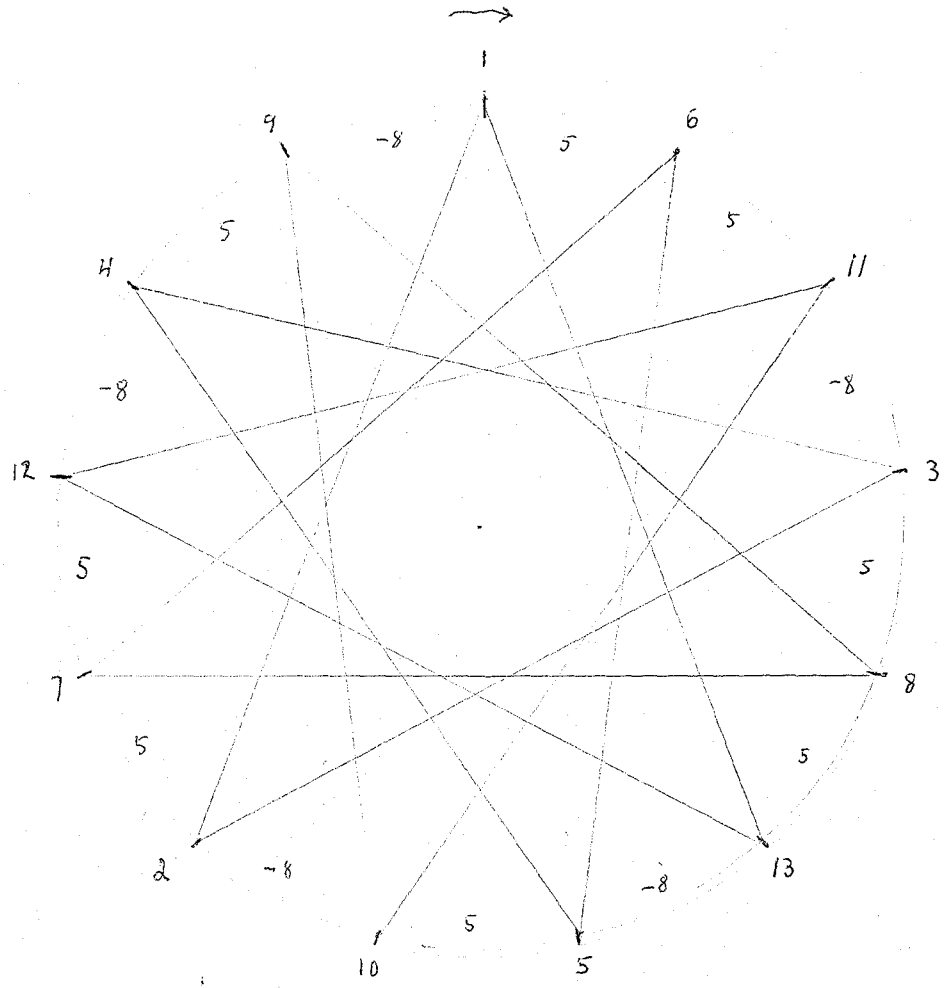


13 divisions spanned in 8 cycles

THE PERI CALENDAR
SUGGESTS THE MODULATIONS OF THE MOON
AND THE ~~REVOLUTION~~ OF THE SUN. (28 days)
ROTATION

THE DIA CALENDAR
SUGGESTS THE OCCULT WORKINGS
OF THE STRUCTURE OF THE
ANALEMMA AND THE GOLDEN SECTION
OR DIVINE RATIO



symmetry point

13 divisions spanned in 8 cycles

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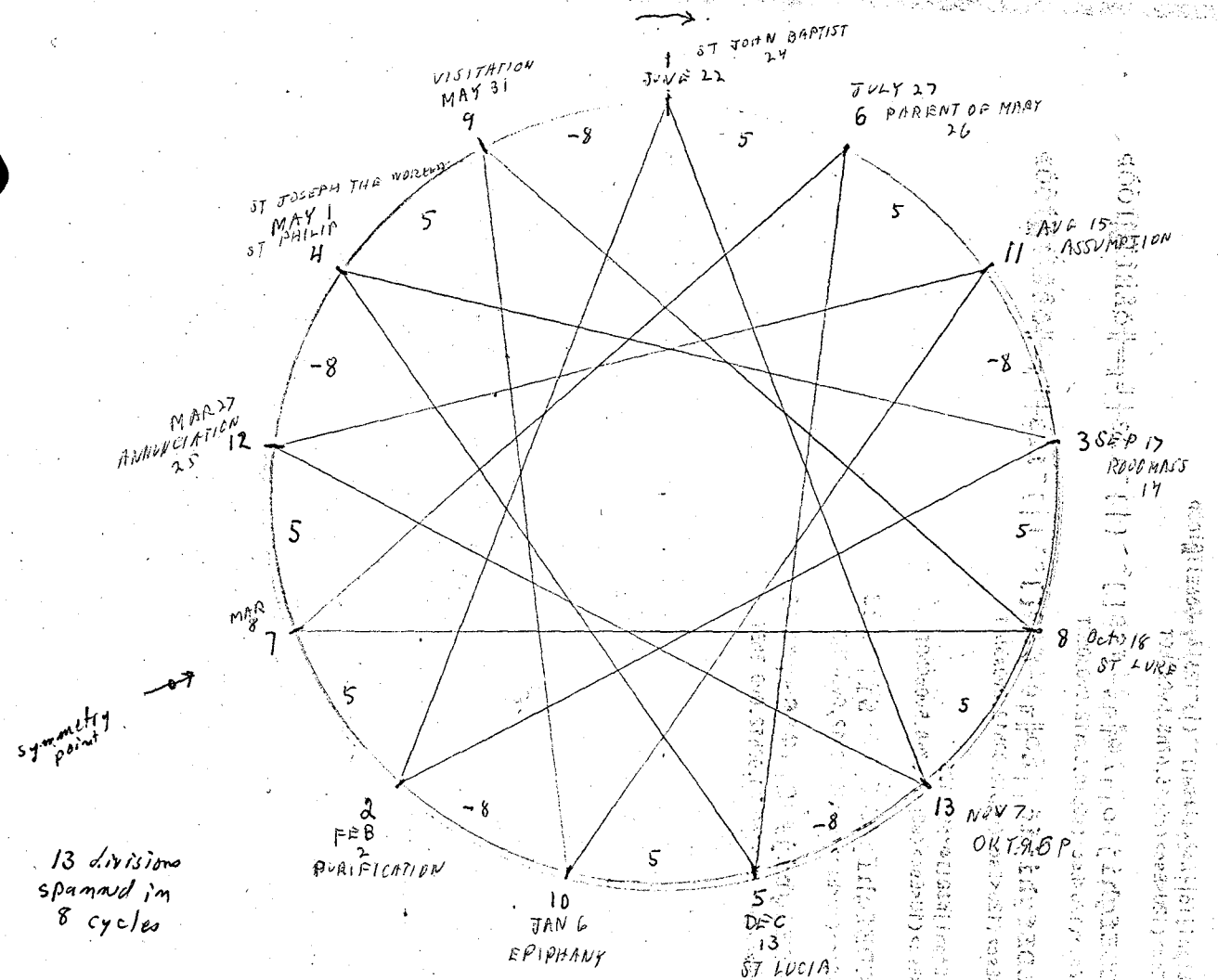
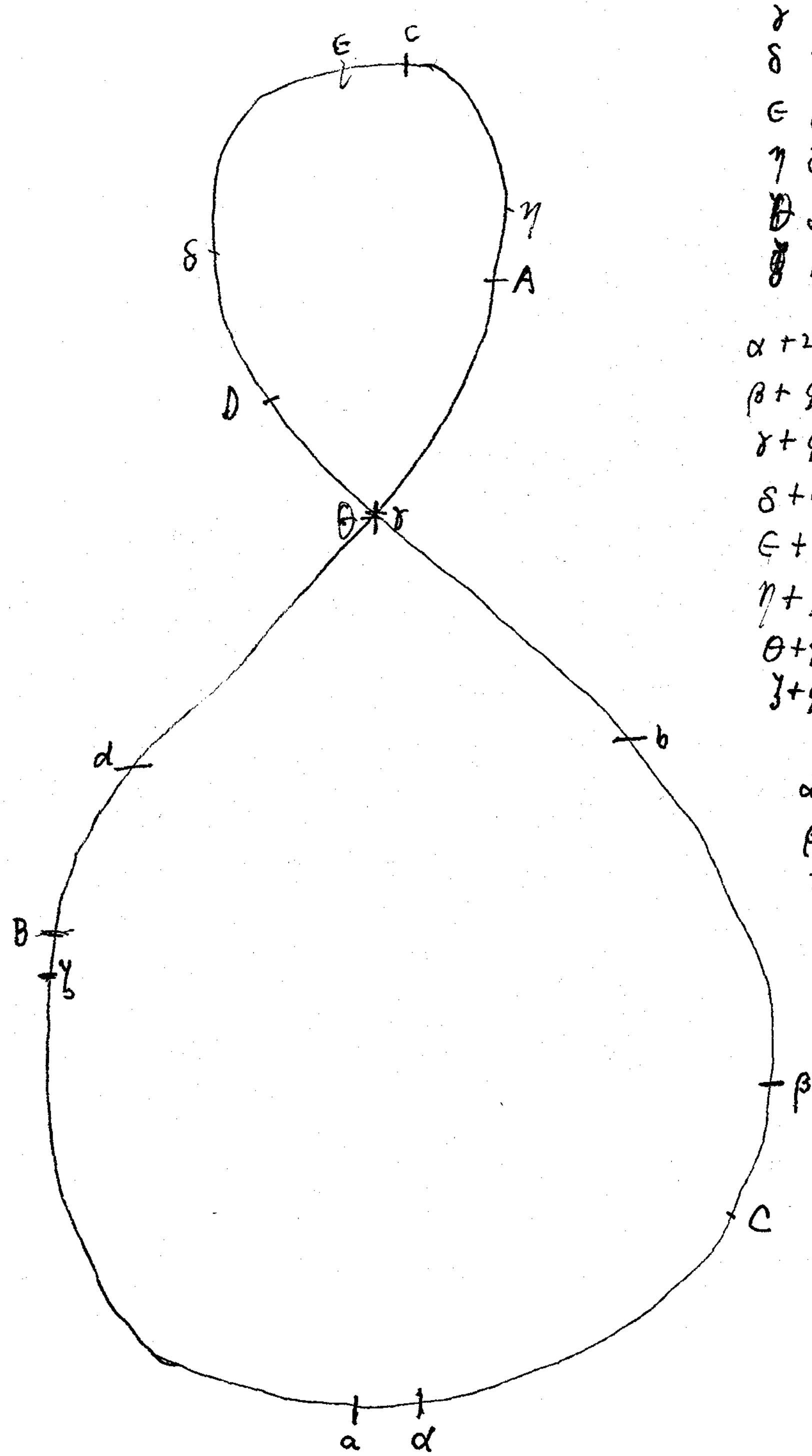

1 JUNE 22 ST JOHN BAPTIST 24
2 FEB 2 PURIFICATION
3 SEP 17 ROOD MASS 14
5 DEC 13 ST LUCIA
6 JULY 27 PARENT OF MARY 26
7 MAR 8
8 Oct 18 ST LUKE
9 VISITATION MAY 31
10 JAN 6 EPIPHANY
11 AUG 15 ASSUMPTION
12 MAR 25 ANNUNCIATION
13 NOV 7 OKTRAB
ST JOSEPH THE WORKER MAY 1 ST PHILIP H
-8
5
symmetry point
13 divisions spanned in 8 cycles

FESTIVALS



III Analemmic Days (Terttany)

α Dec 25 christmas
β Feb 12
γ Apr 15
δ May 15
ε June 14
η July 27
θ Sep 3
ζ Nov 4

α + 225 φY = Aug 6
β + φY = (Sep 21) d
γ + φY = Nov 27
δ + φY = α
ε + φY = St. Agnes Jan 28 Conv
η + φY = [Mar 8]
θ + φY = γ
ζ + φY = (ε)

α − φY = δ
β − φY = July 5
γ − φY = Sep 3 = θ
δ − φY = Sep 29 MICHAELMAS
ε − φY = B
η − φY = Dec 13
θ − φY = Jan 25
ζ − φY = (b)

II. CROSS-QUARTER DAYS
Druidic (Secondary) Days

A Lammas Aug 1
B Samhain Nov 1
C Imbolc Feb 1/2
D Beltane May 1

a → A = φY or a + φY = A
b → B = φY b + φY = B
c → C = φY c + φY = C
d → D = φY d + φY = D

a − φY =
b − φY = Aug 6
C − φY = Nov 7
d − φY =

I Primary Days

				Hipparchus Days	
a	Dec 21 Yule	Winter	89^d	0.5
b	Mar 21 Eostar	Spring	92^d	20.2
c	June 22 Litha	Summer	93^d	14.4
d	Sep 21 Mabon	Autumn	89^d	18.7

Yule — Lammas or Lughnasegh — Christmas — Transfiguration

Dec 21 + 223 = Aug 1 → Dec 25 + 225 = Aug 6

Eostar — Samhain — All Hallows

Mar 21 + 225 = Nov 1 → Nov 1

Litha — Imbolc — Purification

June 22 + 224 = Feb 1 → Feb 2 (225)

Mabon — Beltane

Sept 21 + 222 = May 1

---

224 .. 225 day interval

$\frac{365.25}{225} = 1.62$ cf $1.618034 = \varphi$

Did The Druids used the Golden Ratio to divide the year?

what is the Golden Ratio?

12/18/89

How did the Celts arrive at their cross-quarter days?

