

2012 Essays

May all beings be in peace

All My 2012 Essays Are Here:

Why the Maya Picked 2012
(Shortest Astronomy Essay)

Why the Maya Picked 2012 (11-Minute YouTube Video)

What 2012 Means to Me

The Maya Year Is Extremely Accurate!

Extraterrestrials, Astronomy and 2012

Mystical 2012: Did the Maya Shamans Discover a Mystical View of Reality?

The Actual Astronomy of 2012 in a Nutshell (Medium Length Essay)

The Actual Astronomy of 2012 (Longest Essay)

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The Mystic's View - God and

To Love Like God - A Mystic's Room

To Love Like God - The

Essay

Your Journey into Gnosis

***The Actual Astronomy of 2012 and the
Sacred Triple Rebirth of the Sun***

An Essay by Thomas Razzeto

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This is my longest and most detailed astronomy essay. It is 28 pages!

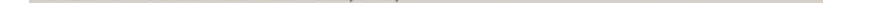
Part 1: How to Understand the Astronomy with Just a Pencil and a Sheet of Paper

Part 2: A Deeper Understanding of the Sacred Triple Rebirth of the Sun

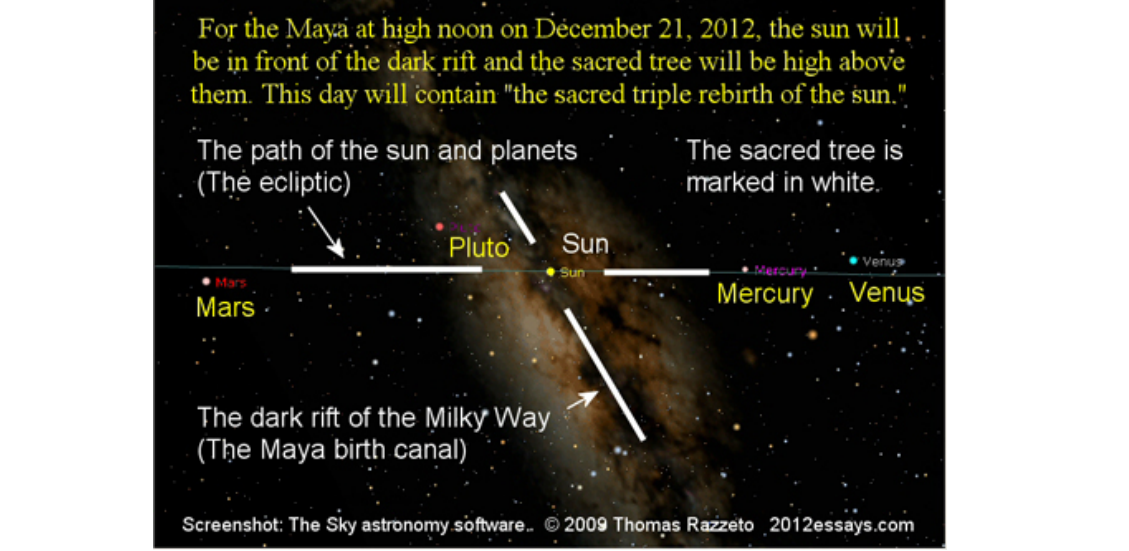
[Video: Click here to see my 11-minute video about why the Maya picked 2012!](#)

Preface: Why the Maya Picked 2012

Let's immediately get right to the point by taking a look at what will be in the sky over the Maya at midday on December 21, 2012. Here it is:



The screenshot shows the top of the TheSky6 application window. The title bar reads "iZapa-12-00-2012.sky - TheSky6". Below it is a menu bar with the following items: File, Edit, View, Orientation, Data, Tools, Telescope, and Help. The window is maximized, as indicated by the maximize button being disabled.



The sun will be in the middle of the dark rift, the Maya birth canal, on the solstice.
The sacred tree will be above the Maya with the sun exactly between Mars and Venus.