We have

Samhain = Nov 1 = Eostar + 225 days
52 days
Yule = Dec 21
41
Brighid = Feb 1 = Litha + 224 days
49
Eostar = Mar 21
40
Beltane = May 1 = Mabon + 222 days
52
Litha = June 22
39
Lammas = Aug 1 = Yule + 223 days
52
Mabon = Sept 21
40
Samhain = Nov 1 = Eostar + 225 days

what is Samhain + 224d ?

av 223.5 days

The cross-quarter days follow an equinox or solstice by about 40 days or precede an equinox or solstice by about 52 days

$4 \times 40 = 160$
$4 \times 52 = 208$
368

$224 \doteq \frac{8}{13} \times 365$ or $\frac{8}{13}$ 365

Also Note The 56 Aubrey Holes could have been used for calculating the cross quarter days
$4 \times 56 = 224$ days

Also of interest is the relation of the cross quarter days to the Analemma:

		Analemma extremes E-W
Lammas = Aug 1	~ July 27	4 days off
Samhain = Nov 1	~ Nov 4	3 days off
Brighid = Feb 1	~ Feb 12	11 days off
Beltane = May 1	~ May 14	13 days off

i.e. the cross-quarter days are fair approximations to the E-W extremes of the Analemma.
while Yule & Litha = the N-S extremes

USING THE AUBREY HOLES TO CALCULATE THE CROSS-QUARTER DAYS

56 × 4 = 224

365, 2425
÷ 13 = 28, 096
× 2 = 56, 2
× 8 = 224, 765

89 EOSTAR MAR 21 — 92 LITHA MIDSUMMER JUNE 22 — 93 MABON FALL SEPT 21, 89 — YULE DEC 22 89

225 → SAMHAIN NOV 1 → 224 JUNE 14

224 → BRIGID IMBOLC FEB 1/2 → SEP 12

222 → BELTANE MAY 1 → DEC 11

223 → LAMMAS AUG 1 → MAR 13

~~EOSTAR~~

AT YULE

START PUTTING A RED STONE IN ~~THE~~ FIRST HOLE
UP TO 56, START REMOVING
WHEN ALL EMPTY START OVER
WHEN EMPTY 2° TIME, AT LAMMAS

AT LITHA BLUE STONE → IMBOLC

etc.

89 + 56 = 33

89 + 92 = 181

112
224
92
132

56
3
168
4

How were the equinoxes determined?
East-West line?

52
56
312
260
2912

But 56 = 2 × 28 (not the Lunar synodic!)
= 29 1/2 d

The Cross-Quarter Days do approximate Anglesmic Days

3 + SAMHAIN ~ Nov 4
10 + IMBOLC ~ Feb 12
13 + BELTANE ~ MAY 14
~~5~~ + LAMMAS ~ JUL 27

4 colored stones could we look at the configuration on any day and tell by date?

4 sequences

4 × 56
52
13 sequences of 224 = 8 years
or 52 × 56
~~448~~
52 Aubrey sequence = 2912 days = 8 years

224 × 8 = 1792
365 × 5 = 1825

225 / 13 = 675 / 225 = 292 5

365 / 8 = 2920 / 8 = 292 5

Oscillate 40, 52

224
184
40
120
104

92

42 + 92 + 40
40 + 52 + 40 + 52 + 40 = 224
5

YULE
10
31
1
52
IMBOLC

28
21
49
EOSTAR
10
30
41
BELTANE
30
22
52
LITHA
8
31
40
LAMMAS
31
21
52
MABON
0
32
41
SAMHAIN
30
21
51 YULE

DID THE WEEK COME FROM THIS

J491WV.P51 DISK:J491 June 15, 1991

THE AMERICAN WORLDVIEW vs THE OLD WORLD WORLDVIEW

AMERICAN WORLDVIEW

- INDIVIDUAL LIBERTY
  SOCIAL EQUALITY, No Elites
  RIGHTS OF BOTH SEXES
  PLURALISM
  ECOLOGY
- WE ARE EQUALS WITH ALL
  THAT IS ON THE EARTH
  THE EARTH CANNOT BE OWNED
  The Great Spirit is Ubiquitous
- BALANCE
  Sustainment
  Covenant with R Animals, The plants, the Earth
- THANKSGIVING
  WE ARE PART OF NATURE
- RESPONSIBILITY UNTO THE
  SEVENTH GENERATION
  Setting aside part
- TIME IS LATERNESS
  EACH DAY IS ACCUMULATIVE
  OF ALL PREVIOUS DAYS
  THERE IS A UNIQUE GOD
  FOR EACH DAY

EUROPEAN WORLDVIEW

Freedom to Acquire - Today Freedom is tied up with the sacredness of private property

- POLITICAL SOVEREIGNTY
  CLASS AND CASTE
  MALE SUPREMECY
  CONFORMITY AND HOMOGENIZATION
  PRINCIPLE of PLENITUDE

"Freedom is when someone can get rich" R. Reagen

10% own 86%
½ have no net worth

- CONTROL AND SUBDUE
  OWNERSHIP AND STEWARDSHIP
  God is like a guardian of a gate - Omnipotent, Omniscious
- NO COUNTERPART UNTIL
  THE CONCEPT OF ECOLOGY
  Covenant with God
- WORSHIP AND PRAISE
  I-THOU
- NO GENERATION BELONGS TO
  EITHER THE PAST OR THE
  FUTURE --JEFFERSON
  Beyond Consumerism
- TIME IS LINEAR
  ~~EACH DAY IS AN ENTITY~~
  ~~UNTO ITSELF~~
  EACH DAY IS LIKE EVERY
  OTHER DAY

Setting aside part - tything

The Tything is the price of open endedness

FOR FESTIVALS

4/364
91

2½ seasons

91	90
91	90
45	45
227	225

Mid Season 45 days

Mar 15 + 45 = May 1

21
10
30

June 15 + 45 = Aug 1

Sep 16 + 45 = Oct 30.

MAY 5 HALF WAY

Aug 1, May 1, --
Are Not Half Way

June 22 Sep 22

45
8
37

Aug 6 is Half Way

Sep 21 + 45

9
36
3
2

Mar 5 Half Way

FEB 4 Half Way

10
31
41

The Half or Mid Days were not the ~~chosen days~~ cross-Quarter Days

May 1, Aug 1, Nov 1, Feb 1

These days came from the Divine Ratio

The Year is a great tapestry of interwoven harmonics
fundamental
and Harmonics - not pythagorean harmonics
but Fibonaccian
i.e. based on the
Golden Ratio

There was an ancient wisdom - lost - diluted by the moon
but somehow rightened

The 56 Aubrey Holes
could have be used for
calendric purposes
4 x 56 = 224 ~ days between
equinox/solstice and quarter-days

SEASONS AND FESTIVALS

The year of the seasons, springtime to springtime, vernal equinox to vernal equinox, ~~is called the tropical year~~. ~~It~~ is the interval of time during which the sun makes a complete circuit of the sky leaving and returning to the vernal equinox. ~~Its length has been determined as 365.24219 days~~. Four key events occur in the ~~tropical~~ this year: 1) The sun's crossing of the equator going north on or about the 21st of March, called the vernal equinox, taken as the beginning of spring. 2) The sun's attaining its maximum northerly position on or about the 22nd of June, called the summer solstice, taken as the beginning of summer. 3) The sun's crossing of the equator going south on or about the 21st of September, called the autumnal equinox, taken as the beginning of autumn. 4) The sun's attaining its maximum southerly position on or about the 22nd of December, called the winter solstice, taken as the beginning of winter. ~~The Greek astronomer Hipparchus who lived in the second century B.C. first calculated the time intervals between these events. He found Spring to be 92 days and 2Ø.2 hours, Summer 93 days 14.4 hours, Autumn 89 days 18.7 hours, and Winter 89 days Ø.5 hours.~~

Though Hipparchus' contribution was a big step forward in the accuracy of knowledge of the seasonal positions of the sun, the seasons had been marked, measured and celebrated since prehistoric times. The ritualistic observance of the solstices and equinoxes, the beginnings and ends of the seasons, was the basis for both the religions and economic life of most primative peoples. Through pagan times the rituals of the annual calendar became increasingly sophisticated, with many supplementary sacred dates being added to the solstices and equinoxes. The Church was adept at adopting these pagan festivals, relabeling them and gradually modifying their emphases. However, in this process, their was an inate wisdom that understood, whatever the label, there was a special significance to the dates themselves, and these must not changed. The same wisdom also saw that places that had been recognized by pagans as sacred were sacred and though a church might replace a grove or temple, the selection of locations for places of worship was not an arbitrary matter.

Of particular meaningfulness to us, because of their influence on our present calendar, are the festivals of the Celtic peoples who inhabited Britain, Ireland, Wales and much of western Europe in pre-Roman times. The Celts had established an elaborate set of annual rituals associated with the solstices and equinoxes and with four additional days, known as cross-quarter days, all ~~of which have~~ with whose vestiges, in ~~the Christian~~ our present calendar.

Refering to the Table I, Bridgit or Imbolc, the cross-quarter day of mid-winter, celebrated on February 2, was dedicated to the Triple Goddess Brigit who represented the three phases of womanhood--maiden, mother, and crone. The Church took this as the date of the Purification of the Virgin or the Presentation in the Temple, or Candlemas but retained February 2.

Eostar, the Celtic celebration of Spring on the vernal equinox, was dedicated to the Goddess of the Dawn, taken by the

* = Analemmic day, + LITURGICAL DAY

JUN 22 *
225
FEB 2 +
226
SEP 16 *
227
MAY 1 +
226
DEC 13 +
226
JUL 27 *
224
MAR 8
224
OCT 18 +
225
MAY 31 +
228
JAN 6 +
222
AUG 16 +
223
MAR 27 *
222
NOV 4 *
230

DEC 25 * +
224
AUG 6 +
225
MAR 19 *
227
NOV 1 +
225
JUN 14 *
225
JAN 25 +
221
SEP 3 *
224
APR 15 *
226
NOV 27 +
227
JUL 6 aphelion *
221
FEB 12 *
227
SEP 27 *
229
MAY 14 *
225
DEC 25 * +

MAR 21 *
225
NOV 1 +

SEP 21 *
222
MAY 1 +

$\frac{8}{13}$ approx

THE EQUINOCTIALS TOO SIMILAR TO THE SOLSTITIALS

Liturgical Days are Golden Days of Analemmic Days

In both cycles all days are either analemmic, liturgical or both except MAR 8

222
JUN 14 *
225
JAN 25 +

1 x 220 = 220
2 x 222 = 444
1 x 223 = 223
2 x 224 = 448
2 x 225 = 450
3 x 226 = 678
1 x 227 = 227
1 x 230 = 230
2920

3 x 221 = 663
2 x 224 = 448
4 x 225 = 0900
1 x 226 = 226
2 x 227 = 454
1 x 229 = 229
2920

8 x 365.25 = 2922

they fall on fertile soil and are nourished or they wither and die if neglected. One of the best places for gathering seed-ideas has always been the **The Whole Earth Catalog** first published in the sixties. The lastest edition just arrived, **THE ESSENTIAL WHOLE EARTH CATALOG**($15,paper). The editor, J. Baldwin reminds us in the preface that "Reviewers of our Catalogs have often missed the point by calling us a 'wishbook.' Not at all. You can grab hold of nearly anything in here and make it a part of your life. Use the book like a huge key ring--select a key from one of our pages and use it to open the door to something new to you. Access to tools and ideas, just as it says on the cover. We use it ourselves."

Another source for rediscovering the cylic patterns is Dane Rudhyar's **AN ASTOLOGICAL MANDALA** ($4.95,paper) This reinterpretaion of the Sabian symbols is presented as a symbolic frame of reference similar to the Chinese I-Ching and can be used in the same way. Rudhyar's understanding of symbolic languages provides a much deeper interpretation of the practice of astrology than any other method known today. The relevance for our topic here is found in a short essay included at the end of this book called 'The Oracular and Astrological Use of the Symbol.' In his discussion of how we should use the Sabian symbols, he says, "...to live one's life in terms of the revelatory message symbolically implied in one's birth chart is to live a life in terms of the sacred character of existence. It does not mean to feel oppressed by bad aspects or elated by good ones. It does not mean to avoid confrontation with existential facts and to escape into fanciful dreams of pseudo-occult transcendence. It demands instead that life be lived strictly on the basis of non-escapism--that is, an attitude of acceptance of what is, but an **is** that remains transparent to the eternal.. Alas, the words 'eternity' and 'eternal' have been made to refer to an escape from minds haunted by a desperate urge to transcend biological and intellectual compulsions and this perversion is at the root of the deepest tragedies mankind is now experienceing. An eternity is a complete cycle of time. The consciousness which can perceive things and events in their eternal nature is one which sees every happening as definitely related to a particular phase of some more or less vast cycle of existence...The eternal is now. We live in it, just as the space of the galaxy pervades every cell of our bodies. It is not to be sought in glamorous Aboves or

$\varphi = 225.732$ ρ = pagan K = celtic, + = Liturgical, * = Anulemmic Festivals

Av	DEC 21 *	Av	DEC 25 *	Av	JUN 22 *	MAR 21 *	SEP 21 *
224	224	224	224	225	225	225	226
	AUG 2 K		AUG 6 +		FEB 2 K +	NOV 1 K +	MAY 5
226.5	229	225.5	227	225.5	226	Sequence	or
	MAR 19 *		MAR 21 *		SEP 16 * P	is in	222
226.7	227	226.33	228	226	227	Dec 21 & 25	to
	NOV 1 K +		NOV 4 *		MAY 1 K +	225	MAY 1
226.25	225	225.25	222	226	226	JUN 14	Then in
	JUN 14 *		JUN 14 *		DEC 13 +		Midsumma
226.00	225	225.20	225	226	226		Sequence
	JAN 25 +		Jan 25 +		JUL 27 *		

225.2 → 221 (Sequence Combines.) 224.5

SEP 3 *

225.1 ~~225~~

APR 16 *

225.1 225

NOV 27 +

224.7 221

JUL 4 *

224.3 221

FEB 12 *

224.6 227

SEP 27 *

224.9 229

MAY 14 *

224.6 221 ~~225~~ 225 224.6

DEC 21 ~~DEC 25~~ DEC 25

224.6 224.6 224.2 223.9 224.2 224.6

225.7 224

MAR 8

225.4 224

OCT 18 *

225.4 225

MAY 31 +

224.8 220

JAN 6 +

224.5 222

AUG 16 +

224.4 223

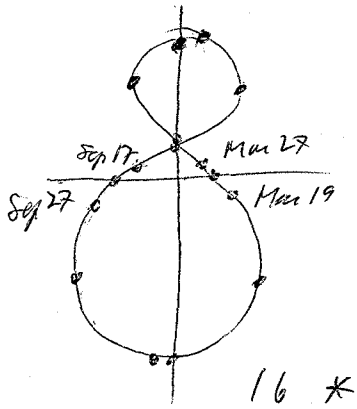
MAR 27 *

222.4 225

NOV 7

224.6 227

JUN 22 *



16 *

2 sequences Winter Summa 04 & Sept 21 out

~~13 X 365.24219 = 4748.1484~~

8 X 365.24219 = 2921.9375 356 X 8 = 2920

13 X 224.6 = 2920

off 8 days in 8 years

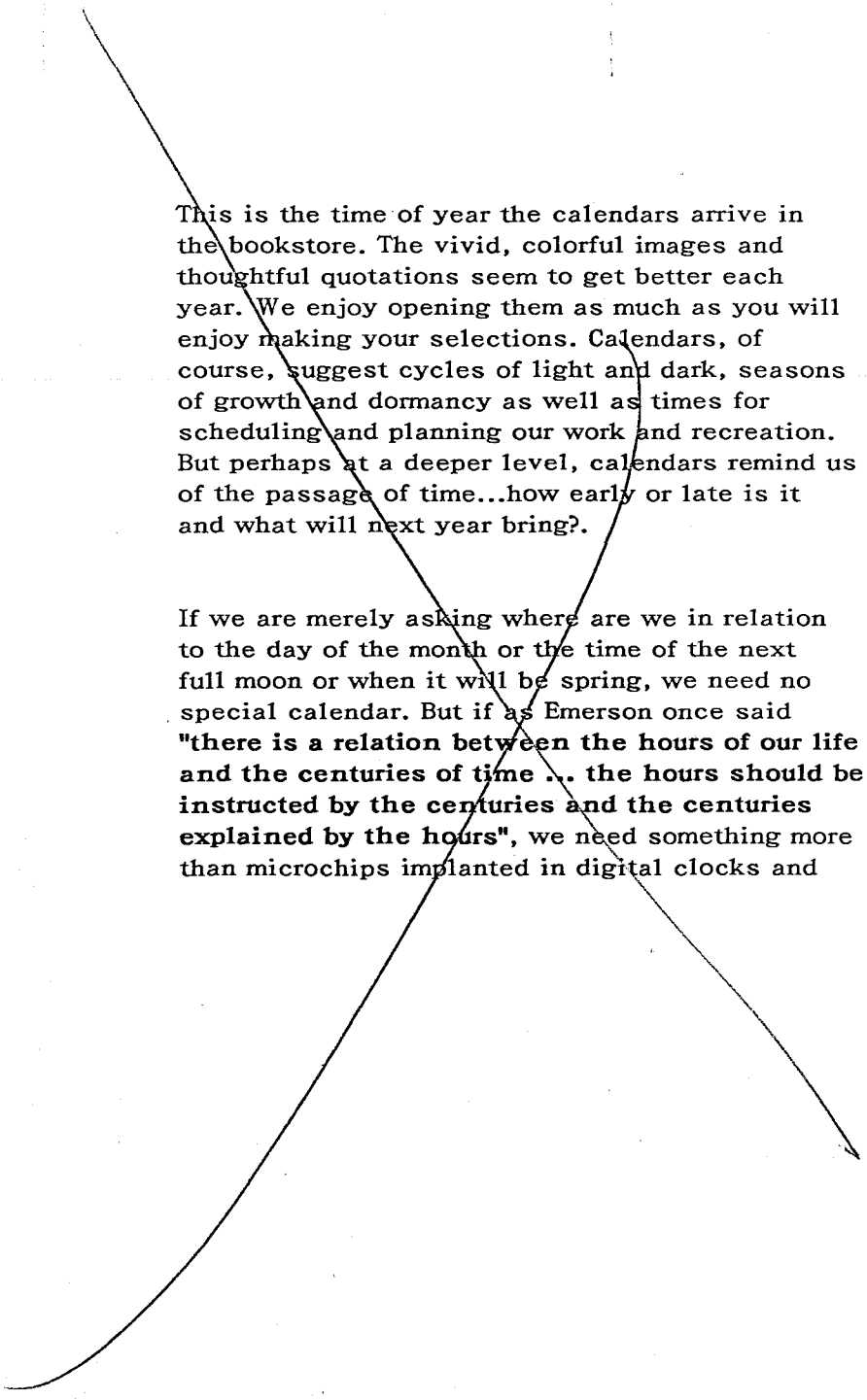
off 1 day in 4 years = leap year

i.e. the $\frac{8}{13}$ approx is ~ no leap year

365 φ = 225.58

The φ dates that are not anulemmic seem to have been selected as liturgical dates

is to consciously live the journey of the year. The **ESSENE BOOK OF DAYS**($12.95,paper) offers a journal format and meditation guide to do just that. It helps tune our awareness to the seasons of the world we live in and stop being carried away by the outer furies of trivia and stress.



This is the time of year the calendars arrive in the bookstore. The vivid, colorful images and thoughtful quotations seem to get better each year. We enjoy opening them as much as you will enjoy making your selections. Calendars, of course, suggest cycles of light and dark, seasons of growth and dormancy as well as times for scheduling and planning our work and recreation. But perhaps at a deeper level, calendars remind us of the passage of time...how early or late is it and what will next year bring?.

If we are merely asking where are we in relation to the day of the month or the time of the next full moon or when it will be spring, we need no special calendar. But if as Emerson once said **"there is a relation between the hours of our life and the centuries of time ... the hours should be instructed by the centuries and the centuries explained by the hours"**, we need something more than microchips implanted in digital clocks and

FESTIVALS

What are lemmics are omitted from the 2 sequence

Mar 19
Sep 21
Dec 21

What about Liturgicals

Christmas
Epiphany
Transfiguration
Easter
All Saints last Apostle
St. Paul —
Corpus Christi
St. Andrew
Michaelmas
Pentecost

St. Luke, St. Lucia, St Andrew, St. Michael 1° Apostle

Purification
Visitation
Annunciation
Assumption

Ascension?

Other Beltane (May Day)
Midsummer
Samhain
Oct Rev

TABLE 3

February 1	Bridgit or Imbolc	Litha + 224days
March 21	Eostar	
May 1	Beltane	Mabon + 222days
June 22	Litha	
August 1	Lammas or Lughnasegh	Yule + 223days
September 21	Mabon	
November 1	Samain	Eostar + 225days
December 21	Yule	

Most of these festivals have survived to modern times, though with altered names and forms. Bridgit has become Candlemas or The Presentation celebrated on February 2. Eostar has become Easter. Beltane is still celebrated as May Day, Litha as Midsummer, and Samain as Hallows or All Saints Day, while Yule has moved over to December 25th and become Christmas. Mabon and Lammas on the other hand have no modern counterparts although Mabon might be considered as the predecessor of Michaelmas and Lammas the predecessor of Transfiguration.

A second cycle of 13 festivals generated over eight years by means of the Golden Ratio complements the cycle given in TABLE 1. The new cycle is symmetrically placed in the year with respect to the first cycle. Each of the corresponding pair of dates are separated from one another by one-half year. This cycle is listed in TABLE 4.

TABLE 4.

DATE	ANALEMMA	SECULAR	ECLESIASTICAL
JUN22	e=0 E,dec max N	MIDSUMMER	
FEB2		GROUND HOG DAY	PURIFICATION
SEP17	de max W		ATONEMENT
MAY1		MAY DAY	BELTANE
DEC13			ST. LUCIA
JUL27	e 2nd max E		
MAR8			
OCT18			ST. LUKE

PSYCHOLOGY

ANAMOVE1.P51 DISK:JOY03 November 29, 1991

ON THE ANALEMMA AND S.A.D.

Three aspects of the apparent solar motion seem to have psychological impacts:

First is the north-south annual motion which is causally related to the climatic seasons and the latitude dependent light-dark cycle. The darkness appears to be causally related to Seasonal Affective Disorder or SAD. However, the two cycles per annum in the SAD data suggest that more than light-darkness is involved in the effect.

Second is the east-west displacement of the sun which displays two cycles per annum similar in both phase and amplitude to that of the SAD data. No causal connection between these two phenomena is known, but the varying tension between sun position and clock time suggests the hypothesis that something like a 'low ~~level~~ circadian jetlag' may be operating whose magnitude varies ~~as~~ with the equation of time.

Third is a relation between depression and the direction of motion of the apparent sun. The SAD data show that euphoria is increasing from the middle of February to the end of May. This closely approximates the period in which the sun is moving westward (February 12 to May 14). Next, depression increases in the SAD data from early June to mid August. During this period the sun is moving eastward (May 14 to July 27). Later, for a brief time from mid August to about the first of October euphoria increases, when again the sun is moving westward (July 27 to November 4). Beginning in October the SAD data shows depression increasing and reaching its lowest value in mid February. During most of this time (November 4 to February 12) the sun is moving east. The discrepancy between the early October date for SAD's onset of depression and the beginning of the eastward motion of the sun on November 4 may be due to the effect of the increasing darkness overriding the more subtle effects of the 'jetlag'. But except for this October discrepancy the data closely follow the generalization that <u>depression increases as the sun moves eastward and decreases as the sun moves westward.</u>

Another, subtle but possibly important, fact related to point three is the that throughout the year the apparent solar day is dilating or contracting with respect to the mean solar day. This effect also varies with two cycles per year, and corresponds to the second derivative of the east-west displacement of the apparent sun. The apparent day dilates from September 17 until Christmas, contracts from Christmas to March 27, dilates until the summer solstice, then contracts until September 17th. The day is most contracted on September 17-18th and most dilated on December 24-25th. The secondary contraction maximum is March 27th, the secondary dilation maximum is June 22nd. These four dates are at the inflection points of the equation-of-time vs. date curve. Dilation occurs when d^2e/dt^2 is negative and contraction occurs when d^2e/dt^2 is positive. Again, except for the October anomaly, emotional highs occur when dilating and emotional lows occur when contracting.

E-W effects are latitude independent

PSYCHOLOGICAL INTERPRETATIONS of the ANALEMMIC SEASONS

1. The Seasons of the Analemma
   a) The $e, \dot{e}, \delta, \dot{\delta}$ division
   b) The $\dot{e}, \ddot{e}, \dot{\delta}, \ddot{\delta}$ division

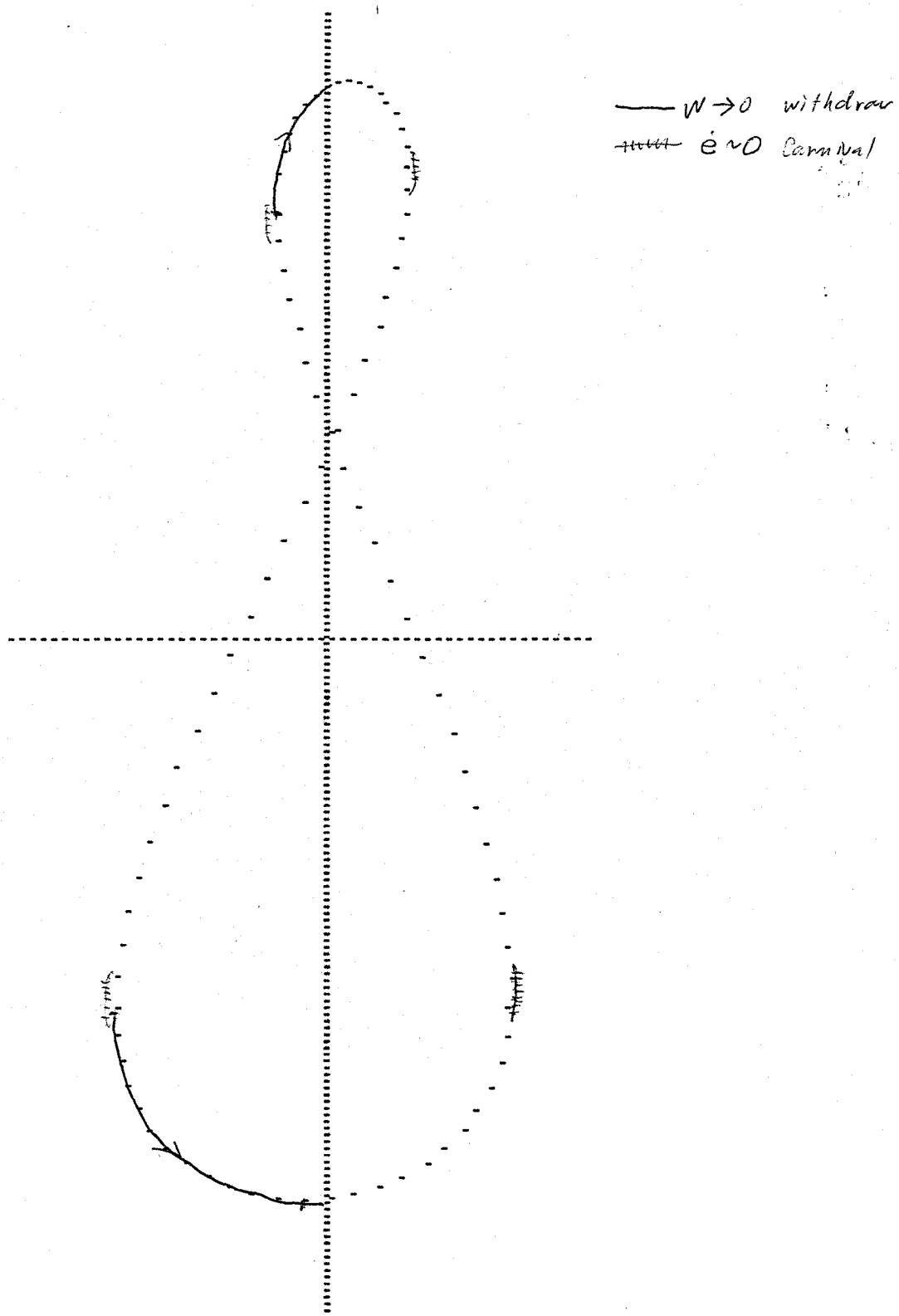
2. The North/South motion $\dot{\delta}$ or $\dot{y}$ — SUBJECTIVE
   Darkening/Brightening

3) The East/West motion $\dot{e}$ or $\dot{x}$ — SUBJECTIVE
   Accelerated/Delayed

4) The Subjective feeling/mood of the seasons — DATE/MOOD

5) Historical Associations of the seasons

NOTES:
Jet lag analogues for E/W motion
Inner ear response to terrestrial acceleration
Gravitational vectors as hands of clock


W → 0 withdraw
ė ~ 0 Carnival

PSYCHOLOGY (E-W only)

INTROVERTED TIMES W→O

i.e. $\dot{e}E$, eW $\ddot{e}E$

MAJOR NOV 4 TO DEC 25

MINOR MAY 15 TO JUL 14

EXTROVERTED TIMES E→O

$\dot{e}W$, eE

FEB 12 TO APR 15

JULY 28 TO SEP 2

CARNIVAL-LIKE TIMES $\dot{e} \doteq 0$

Major c. Nov 4 ~ ALL HALLOWS

c. Feb 12 ~ MARDI GRAS

Minor c. May 14 ~

c. July 27 ~ Lammas

calendar. The civil calendar considers time as linear and is used for all those purposes for which intervals of time must be calculated. On what date is the note due? How long before the shipment arrives? How many shopping days until Christmas? Liturgical calendars, on the other hand, consider time as cyclical and are for the purpose of informing us what activities should be emphasized at what times. Harvest is the time for thanksgiving, Lent is the time for purification, Carnival is the time for suspending the rules. The civil calendar holds that the quality of time is always the same, times differ only in their length. The liturgical calendar attempts to organize the changing physical and psychological aspects of time in accord with their seasons.