The astronomy that will unfold in the sky directly over the Maya on the winter solstice of 2012 is the key to understanding why the Maya restarted their calendar on that exact day. Almost all calendars are based on astronomy and it appears that this is also true for the Maya calendar, although in a rather spectacular way! In the above screenshot, we see that the sun will be in the middle of the dark rift, the Maya birth canal, on the day of the winter solstice. Later in this essay, I will go over why this day can be said to contain the triple rebirth of the sun. We also see that there are four planets forming the horizontal crossbar of the sacred tree and the sun is virtually exactly in the middle of these planets. This is also quite significant as to why the Maya picked this exact day to restart their calendar. (The fastest and easiest way to understand this is to read my essay: [Why the Maya Picked 2012](#). For more complete astronomical details, continue reading below.)

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We will be using the viewpoint of Izapa, Mexico, the birthplace of the Maya Long Count calendar. I think that it is crucial to investigate 2012 from the viewpoint of the Maya themselves but this point is often overlooked by other researchers. Yes, the actual location of the Maya on the surface of the earth is important when examining the astronomy and in addition to that, their cultural viewpoint is also very important. Both the calendar and the Maya's timeless metaphorical stories about transformation and rebirth have an astronomical basis to them and this is why understanding the astronomy can be so helpful.

While the above screenshot shows what is most important to the Maya, most 2012 researchers talk about something called the "galactic equator" rather than the dark rift. Because of this, I will develop this essay along the lines of understanding the shape of the galaxy, the plane of the galaxy and the galactic equator. Once you understand these things, it is only a very small shift from the galactic equator to the dark rift, which is something that the Maya could actually see with the naked eye at certain times of the year. As we will soon find out, focusing on the galactic equator leads us to 1998; focusing on the dark rift leads us to 2012.

Introduction

Do the following two facts pique your interest in 2012?

1) If the Maya intentionally pinpointed the exact day of the winter solstice in 2012 from over 2,000 years ago, they would have needed to know the length of the year to within 45 seconds! ([Learn more here](#))

2) Five cycles of their Long Count calendar add up to the length of the earth's precessional cycle to within one-half of one percent and the Maya often talk about all five cycles!

The first fact comes from a very simple calculation, as we shall soon see. As far as I know, I am the only 2012 researcher that has carried out this calculation. The second fact is well known to all good 2012 researchers but it is still important to state it right up front. As profoundly significant as these two facts are to me, hard-nosed skeptics reduce their significance to absolutely nothing with a shrug of the shoulders and a quick, "So what?" To them, it's all just a big coincidence. But what if this was planned? It seems pretty clear to me that astronomy is at the heart of both the Maya calendar and their metaphorical stories. Because of this, it can be very helpful to learn about this astronomy and this is fun and fairly easy to do as long as we take it a little bit at a time. Even still, you may find yourself pondering this subject more deeply for quite awhile. For me personally, the more I dug into the actual astronomy of 2012, the more mind-blowing it all became! Perhaps you will have a similar experience.

I intentionally have my title reflecting both the solid science of 2012 and also its metaphorical aspects in order to let you know that I am not going to "squeeze the wonder and awe out of the event" by "explaining it" with science. While I address the metaphorical and mystical aspects of 2012 much further in my essay [Mystical 2012](#), here I focus on the details of the actual mainstream astronomy. I include some of my own original research so this essay is not a rehash of what you might have read elsewhere. I also utilize unique presentation tools that I created to help you easily understand the material. These tools include pictures, diagrams and also a simple but very important 3-dimensional model that we will build out of a single sheet of paper and a pencil. When we put this model into motion, you will see the basic astronomy of 2012 right before your eyes.

It is helpful to note that in order to understand the astronomy of 2012, you only need to be concerned with the motion of the earth. This makes understanding the astronomy a lot easier than you might expect. The three motions of the earth that create the special event of 2012 are as follows: It spins on its axis once a day, it orbits the sun once a year and it slowly wobbles on its axis like a top that is not standing straight up once every 26,000 years. These three motions combine to create what I call "the sacred triple rebirth of the sun" and we will soon learn much more about this.

I also want to mention that all the astronomy that I present here is in complete agreement with mainstream science. I am not going to introduce or support any unproven theories. While I don't believe that today's mainstream science has all the answers for all subjects, when it comes to the astronomy of 2012, it looks to me like the truth is known.