Although our cultural schizophrenia requires these two calendars, both are structured from the same basic astronomical data which derive from the rotation and revolution of the earth. To design any calendar we need to know the length of the year of the seasons, the so called tropical year (currently measured as being 365.24219 mean solar days) and we need to define a time when the longitude of the sun has a specified value (now taken as equal to zero when the sun crosses the equator at the vernal equinox). But the design of a liturgical calendar is even more complex. We must know additional parameters of the earth's orbit, the inclination and the eccentricity, so that we may determine when the day is lengthening and when it will be longest, when the day is shortening and when it will be shortest. We need data to tell when the sun is moving north, when south, when east and when west.

A principal problem in the construction of every calendar is the non-comensurability of the daily, monthly and annual cycles. The year and the month do not contain an integral number of days nor does the year contain and integral number of months. The problem centers on how to take care of the fractions of days that are left over after the year has been filled with whole days. Over centuries these fractions can lead to large discrepancies between the dates of the calendar and the seasons of the year. If calendars were needed solely for measuring intervals of time, then having periods with winter beginning in April and summer in October would be disconcerting but not disasterous. But if the seasons are important in our activities then we must establish a dependable correlation between the calendric dates and the physical and psychological quality of time. To do this the average length of the calendric year must equal as closely as possible the length of the tropical year.

An important step in this design was undertaken by Julius Caesar in 46 b.c. With the help of the astronomer Sosigenes, he designed a calendar in which the average calendric year was equal to 365.25 days (cf tropical year of 365.24219 days). The ingenious device was the concept of 'leap year', an extra day every fourth year. But even with this better approximation after 1500 years the year of the seasons had drifted 12 days with respect to the Julian calender. This change in the date of the coming of winter or spring was becoming widely noticable. The time had come for another refinement. In 1582 Pope Gregory XIII with the help of the astrnomer Clavius, established a new

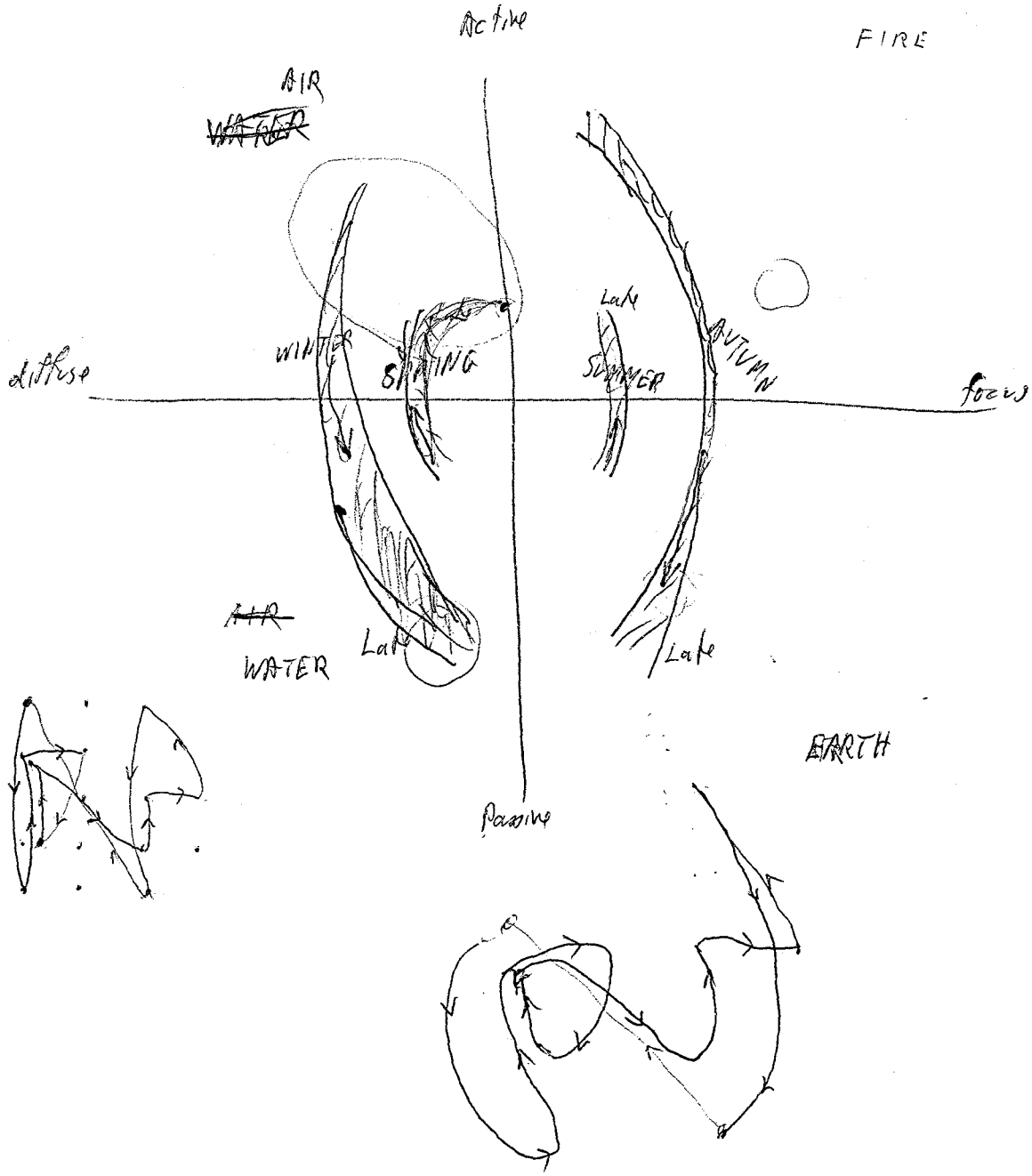
~~The ė, ė, ṡ, ṡ Division~~

I The ė, ṡ Division [Based on the extremes of ė and ṡ and their zeros]

A	Dec 25 – Feb 12	49 days	eE, ėE, ëW, SS, ṡN, s̈N	CHRISTMAS/EPIPHANY
B	Feb 12 – Mar 19	35 days	eE, ėW, ëW, ṡS, ṡN, s̈N	LENT
C	Mar 19 – Mar 27	8 days	eE, ėW, ëW, ṡ changes, ṡN, s̈S	EASTER
D	Mar 27 – May 14	48 days	e changes, ėW, ëE, ṡN, ṡN, s̈S	SPRING
E	May 14 – Jun 22	39 days	e changes, ėE, ëE, ṡN, ṡN, s̈S	LATE SPRING
F	Jun 22 – July 27	35 days	eE, ėE, ëW, ṡN, ṡS, s̈S	EARLY SUMMER
G	July 27 – Sep 17	52 days	e changes, ėW, ëW, ṡN, ṡS, s̈S	LATE SUMMER
H	Sep 17 – Sep 27	10 days	eW, ėW, ëE, ṡ changes, ṡS, s̈S	MICHAELMAS
I	Sep 27 – Nov 4	38 days	eW, ėW, ëE, ṡS, ṡS, s̈N	AUTUMN
J	Nov 4 – Dec 21	47 days	eW, ėE, ëE, ṡS, ṡS, s̈N	Harvest/Advent
K	Dec 21 – Dec 25	4 day	eW, ėE, ëE, ṡS, ṡN, s̈N	Yule
(11)		365		

II The ė, ë, ṡ, s̈ Division I

							FROM NORTH TEMPERATE			
			e	ė	ë	δ	δ̇	δ̈		
1	A	DEC25 – FEB2	E	YIN	slowing	S	Brightening	speeding		
2	B	FEB 2 – FEB12	E	"	"	S	"	"		
3	C	FEB12 – MAR19	E	YANG	speeding	S	"	"		
4	D	MAR19 – MAR21	E	"	"	S	"	Slowing		
5	E	MAR21 – MAR27	E	"	"	N	"	"		
6	F	MAR27 – APR16	E	"	slowing	N	"	s "		
7	G	APR16 – MAY15	W	"	"	N	"	"		
8	H	MAY15 – JUN14	W	YIN	speeding	N	"	"		
9	I	JUN14 – JUN22	E	~~YIN~~ "	"	N	"	"		
10	J	JUN22 – JUL27	E	"	slowing	N	Darkening	speeding		
11	K	JUL27 – AUG6	E	YANG	speeding	N	"	"		
12	L	AUG6 – SEP3	E	~~YANG~~ "	"	N	"	"		
13	M	SEP3 – SEP17	W	"	"	N	"	"		
14	N	SEP17 – SEP21	W	"	slowing	N	"	"		
15	O	SEP21 – SEP27	W	"	"	S	"	"		
16	P	SEP27 – NOV4	W	"	"	S	"	slowing		
17	Q	NOV4 – DEC21	W	YIN	speeding	S	"	"		
18	R	DEC21 – DEC25	W	"	"	S	Brightening	speeding		
19										
20			not same diagram					BREAK EPI	PHANY	WINTER
21		Combine	A – B	Light ↑ Yin ↑	DEC25 – FEB12	EPIPHANY	or WINTER	→ DEC 25	– JAN6, JA	N6 – FEB12
22			C	Light ↑ Yang ↑	FEB12 – MAR19	LENT				
23			D – E	Light ↓ Yang ↑	MAR19 – MAR27	EASTER				
24			F – G	Light ↓ Yang ↓	MAR27 – MAY15	SPRING	→ ~~PENTACOST~~			
25			H – I	Light ↓ Yin ↑	MAY15 – JUN22	PENTACOST				
26			J	Dark ↑ Yin ↓	JUN22 – JUL27	SUMMER				
27			K – L – M	Dark ↑ Yang ↑	JUL27 – SEP17	LAMMAS				
28			N – O –	Dark ↑ Yang ↓	SEP17 – SEP27	MICHAELMAS				
29		11 Periods	P	Dark ↓ Yang ↓	SEP27 – NOV4	AUTUMN				
30			Q	Dark ↓ Yin ↑	NOV4 – DEC21	ADVENT				
31			R	Light ↑ Yin ↑	DEC21 – DEC25	CHRISTMAS				
32										
33										
34										


Active
FIRE
AIR
~~WATER~~
diffuse
WINTER
SPRING
Late
SUMMER
AUTUMN
focus
~~AIR~~
WATER
Late
Late
EARTH
Passive

Church as appropriate for the celebration of the Resurrection of the Christ, but here, after much controversy, the date was changed to be in accord with the Hebrew lunar calendar rather than holding with the tradition of the vernal equinox.

DATE	CELTIC NAME	PRESENT NAME
February 2	Brigit or Imbolc	Candlemas
March 21	Eostar	Easter
May 1	Beltain	May Day
June 22	Litha	Midsummer
August 2	Lammas or Lughnasegh	
September 21	Mabon	
November 1	Samain	All Hallows
December 22	Yule	Christmas

Beltis is the Sabian name for the goddess Venus. Beltain, May 1, was the celebration of mid-spring given to orgiastic revels on the day after Valpurgis Night when evil was abroad. May Day retains its importance both liturgically and secularly. Its present meanings vary from honoring the Virgin to the Communist International Labor Day, the most important festival in Easten Bloc countries.

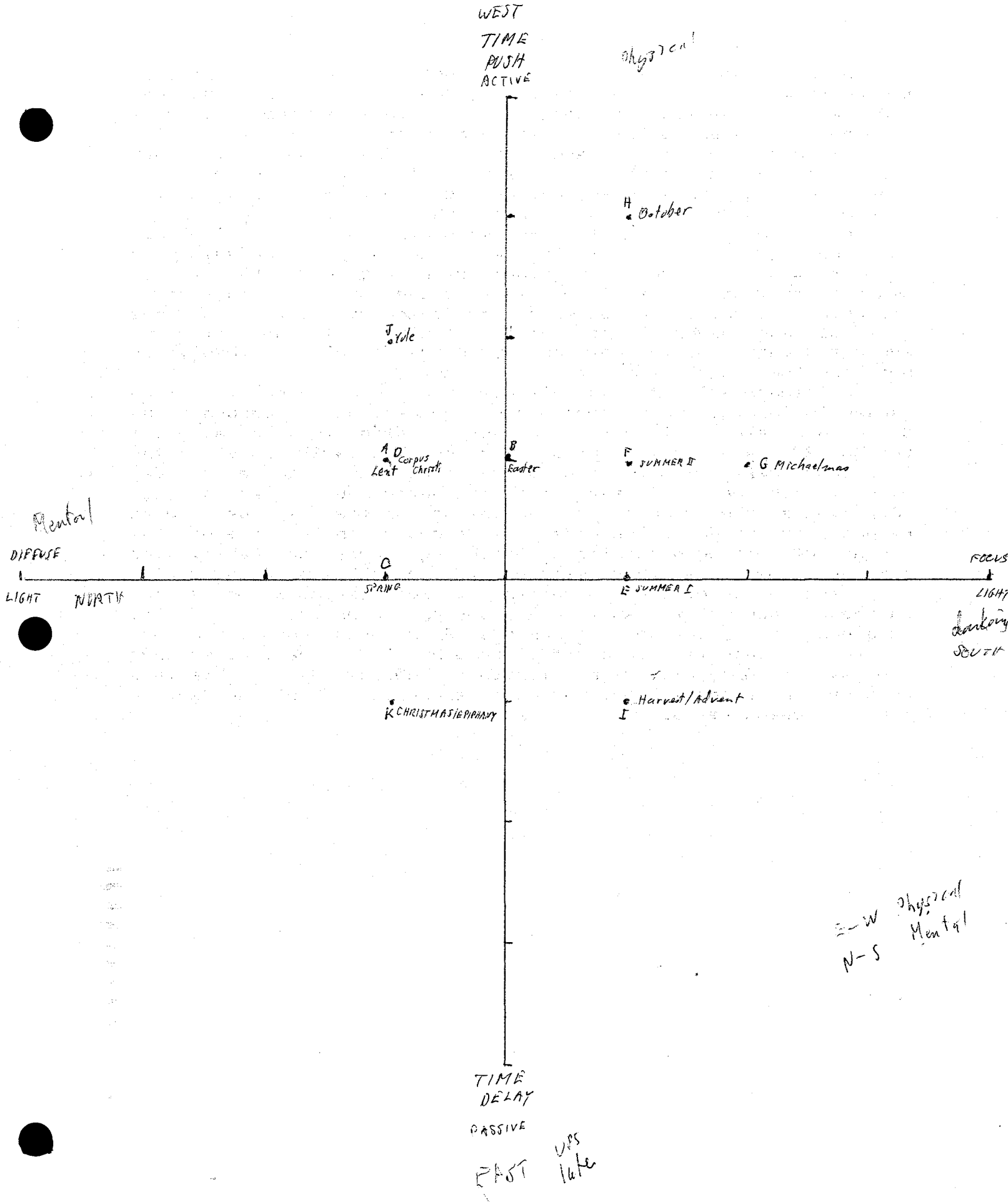
Midsummer, June 22nd the summer solstice, was celebrated with bonfires and sacrifices. It is still an important festival especially in Scandinavian countries where it is accompanied with all night revelries in the glow of the midnight sun.

Lammas shortened from Lughomas, celebrated as a wake for the god Lugh on August 2, became a mid-summer fair between the hay harvest and the corn harvest. This festival has not survived except locally in parts of Ireland and Britain. Its nearest Christian derivative is the Feast of the Transfiguration on August 6th.

Mabon or Mab, the autumnal equinox, the time of the Poet, a figure of importance equal to the warrior or prince. The season for recounting and interpreting of the sagas of sky and earth, perhaps now reflected in the saga of St Michael and All Angels celebrated on September 29th.

Samas, Sabian for the Sun. Samhain, the festival of the death of the year, November 1, the Celtic new year. A time when the separation between the worlds of the living and of the dead became a minimum. A foreboding time, fraught with great peril. All Hallows Eve when the world might be seized by wraiths and witches. The numinosity of this time is carried today in our practice of Halloween masks to frighten the real demons and in the dedication of the next two days by the Church for the veneration (and appeasement?) of all souls and saints.

Yule, the winter solstice, along with mistletoe and yule logs has been incorporated into Christmas. The history of the change in date is obscure. Yule was the birthday of the sun god, but December 25th was the birthday of Mithraic sun god, adopted by the Church as the birthday of Jesus in the sixth century. All of the days from December 21 through December 25th are special days. The Celts reserved December 23rd as a day belonging to no month, a sort of leap day.


WEST
TIME
PUSH
ACTIVE
Physical
H October
J Yule
A D Corpus Christi
Lent
B Easter
F SUMMER II
G Michaelmas
Mental
DIFFUSE
LIGHT
NORTH
C SPRING
E SUMMER I
FOCUS
LIGHT
darkening
SOUTH
K CHRISTMAS/EPIPHANY
I Harvest/Advent
E-W Physical
N-S Mental
TIME
DELAY
PASSIVE
EAST
UPS late

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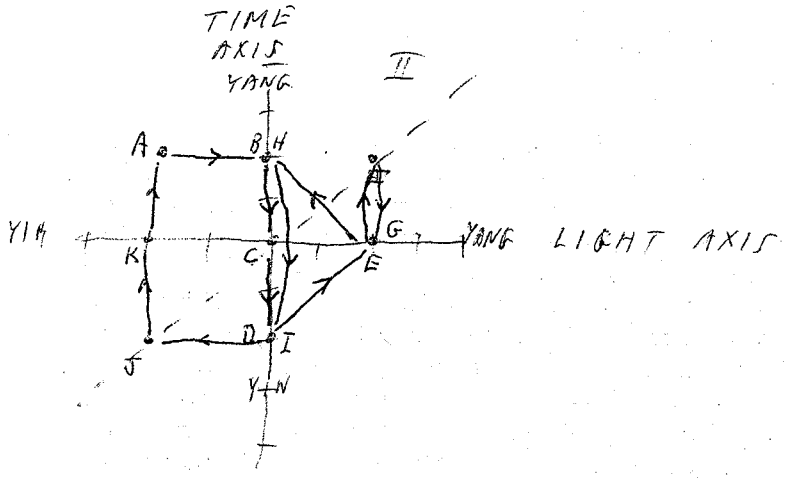
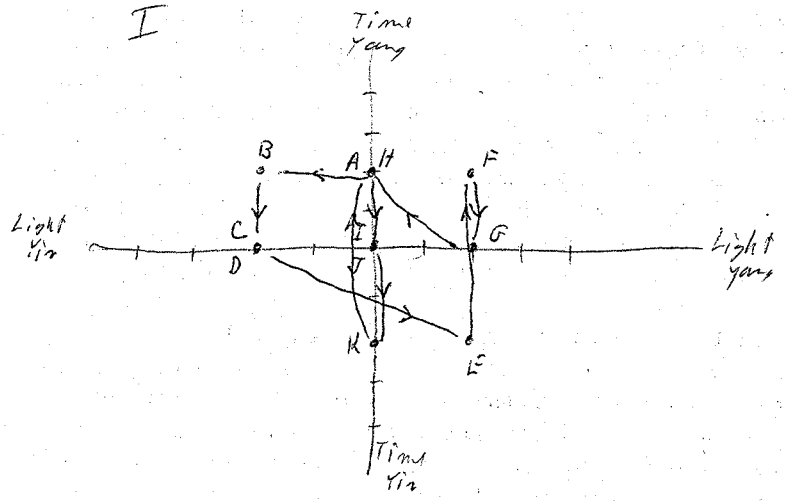
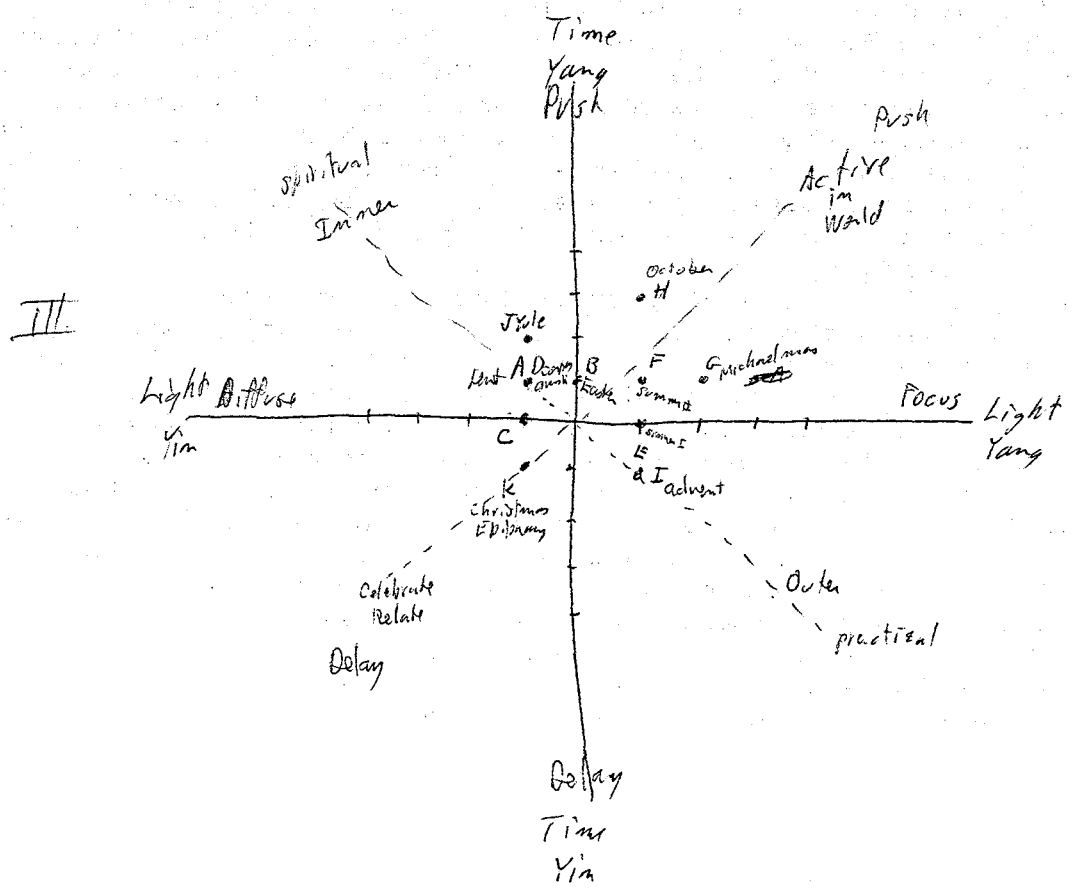
TWO DIMENSIONAL EVALUATIONS







CALENDARS

Calendars are yardsticks for the measure of time. Their basic structure derives from the cyclical astronomical configurations of the earth, sun and moon which determine the length of the day, month and year. Calendars are needed not only for counting the number of lapsed days, months and years, but are also essential for keeping the counts synchronized with the seasons. Seasons are manifestations of the 'quality' of time and calendars are needed to inform us when to expect cold and heat and when to prepare to plant and harvest. Since nature--the world of plants and animals--is closely guided by the seasons, the closer our culture interacts with nature the more significant the quality aspects of time become. Primitive cultures not only devised calendars to reckon the timing of the seasons but to organize the the moods and the feelings of the year--the psychological aspects of time. As industrialization and urbanization decoupled civilization from nature, the psychological year slipped into the unconscious, and emphasis shifted to the physical year and to the notion that duration was the only essential attribute of time. But a vestige of the psychological year has endured in various eclesiastical or liturgical calendars though frequently clothed in the language and symbolism of various religious traditions.

Thus today we find ourselves possessing two calendars: The civil or secular calendar and the liturgical or religious calendar. The civil calendar considers time as linear and is used for all those purposes for which intervals of time must be calculated. On what date is the note due? How long before the shipment arrives? How many shopping days until Christmas? Liturgical calendars, on the other hand, consider time as cyclical and are for the purpose of informing us what activities should be emphasized at what times. Harvest is the time for thanksgiving, Lent is the time for purification, Carnival is the time for suspending the rules. The civil calendar holds that the quality of time is always the same, times differ only in their length. The liturgical calendar attempts to organize the changing physical and psychological aspects of time in accord with their seasons.

Although our cultural schizophrenia requires these two calendars, both are structured from the same basic astronomical data which derive from the rotation and revolution of the earth. To design any calendar we need to know the length of the year of the seasons, the so called tropical year (currently measured as being 365.24219 mean solar days) and we need to define a time when the longitude of the sun has a specified value (now taken as equal to zero when the sun crosses the equator at the vernal equinox). But the design of a liturgical calendar is even more complex. We must know additional parameters of the earth's orbit, the inclination and the eccentricity, so that we may determine when the day is lengthening and when it will be longest, when the day is shortening and when it will be shortest. We need data to tell when the sun is moving north, when south, when east and when west.

ONE-DIMENSIONAL EVALUATIONS

δ S Yang, N Yin
e E Yin, W Yang

Weight with value of e and δ

		Light δ	Time e	Total		
A	Feb 12 - Mar 19	Yin + Yang	Yang + Yin	0	LENT	ASSESS
B	Mar 19 - Mar 27	Yin - 0	Yang + Yin	1	EASTER	OUTER ACTIVE
C	Mar 27 - May 15	Yin - Yin	Yang - 0	-1	QUIET	ASSESS
D	May 15 - June 22	Yin - Yin	Yin + Yang	-2	QUIET	EVALUATE
E	June 22 - July 27	Yang + Yin	Yin - 0	1	ACTIVE	
F	July 27 - Sep 17	Yang + Yin	Yang + Yin	2	ACTIVE	
(11) G	Sep 17 - Sep 27	Yang + 0	Yang - Yang	3	ACTIVE	
H	Sept 27 - Nov 4	Yang - Yang	Yang + Yang	4	ACTIVE	
I	Nov 4 - Dec 21	Yang - Yang	Yin + Yang	0	ADVENT	PLAN, REVIEW
J	Dec 21 - Dec 25	Yin + Yang	Yin + ~~Yang~~ 0	-3	RECEIVE	
K	Dec 25 - Feb 12	Yin + Yang	Yin - ~~Yin~~	-2	ASSESS	INNER ACTIVE

WHEN DO WE RELATE?
NOT RELATE

III

THE ANALEMMA AND ITS SEASONS

Although not a universal practice, the most natural division of the year seems to be into four seasons, the seasons delineated by Hipparchus--Spring, Summer, Autumn, and Winter. This division matches well the phenomena of the physical seasons as manifested in the temperate zones. However, this quatenary division does not satisfactorily map the fine structure exhibited by the physical changes in the cycle of the year. The present solar calendar makes up for this deficiency by superimposing on its basic structure a set of twelve divisions called months, which are really pseudo-months having no correspondence with the actual cycles of the moon. But with the aid of these months it has been possible to relate most of the annualy changing physical phenomena to the calendar. This has not been true, however, for relating the moods, feelings and other quality aspects of time to the calendar. But there is another way to go. The seasons are an annual phenomenon, They are related to the annual cycle of the sun, It is misleading to try to tie them to the cycles of the moon, even more so to pseudo-cycles of the moon. It is important to remain with the motions of the sun.

Hipparchus' contributions to our knowledge of the motions of the sun, great as they were, did not complete the description. It remained for astronomers of later times to develop deeper understanding. The sun's annual cycle from the winter solstice northward through the vernal equinox to the summer solstice, back through the autumnal equinox to the winter solstice causing the lengthening and shortening of days and the bringing of heat and cold, is in the conscious experience of all. But few know that in addition to the sun's north-south excursions there are also east-west excursions. This fact has been obscured by the daily rotation of the earth. The north-south excursions are brought about because the earth's axis of rotation is not perpendicular to the plane of its orbit. The east-west excursions are caused both by this non-perpendicularity and by the fact that the earth's orbit is not circular. The total annual motion of the sun, when both the north-south and east-west components are combined, is a large figure-eight, extending about 47 degrees north and south and 7 degrees east and west. This figure-eight has been called the analemma.

One of the most astonishing properties of the analemma is the presence of the Golden Ratio in its basic structure. The two loops of the figure-eight have the property that the length of the northern loop is to the length of the southern loop as the length of the southern loop is to the entire year. In other words, the cross-over point of the figure-eight divides the year in the Golden Ratio. This is all the more remarkable because the structure of the analemma depends on the value of certain numbers defining the earth's orbit (particularly the obliquity of the ecliptic and the eccentricity) and these values change with time with cyclic periods of several tens of thousands of years. Thus the analemmic division by the Golden

SAVE FOR FESTIVALS OF THE ANALEMMA

Darkening focuses clouds in ∴ is yang
also compacting is yang

delaying ~ diffusing
racing ~ compacting

July 27 - Sep 17
Yang acc
Yang acc

Sept. 27 - Nov 4
Yang dec
Yang acc

Sep 17 - Sep 27
Yang acc
Yang dec

Clearing
Racing

But δ ground is low
e ground is low

ONE DIMENSIONAL EVALUATIONS

Strong ground δr
$\dot{\delta}$
is when δ is way South
large neg
Strong ground δr
$\ddot{\delta}$
is when δ is small
Near solstices

			Light	Time		+ Yang, − Yin	+ − neither	
Lent	A	Feb 12 - Mar 19	YIN +	YANG +	− neutral	2	0	
PASSION / PASCAL	B	Mar 19 - Mar 27	YIN −	YANG +	− slight yang	0	2	EASTER
	C	MAR 27 - MAY 15	YIN −	YANG −	−	−2	0	
	D	MAY 15 - JUN 22	YIN −	YIN +	yin	−2	−2	CORPUS CHRISTI
	E	JUN 22 - JUL 27	YANG +	YIN −	slight yang	0	+2	
	F	JUL 27 - SEP 17	YANG +	YANG +	MOST YANG TIME	4	4	
	G	SEP 17 - SEP 27	YANG +	YANG −	Yang	2	2	
	H	SEP 27 - NOV 4	YANG −	YANG +	Yang	2	2	
	I	NOV 4 - DEC 21	YANG −	YIN +	slight yin	0	−2	ADVENT
	J	DEC 21 - DEC 25	YIN +	YIN +	MOST YIN TIME	0	Receive −4	YULE
	K	DEC 25 - FEB 12	YIN +	YIN −	Yin	−2	−2	CHRISTMAS EPIPHANY

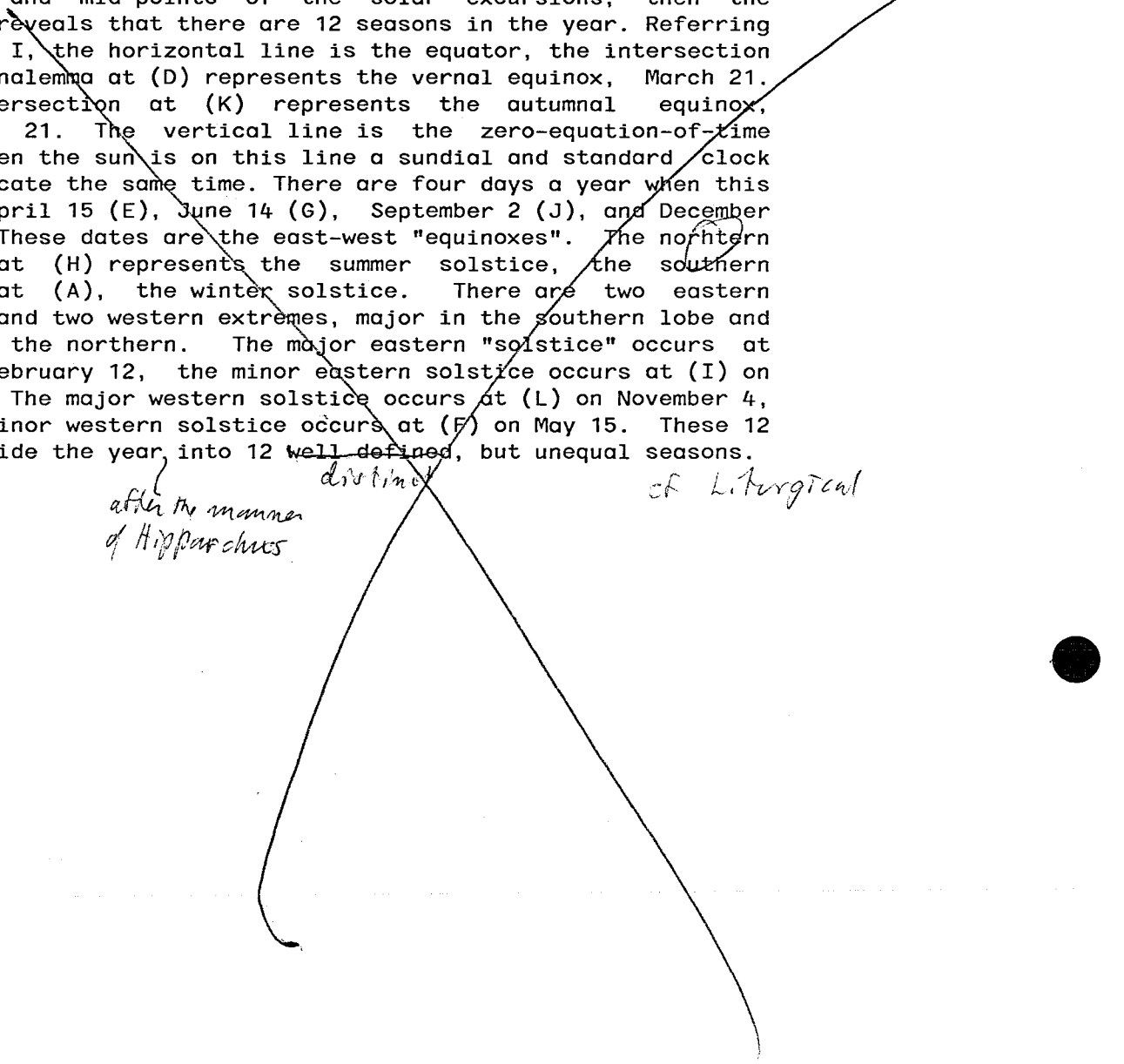
I I

Section is peculiar to our own times and makes the present period in history one that is unique.

If in the tradition of Hipparchus, we define seasons in terms of the solstices and equinoxes, that is in terms of the extremes and mid-points of the solar excursions, then the analemma reveals that there are 12 seasons in the year. Referring to Figure I, the horizontal line is the equator, the intersection of the analemma at (D) represents the vernal equinox, March 21. The intersection at (K) represents the autumnal equinox, September 21. The vertical line is the zero-equation-of-time line. When the sun is on this line a sundial and standard clock will indicate the same time. There are four days a year when this is so: April 15 (E), June 14 (G), September 2 (J), and December 25 (B). These dates are the east-west "equinoxes". The northern extreme at (H) represents the summer solstice, the southern extreme at (A), the winter solstice. There are two eastern extremes and two western extremes, major in the southern lobe and minor in the northern. The major eastern "solstice" occurs at (C) on February 12, the minor eastern solstice occurs at (I) on July 27. The major western solstice occurs at (L) on November 4, and the minor western solstice occurs at (F) on May 15. These 12 dates divide the year into 12 ~~well defined~~ distinct, but unequal seasons.

after the manner of Hipparchus

of Liturgical



CHANGES IN

ë or ö or è or ȯ

DEC 21 YULE
DEC 25 CHRISTMAS/EPIPHANY
FEB 12 LENT — SAME AS MAX-MIN MOTION
MAR 19 EASTER/PASCAL
MAR 27
MAY 15
JUN 22 — This begins to look like the liturgical calendar
JUL 27
SEP 17 MICHAELMAS
SEP 27
NOV 4 HALLOWS

(11) SEASONS

FEB 12 - MAR 19 ë↑, ö↑ ėW, ëW, ȯN, öN
It is brightening, with acceleration
It is compacting, with acceleration

DEC 21 - DEC 25 ë↑, ö↑ ėE, ëE, ȯN, öN
It is brightening, with acceleration
It is dilating, with acceleration

Jul 27 - Sep 17 ë↑, ö↑ ėW, ëW, ȯS, öS
It is darkening with acceleration
It is compacting with acceleration

Mar 27 - May 15 ë↓, ö↓ ėW, ëE, ȯN, öS
It is brightening with deceleration
It is compacting with deceleration

Sep 27 - Nov 4 ë↓, ö↓ ėW, ëE, ȯS, öN
It is darkening with deceleration
It is compacting with acceleration

MAR 19 - MAR 27 ë↑, ö↓ ėW, ëW, ȯN, öS
It is brightening with deceleration
It is compacting with acceleration

May 15 - Jun 22 ë↑, ö↓ ėE, ëE, ȯN, öS
It is brightening with deceleration
It is diffusing with acceleration

Nov 4 - Dec 21 ë↑, ö↓ ėE, ëE, ȯS, öN
It is darkening with deceleration
It is diffusing with acceleration

Dec 25 - Feb 12 ë↓, ö↑, ėE, ëW, ȯN, öN
It is brightening with acceleration
It is diffusing with deceleration

Jun 22 - Jul 27 ë↓, ö↑ ėE, ëW, ȯS, öS
It is darkening with acceleration
It is diffusing with deceleration

Sep 17 - Sep 27 ë↓, ö↑, ėW, ëE, ȯS, öS
It is darkening with acceleration
It is compacting with deceleration

THE ANALEMMA AND ITS SEASONS

Although not a universal practice, the most natural division of the year seems to be into four seasons, the seasons delineated by Hipparchus--Spring, Summer, Autumn, and Winter. This division matches well the phenomena of the physical seasons as manifested in the temperate zones. However, this quatenary division does not satisfactorily map the fine structure exhibited by the physical changes in the cycle of the year. The present solar calendar makes up for this deficiency by superimposing on its basic structure a set of twelve divisions called months, which are really pseudo-months having no correspondence with the actual cycles of the moon. But with the aid of these 'months' it has been possible to relate most of the annualy changing physical phenomena to the calendar. This has not been true, however, for relating the moods, feelings and other quality aspects of time to the calendar. But there is another way to go. The seasons are an annual phenomenon and therefore related to the annual cycle of the sun. It is misleading to try to tie them to the cycles of the moon, and even more misleading to pseudo-cycles of the moon. It is important to remain with the motions of the sun.

Hipparchus' contributions to our knowledge of the motions of the sun, great as they were, did not complete the description. It remained for astronomers of later times to develop deeper understanding. The sun's annual cycle from the winter solstice northward through the vernal equinox to the summer solstice, back through the autumnal equinox to the winter solstice causing the lengthening and shortening of days and the bringing of heat and cold, is in the conscious experience of all. But few know that in addition to the sun's north-south excursions there are also east-west excursions. This fact has been obscured by the daily rotation of the earth. The north-south excursions are brought about because the earth's axis of rotation is not perpendicular to the plane of its orbit. The east-west excursions are caused both by this non-perpendicularity and by the fact that the earth's orbit is not circular. The total annual motion of the sun, when both the north-south and east-west components are combined,is a large figure-eight, extending about 47 degrees north and south and 7 degrees east and west. This figure-eight has been called the analemma.

C-D	→EQ=G	DEC 21 - MAR 21	JUN 21 - SEP 21	EQ→ = N	MAR 21 - JUN 21	SEP 21 - DEC 21
E-W	→W = G	FEB 12 - MAY 14	JUL 27 - NOV 4	→E = N	NOV 4 - FEB 12	MAY 14 - JUL 27
T-F	→ O eq of t G	NOV 4 - DEC 25	FEB 12 - APR 16	O eq of t → N	DEC 25 - FEB 12	APR 16 - MAY 14
"		MAY 14 - JUN 14	JUL 27 - SEP 3		JUN 14 - JUL 27	SEP 3 - NOV 4
accel N-S	↑N G	DEC 21 - MAR 19		↓N N	MAR 19 - JUN 21	
	↑S G	JUN 21 - SEP 27		↓S N	SEP 27 - DEC 21	
accel E-W	↑E G	NOV 4 - DEC 25	MAY 14 - JUN 21	↓E N	DEC 25 - FEB 12	JUN 21 - JUL 27
	↑W G	FEB 12 - MAR 27	JUL 27 - SEP 17	↓W N	MAR 27 - MAY 14	SEP 17 - NOV 4
A-P	↑R ↓R G	JUL 3 - JAN 2		↓R ↑R N	JAN 2 - JUL 3	

GG (18)

	C-D	mov E-W	T-F	accel N-S	accel E-W	A-P	#
NOV 4 - DEC 21	N	N	G	N	G	G	3
DEC 21 - DEC 25	G	N	G	G	G	G	5
DEC 25 - JAN 2	G	N	N	G	N	G	3
JAN 2 - FEB 12	G	N	N	G	N	N	2
FEB 12 - MAR 19	G	G	G	G	G	N	5
MAR 19 - MAR 21	G	G	G	N	G	N	4
MAR 21 - MAR 27	N	G	G	N	G	N	3
MAR 27 - APR 16	N	G	G	N	N	N	2
APR 16 - MAY 14	N	G	N	N	N	N	1
MAY 14 - JUN 14	N	N	G	N	G	N	2
JUN 14 - JUN 21	N	N	N	N	G	N	1
JUN 21 - JUL 3	G	N	N	G	N	N	2
JUL 3 - JUL 27	G	N	N	G	N	G	3
JUL 27 - SEP 3	G	G	G	G	G	G	6
SEP 3 - SEP 17	G	G	N	G	G	G	5
SEP 17 - SEP 21	G	G	N	G	N	G	4
SEP 21 - SEP 27	G	G	N	G	N	G	4
SEP 27 - NOV 4	G	G	N	N	N	G	3

3G earth
2G water
1G air
3N fire

C-D ~~N-S~~ A-P	E-W T-F E-W		low discrimination	high disc	absolute
NNG AIR	NGR water	earth/fire	air/water	Fire/earth	
GGG EARTH	NGG water				water/earth
GGG EARTH	NNN fire	air/water	air/water	Fire/earth	
GGN WATER	NNN fire	air/air	air/air	Fire/water	
GGN WATER	GGG earth				water/earth
GNN AIR	GGG earth	water/water	water/water	air/earth	
NNN FIRE	GGG earth	air/water	air/water	Fire/earth	
NNN fire	GGN water	air/air	air/air	Fire/water	
NNN fire	GNN air				fire/air
NNN fire	NGG water	air/air	air/air	fire/water	
NNN fire	NNG air				fire/air
GGN WATER	NNN fire	air/air	air/air	Fire/water	
GGG EARTH	NNN fire	water/air	air/water	Fire/earth	
GGG earth	GGG earth				earth/earth
GGG earth	GNG water				water/earth
GGG earth	GNN air	water/water	water/water	air/earth	
GGG earth	GNN air	water/water	water/water	air/earth	
GNG WATER	GNN air	fire/earth	air/water	fire/earth	

J. of Y. SUBJECTIVE

Seasons: Based on position and motion of the Sun

$\delta, \dot{\delta}$ → Physical Seasons (outer or) Horizontal YIN/YANG

$e, \dot{e}$ → Psychical Seasons (inner or) Vertical YIN/YANG

Festivals: Based on critical days and the Golden Ratio

Major Chain 12/25 → The 13 day / 8 year approximation to φ

Minor Chain 06/22 → " " " " "

Seed Days, Golden Days, ... Limit Days

A Liturgical Year is like a musical composition

∃ two "scales," the major and the minor

δ and $\dot{\delta}$ Referenced to north temperate latitudes

Horizontal or Physical

$\dot{\delta} \to S \Rightarrow$ Darkening

$\delta \to N \Rightarrow$ Brightening

STATE OF EARTH OR SELF

Darkening

A closing in (Yang)

Horizontal Focusing, Centering

Horizontal withdrawal

Narrowing field ⇒ increased resolving power ∴ more clarity and intense

Rising Anticipation

calming

Brightening

An Opening up (YIN)

Horizontal Spreading, Diffusing

Horizontal relating

Widening field ⇒ less resolving power ∴ less clarity, intense

Rising Disillusion, disappointment

anxiety

stimulating

dissatisfaction

restlessness

dissaffection

e and $\dot{e}$ Globally valid

"WOLF" TIME

Vertical or Spiritual

$\dot{e} \to E \Rightarrow$ dilation of time (~ Jet lag flying west)

$\dot{e} \to W \Rightarrow$ compaction of time (~ Jet lag flying east)

STATE OF HEAVEN OR OTHER

Compaction

A closing in (YANG)

Vertical focusing, i.e. to one level

Vertical withdrawal

initiating

Lowering Consciousness (self-reference)

Depressing

deadening

energy flow out

Dilation

An opening up (YIN)

Vertical extending to multi-levels

Vertical relating

receptive

Rising Consciousness increasing self-reference

Inspiring

energy entering

Physical Horizontal is continuous

Vertical is discreet

Spiritual

JOYNOTE2.WSR AGW 11/11/87

MONTH	J of Y (AGW)	KWAN YIN I CHING	HEXAGRAM No.
NOVEMBER PAST ORIENTED	REFLECTION SUMMING UP EVALUATION COMMEMORATION	SPLITING APART	23
DECEMBER	CONTEMPLATION RECEPTION DETACHMENT TRANS-TEMPORAL	CONTEMPLATION WHEEL OF LIFE	20 24
JANUARY FUTURE ORIENTED	INITIATING OPEN ENDED	APPROACH	19
FEBRUARY	PURIFYING PRUNING SPECIFYING WHAT IF	PEACE	11
MARCH	DISCIPLINE PERSEVERENCE EFFORT SACRIFICE	JUSTICE BEGINNINGS	34 64
APRIL	RECOGNITION RESURRECTON	RESOLUTION	42
MAY	MATERIALIZATION DISSEMINATION	LETTING GO	43
JUNE	OUTER ORIENTED	THE GODESS' GIFTS	14
JULY	FELLOWSHIP CONCERTED ACTION	COMING TO MEET	44
AUGUST	LAID BACK DISOLVING	CARESSING FIRE	30
SEPTEMBER	MICHAELMAS	DISHARMONY WITHDRAWAL	12 33
OCTOBER	COMPLETION CELEBRATION	COMPLETION ABUNDANCE	63 55

SUBJECTIVE EXPLANATION

It is also important with the analemma to introduce the Weber-Fechner Law

The power of darkening increases as the darkness increases:

$$\frac{\dot{\delta}}{(\lambda - \delta)} \geq 1$$ i.e. not only the rate of darkening as $\delta \to$ South but the level of darkness which may be measured in a first approximation by the meridional sun-zenith angle $= \lambda - \delta$ where λ is the latitude

Of course in responding to the rate of darkening we are responding to $\dot{\delta}$

The effect of the Weber-Fechner Law in the East/West motions is not so clear.

The velocity to the east (or west) seems to be the significant parameter $\frac{\delta \dot{e}}{e}$?

Other possible parameters $\ddot{e}$ and whether moving toward or away from $e = 0$ or curvature of path being + or - i.e. concave on the right or left

What is the proper way to consider the Weber-Fechner Law with regard to the ANALEMMA

	Mood DATE/MOOD	Physical Activities
	Withdrawal	Small Tasks - Nothing Big
	Introspective	Planning
A Harvest/Advent		
B YULE	Expectation	
	"Excitement/Calm" tension	Decorating
C Christmas/Epiphany	Relating, Relief	
	Outgoing	Getting Started
D LENT		Initiating
	Tedeum,	
	Persistance	Commitment - Routine
	Faithfulness	Dedication
		Discipline
E Easter	Joy - Alive in Heaven	
F Spring		
G Late Spring	[Exposure to New]	Push - Travel Meet
	Withdraw	
H Early Summer	Remembrance	Evaluation
		Digestion
I Late Summer	~~Reserve~~	
	Go With It	Mid course Correction
J Michaelmas	Focused	Vacation,
		Synthesis of Cosmos + Terra
K Autumn	Easy - Down Hill	Active - Find Dark

Nov 30, 19

(1) DATE / MOOD ACTIVITY (2)

Jan

1 2 3 4
5 6 7 8 [9 10 11]
12 13 14 15 16 17 18
19 20 21 22 23 (24) 25
26 27 28 29 30 31

Febuary

1
2 3 4 5 6 7 8
9 10 11 12 [13 14 15]
16 17 18 19 20 21 22
23 24 25 26 27 28

Mar

1
2 3 4 5 6 7 8
9 10 11 12 [13 14 15]
16 17 18 19 20 21 22 PMC
23 24 25 26 27 (28) 29
(30) 31

27 Dec ~~travel~~ meeting — Invite (spreading light) — 12 Feb Ash Wednesday — ~~coasting~~ Working hard —

Apr

1 2 3 4 5
6 7 8 9 [10 11 12]
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30

May

1 2 3
4 5 6 7 [8 9 10]
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31

June

1 2 3 4 5 6 7
8 9 10 11 [12 13 14]
15 16 17 18 19 20 21
22 23 24 25 26 (27) 28
29 30

— 15 April — relating meeting/travel — 14 ~~23~~ MAY digest ~~guilt~~ — 14 JUNE —
— evaluating — mid course correction

Jul

1 2 3 4 5
6 7 8 9 [10 11 12]
13 14 15 16 17 18 19
20 21 22 23 24 (25) 26
27 28 29 30 31

Aug

1 2
3 4 5 6 [7 8 9]
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31

Sept

1 2 3 4 5 6
7 8 9 10 [11 12 13]
14 15 16 17 [18 19 20] PMC
21 22 23 24 25 26 27
28 29 30 1 2 3 4

minor irritations — ~~travel~~ — 10 Aug — ~~drag~~ no expectations — 10 Sep — Michael ~~move~~ (29 Sep)

Oct

1 2 3 (4)
5 6 7 8 [9 10 11]
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31

Nov

1
2 3 4 5 6 7 8
9 10 11 12 [13 14 15]
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30

Dec

1 2 3 4 5 6
7 8 9 10 [11 12 13]
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31

Quiet dark great activity — 27 4 Nov ~~[illegible]~~ Summing up ~~9 Dec~~ 25 DEC
28 Nov

Aug 16, 3, 10, 17
Sep 15, 7, 14, 21
Oct 18, 5, 12, 19
Nov 22, 2, 9, 16
Dec 22

[illegible]
26
9
29
19
15

Lunar Calendar — nomadic age
Solar Calendar — intentional community

transforming holidays
moveable feasts → intentional rituals

Apr (12-18) 15/16 - EASTER - Sunday
Mar 7 - Ash Wednesday (3-9)
May 26 - Ascension
Jun 4 Pentecost - Whitsunday
Jun 14 Corpus Christi

DATE/MOOD Nov 30, 1986

	physical	~~mental~~	Result
Advent	darkening	delay	frustrated
Yule	brightening	acceleration	Euphoria
Christmas	brightening	delay	holiday mood
~~Epi~~ Epiphany	"	"	" lessening
Lent	brightening	acceleration	less intense than yule Euphoria useful time-
Easter	neutral	accelerating	solemn joyous
Springtime	brightening	neutral	(diffuse) spring fever
Corpus Christi	brightening	accelerating	like LENT
Midsummer	darkening	neutral	focusing
Summer 1	darkening	accelerating	not frustrated but how to push to get anything done "dog days"
Michael Mass	darkening	accelerating	most focused time of year
October	darkening	accelerating	best time of year to get things done

ZONE A ADVENT

DATE/MOOD

Begins about Nov 27th

Initially darkening dominate diffusion

ṡ ė

Darkening:

calming, narrowing, focusing → anticipation

superficiality = most relating

Diffusion:

passivity, receptivity, multi-leveled, open

ZONE B CHRISTMAS

Dec 21 YULE through Dec 25

Most YIN time of year

Resolved High anticipation, Receptivity, relatedness

Very wide field, open

ZONE C₁ EPIPHANY

Dec 26 – Jan 6 (The 12 days)

Initially – high YIN – diffused state, related, sensitive

Beginning brightening, expanding light, inspiring

widening field

ZONE C₂ WINTER

Jan 7 – Feb 2

ṡ → N Brightening dominates (ė → E diminishes)

Stimulation, relational, widening field

ZONE D CARNIVAL

Feb 3 – Feb 11

All motion ṡ → N no E/W motion

∴ physical season

sensitive – sensuous, diffusing

ZONE E LENT

Feb 12 – MAR 19

dominated by ṡ → N, brightening – stimulated

but increasing ė → W YANG

one level centering – initiating, focusing

ZONE F PASSIONTIDE

MAR 19 – MAR 21

MAX ṡ → N brightening – intense stimulation, participation

but initiating and focused

ZONE G EASTER

MAR 21 – MAR 27

ANNUNCIATION

High ė → W YANG

active, centered, closed, non-speculative

strongly Belief Oriented (dogmatic)

ZONE H-I SPRING

MAR 27 – MAY 15

ė → W YANG

ṡ → N YIN Balanced ė and ṡ verticality of motion → physical

neutralizes no strong YIN or YANG

esp MAY 1

ZONE J PENTACOST
Brightening MAY 15 – JUNE 14

YIN → ~~introspective~~ re-evaluation
ė → E multi-level self-referential
vertical communicative
reception

ṡ → N horizontally relating

ZONES K, L SUMMER JUN 14 – JULY 22
K little change in ṡ ∴ dominated by ė
First part K ė → E large conscious self
to Midsummer
second part L ṡ → S YANG balance and neutralize
but a neutralized period

ZONES M, N, O LAMMAS
Part I
little ė motion ∴ physical period
Special day AUG 6
ṡ → S YANG Active,

Part II ė → W active YANG
MO double YANG peaks on Day 17
closed, dedicated, focused
single-level, little vertically,

Zone PQ MICHAELMAS level switch
ṡ → S YANG
ė → W YANG > highly focused but on 2nd level

Zone R AUTUMN
ṡ → S YANG horizontally withdrawn
ė → W YANG → ṙ = 0 spirituality fades

Zone S, A ADVENT
PART I HARVEST
ṡ → S YANG collecting horizontally > Gifts to Heaven
ė → E YIN diffusing vertically

UNITE/MOOD

Advent: Nov 27 - Dec 21 ☉ darkening & Expanding horizontal withdrawal / vertical fo[cusing]
leads to anticipating / coloring / multi-level (levels can go higher or much lower - devil / ghosts)
cannot stay on one level -

Christmas Dec 21 - Dec 25 ☉ brightening & Expanding horizontal relating / vertical expa[nding]
relating to others but still in tune with multi-levels

after Jan 6

Dec 25 - Feb 12 | spiritual fades / physical North motion dominates : Winter Dec 25 - F[eb 12]
WINTER

☉ brightening — horizontal relating
restless / people are active /

LENT Feb 12 - April Mar 19 ☉ brightening & Contracting horizontal relating / vertical focusing
opportunity to change direction.
focusing on one level:

Mar 19 - Mar 27 ☉ brightening & contracting
one week: Passiontide
Mar 27 - greatest west motion - highly vertical focusing

DATE/MOOD

HARVEST I SEP 3 - OCT 30

SEP 16 MOST YANG TIME

PHYSICAL → PSYCHIC

COMING TOO SOON → REACT AGAINST IT
COMPACTED PROCRASTINATE
WAIT

NOT YIN OR YANG
BUT ↑ ↓
energy depletion

YIN TIME
COMING TOO LATE → REACTION
UNLAWFUL ACTIVITY
ANTICIPATION

DARKENING → FOCUS, CLOSE IN

LIGHTENING → DIFFUSE, OPEN UP

DO NOT USE YIN/YANG
USE DARK ↓ ↑
AND TOO SOON
TOO LATE

AS SEPARATE PHYSICAL AND
PSYCHOLOGICAL PARAMETERS

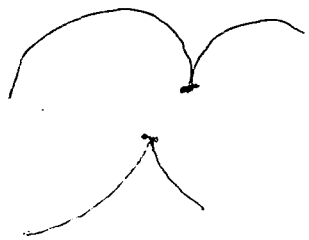
FEELING CHANGES ON SEP 16/17 ∴ not è but ë
DEC 21 NOT length but change

HIGH SPIRITS BEFORE SEP 16 – ↑↑
LOW AFTER ↑↓ DECEMBER IS COMPLEX

HIGH SPIRITS BEFORE DEC 25 (i.e. YULE TO CHRISTMAS)
LOW AFTER DISILLUSION

BEFORE DEC 25 A↓ ∴ LOW

E/W gives order
to N unmanifest



EXPLANATIONS

The Two Motions
N/S and E/W

The Two Energies
$h\nu$ radiation Fast
$\frac{1}{2}mv^2$ inertial Slow

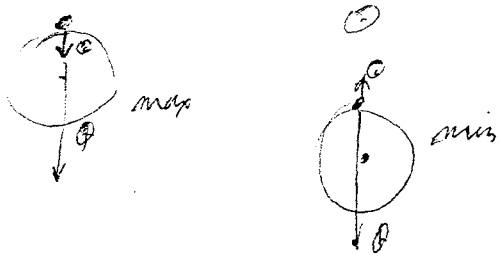
One is Ground the other is figure

In the analemma
N/S Fast light ⟷ darkness
E/W Slow Accelerate ⟷ Decelerate

If eq of t, E, were ≡ 0
then our bio-clock re-phasing
would be constant
(If the bio-clock ≡ 24 hr
then there would be no
corrections needed)

Assume the bio-clock of an individual is constant
perhaps > 24hr.

This is reset whenever the gravitational
vectors are max (or min) [but then the moon
of Earth and Sun would be important



ⓒ but the interval between successive maxima
(or minima) is not constant.

When the Sun is moving east (eg. Nov 4 – Feb 21
The interval is expanded, the reset is delayed
The "pull up" is late

HISTORICAL

THE CHURCH CALENDAR, from AUTHORIZED SERVICES 1973

JANUARY
- 1 The Holy Name of OUr Lord Jesus Christ
- 6 The Ephiphany
- 18 The Confession of St. Peter† the Apostle — Jan 21 St. Agnes
- 25 The Conversion of St. Paul the Apostle

FEBRUARY
- 2 The Presentation of Our Lord Jesus Christ in the Temple
- 24 St. Matthias (†) the Apostle

MARCH
- (20 St Cuthbert, Bishop of Lindisfarne 687)
- 19 St. Joseph
- 25 The Annunciation of Our Lord Jesus Christ to the Blessed Virgin Mary (LADY DAY)

APRIL
- 25 St. Mark the Evangelist

MAY
- 1 St. Phillip† and St. James†, Apostles
- 31 The Visitation of the Blessed Virgin Mary

Old Transfiguration: Feb 17 or Last Sunday after Epiphany: 12 +

JUNE
- 11 Saint Barnabas† the Apostle
- 24 The Nativity of St. John the Baptist
- 29 St. Peter and St. Paul, Apostles

JULY
- 4 Independence Day — St. SWITHIN JULY 15
- 22 St. Mary Magdalene
- 25 St. James† the Apostle

AUGUST
- 6 The Transfiguration of Our Lord Jesus Christ
- 15 St. Mary the Virgin, Mother of Our Lord Jesus Christ
- 24 St. Bartholomew† the Apostle

(3 St Aidan, Bishop of Lindisfarne 651)

SEPTEMBER
- 14 Holy Cross Day — ROODMASS
- 21 St. Matthew,† Apostle and Evangelist ~ 25 ~
- 29 St. Michael and All Angels (OLD ST MICHAEL MAYB)

OCTOBER
- 18 St. Luke the Evangelist
- 23 St. James of Jerusalem, Brother of our Lord Jesus Christ, and Martyr
- 28 St. Simon† and St. Jude†, Apostles

NOVEMBER
- 1 All Saints — NOV 11 ST. MARTIN
- 30 St. Andrew† the Apostle

DECEMBER
- 21 St. Thomas† the Apostle
- 25 The Nativity of Our Lord Jesus Christ
- 26 St. Stephen, Deacon and Martyr
- 27 St. John,† Apostle and Evangelist
- 28 The Holy Innocents

Greek/Roman
Saturnalia Dec 17-23
on Cos Aesclapius Aug 19
Eleusinian Sept 17/18 for 5 days

Kiowa Oct. 1 New Year

Buddhist Lent begins June 24

Nov 3 Divali Hindu
Mar 27 Holi (year?)

Dec 1 (approx) Zuni Shalako

Sept SWITHIN ? July 15

HISTORICAL

Aug 5 Lailat-al-Miraj Islamic (Lunar?)

Guy Faukes Nov 5

St. Swithin JULY 15 - If Rains, will rain for 40 days

St. Olaf, July 29

Hocktide - 2 weeks after Easter and Michaelmas
Divisions for collection of rent.

Old Transfiguration - Feb 17, last Sunday after Epiphany

Annunciation Mar 25

Vacation 2 St Thomas Dec 21 → July 3

Old St. Michael May 8

St. Agnes Jan 21

St. Francis Oct 4

St. Patrick Mar 17

St. Martin Nov 11

St. Michelas Dec 6

St. Lucy Dec 13

GOLDEN RATIO

$\varphi = 0.618034$ $\quad Y = 365.2422$

$\varphi - 1 = -0,381966$

$(\varphi - 1)Y = -139.5101$ $\quad \frac{1}{\varphi - 1} = \varphi + 2 = (\varphi + 1)^2$

$1.618034 \times 365.2422 = 590.97429$

365.2422

225.7321

$\dot{\varphi} = 1 + \varphi$

$f_n \dot{\varphi} = f_{n+1}$

$\varphi Y - 1 \neq (\varphi - 1)Y$

$224.73 \qquad 139.51$

$\frac{5}{13} \times Y = 224.76$

$f_{n-1} + f_n = f_{n+1}$

$f_{n-1} + \dot{\varphi} f_{n-1} = (1 + \dot{\varphi}) f_{n-1} = f_{n+1}$

$f_{n-1} \dot{\varphi}^2 = f_{n+1}$

i.e. The 8 : 13 approximation uses $\varphi Y - 1 = 224.73$

224.76

$\Delta = 0.03$

A Mystical Meaning of the Divine Proportion

What does the presence of the Divine Proportion mean?

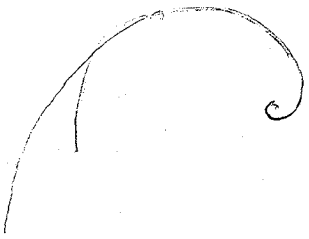
Some dynamic or growth process is present

i.e. It is not pure cyclicity

like the shell of the nautilus, the exponential spiral, the fractal to ∞ ie φ

there is growth

The Golden Ratio is a symbol for the Fibonacci Sequence which is nature's recursion.



But we remain fixed at 8 : 13

$f_n \varphi = f_{n+1}$ $\quad f_{n-1} + f_n = f_{n+1}$

We move to next member of sequence

by multiplying by φ or by adding f_{n-1}

not by adding φ

$f_n + \varphi$

3 5

5 8
years days

8 13
years days

13 21
years days

21 34
years days

presently

We are locked at the 8/13 level

$$\varphi^n = f_{n+1} + f_{n-1}$$
$$f_n = f_{n+1} - f_{n-1}$$

$$\begin{cases} \dfrac{f_n}{\varphi^n} = \dfrac{f_{n+1}}{\varphi^{n+1}} \\ f_{n+1} = \varphi f_n \end{cases}$$

$$\sum_1^N f_n = F_N = f_{n+2} - 1$$

$$f_n = \frac{\varphi^n}{\sqrt{5}} \quad \text{for large } n$$

---

3 years	5 days	
		$0.6 \times 365.2422 = 219.14$
5	8	$0.625 \times 365.2422 = 228.28$
8	13	$0.61538846 \times 365.2422 = 224.76$ $\quad \varphi Y = 228.73$
		$8/13 = \varphi^{Y-1}$
13	21	$0.6190476 \times 365.2422 = 226.1023$
21	34	$0.617647 \times 365.2422 = 228.59$

∞ every day

$\sum^i f_n = F_n$

The $\sum$ for 8/13 is 33

The age of the Christ

THE GOLDEN SECTION
or
DIVINE PROPORTION

Playing cards
The Parthenon
Sun Flower
Nautilus Shell
Galaxies
Pine Cones
Logarithmic Spiral
Horns
Modular

Kepler:
The Pythagorean Theorem ~ Gold
The Divine Proportion ~ Jewell

Attributes
Growth in size without change in shape
also The attribute of flat space

$\pi = 3.14159$
$e = 2.71828$
$\varphi = 1.618037$

To join two things, a 3rd must be present.
Bonding is best achieved by proportion:
— Plato

$$\frac{g}{m} = \frac{m}{s}, \quad m = \sqrt{gs}$$

$$\frac{g+s}{g} = \frac{g}{s}$$

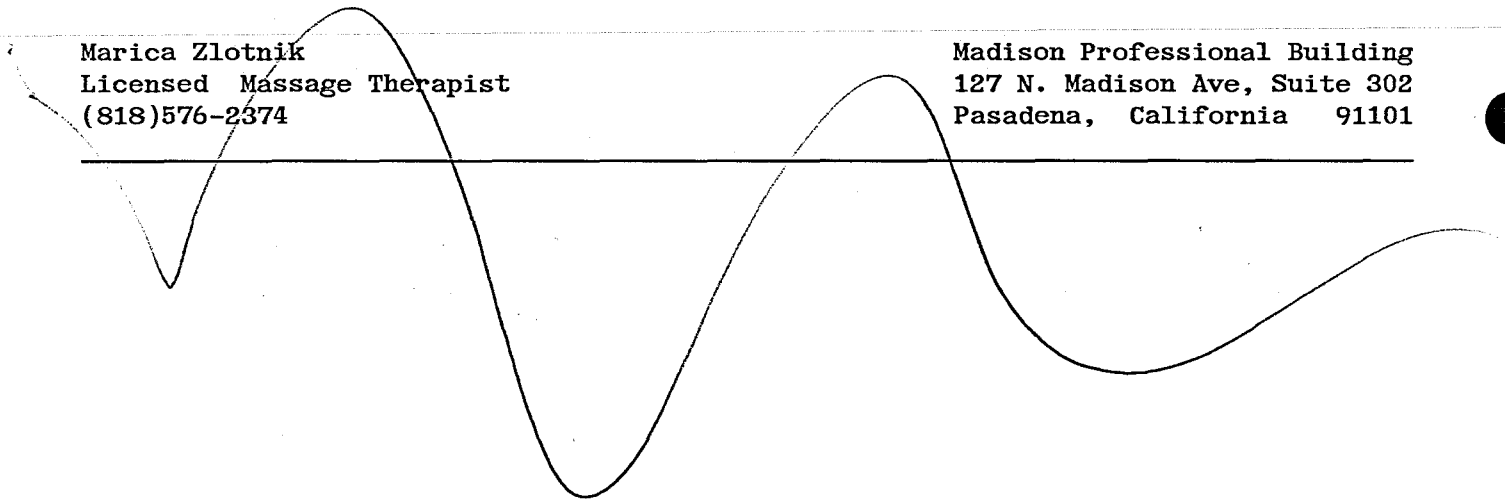
Thus the golden-ratio tells us about our topology when it obtains, curvature = 0

In the Analemma
The ratio $\frac{\text{material object about earth}}{\text{photon about earth orbit}} = \varphi$ check this

Gentle Touch

Marica Zlotnik
Licensed Massage Therapist
(818)576-2374

Madison Professional Building
127 N. Madison Ave, Suite 302
Pasadena, California 91101



FIBONACCI NUMBERS

N	f_N	PHI_N	EXP(N*LN(PHI))/SQRT(5)
1	1	1.62	.72
2	1	2.62	1.17
3	2	4.24	1.89
4	3	6.85	3.Ø7
5	5	11.Ø9	4.96
6	8	17.94	8.Ø2
7	13	29.Ø3	12.98
8	21	46.98	21.Ø1
9	34	76.Ø1	33.99
1Ø	55	122.99	55.ØØ
11	89	199.Ø1	89.ØØ
12	144	322.ØØ	144.ØØ
13	233	521.ØØ	233.ØØ
14	377	843.ØØ	377.ØØ
15	61Ø	1364.ØØ	61Ø.ØØ
16	987	22Ø7.ØØ	987.ØØ
17	1597	3571.ØØ	1597.ØØ
18	2584	5778.ØØ	2584.ØØ
19	4181	9349.ØØ	4181.ØØ
2Ø	6765	15127.ØØ	6765.ØØ
21	1Ø946	24476.ØØ	1Ø946.ØØ
22	17711	396Ø3.ØØ	17711.ØØ
23	28657	64Ø79.ØØ	28657.ØØ
24	46368	1Ø3682.ØØ	46368.ØØ
25	75Ø25	167761.ØØ	75Ø25.ØØ
26	121393	271443.ØØ	121393.ØØ
27	196418	439Ø4.ØØ	196418.ØØ
28	317811	71Ø647.ØØ	317811.ØØ
29	514229	1149851.ØØ	514229.ØØ
3Ø	832Ø4Ø	186Ø498.ØØ	832Ø4Ø.ØØ
31	1346269	3Ø1Ø349.ØØ	1346269.ØØ
32	2178Ø9	487Ø847.ØØ	2178Ø9.ØØ
33	3524578	7881196.ØØ	3524578.ØØ
34	57Ø2887	12752Ø43.ØØ	57Ø2887.ØØ
35	9227465	2Ø633239.ØØ	9227465.ØØ
36	1493Ø352	33385282.ØØ	1493Ø352.ØØ
37	24157817	54Ø18521.ØØ	24157817.ØØ
38	39Ø88169	87Ø3Ø83.ØØ	39Ø88169.ØØ
39	63245986	141422324.ØØ	63245986.ØØ

n	f_n	φ^n	e^n
1	1	1.62	2.72
2	1	2.62	7.39
3	2	4.24	20.09
4	3	6.85	54.60
5	5	11.09	148.41
6	8	17.94	403.43
7	13	29.03	1096.63
8	21	46.98	2980.96
9	34	76.01	8103.08
10	55	122.99	22026.47
11	89	199.01	59874.14
12	144	322.00	162754.79
13	233	521.00	442413.39
14	377	843.00	1202604.28
15	610	1364.00	3269017.37
16	987	2207.00	8886110.52
17	1597	3571.00	24154952.75
18	2584	5778.00	65659969.14
19	4181	9349.00	178482300.96
20	6765	15127.00	485165195.41

$$\varphi^n = f_{n+1} + f_{n-1}$$

$$f_n = f_{n+1} - f_{n-1}$$

$$\frac{f_n}{\varphi^n} = \frac{f_{n+1}}{\varphi^{n+1}} \qquad f_{n+1} = \varphi f_n$$

$$f_n = \frac{\varphi^n}{\sqrt{5}} = \frac{e^{n \ln \varphi}}{\sqrt{5}} = \frac{1}{\sqrt{5}} e^{\ln \varphi^n}$$

Fibonacci vs Markovian

3
5 ← perceived past
8 ← perceived present
13 the future
21

e^n depends on present state only

The algorithm $f_{n+1} = f_n + f_{n-1}$
is inviolate
but values of f_n may be
changed, selected

Species of
Determinism
1) Historical all
2) Markovian last 1
3) Fibonaccian last 2

Fibonaccian
$\dot{y} \propto y(t), y(t-t_1)$
$\dot{y} \propto y(y-1)$

Markovian
$\dot{y} \propto y$

growth curves
$\dot{y} \propto y(1-y)$
Randomism

what gives oscillation

Direction of change ∝ present value, mean past value,
etc.

The role of changing 10th decimal place
Anthropic Principle

Tie moving into the future
i.e. change
with cybernetics