And one of the strongest points that I want to make is that as far as mainstream astronomy goes, the earth is in no danger whatsoever. We are not going to fall into a black hole or be inundated with a high level of cosmic rays. The slow change of the angle of the axis of the earth with respect to the center of the galaxy will have no ill effects. As far as Mother Nature goes, it will be business as usual. The sun will continue to shine, the earth will continue to spin and the four seasons will continue to transform from one into another.

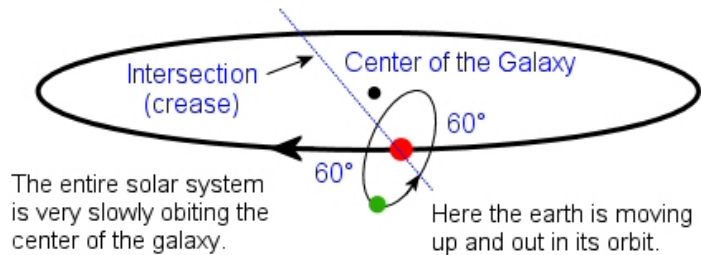
And yet the astronomy of 2012 is still quite remarkable. In this essay, we will learn about it in two steps. The first step focuses on a unique galactic alignment that already occurred in 1998. Yes, this much talked about but seldom understood alignment has already happened! We will use our 3-dimensional model along with our pictures and diagrams to create a clear

understanding of this event. In the second step, I will present some screenshots from my astronomy software program that depict what will actually happen on the day of the winter solstice of 2012 to help you see why the Maya picked 2012.

By the way, many people are surprised to learn that galactic alignments happen once a year. Yes, they happen simply because the earth orbits the sun as we can see in the diagram below. We will study this diagram in more detail very soon but for right now, let's just take a quick glance.

The Annual Galactic Alignment

The plane of the galaxy seen flat and level



Once a year, the earth orbits up into a position where you can draw a line from the earth through the sun and into the plane of the galaxy, almost directly towards the center of the galaxy. In this diagram, this happens in about 3 months.

© Copyright 2008 Thomas Razzeto infinitely-mystical.com Not to scale

The annual galactic alignment between the earth, the sun and the plane of the galaxy.

Here we see that once a year, the earth orbits up into a position where we can draw a line from the earth through the sun and into the plane of the galaxy, almost directly towards the center of the galaxy. In the 2012 community, this is commonly called a "galactic alignment," although that is not a formal astronomical term, and as I just mentioned, it happens once a year. But once every 26,000 years, the alignment happens at virtually the same time as the winter solstice and this is what makes the galactic alignment of 1998 so special.

Incidentally, the galactic alignment is sometimes loosely described as the sun lining up with the center of the galaxy. But two points always make a line. When this phrase is used, the earth is implied as the additional third point required for the alignment. But more importantly, the alignment happens with the plane of the galaxy, not the center of the galaxy, although the center of the galaxy is close, as we see in our diagram above. We will soon learn more about the parts of our galaxy and see more clearly why we need to make a distinction between the center of the galaxy and the plane of the galaxy.

We will also clearly see the almost exactly simultaneous occurrence of the winter solstice and the galactic alignment when we build our 3-dimensional model. Since our model only has three parts and since the axis of the earth is the only thing in our model that moves, you will easily understand the basic astronomy in just a few minutes. With all this in mind, let's begin by learning about the three parts of our 3-dimensional model starting with the plane of the earth-sun orbit and the earth's axis of rotation.



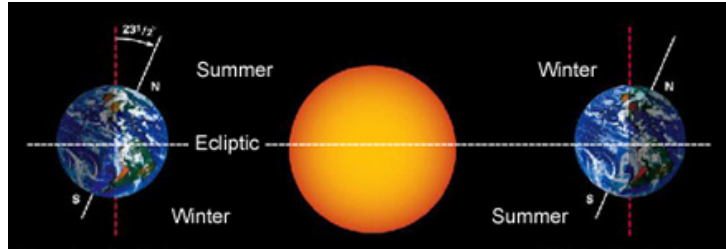
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Our 3-dimensional model of the astronomy of 2012. [Click to see the video.](#) (1)
(Click any footnote number to read it. Return by clicking your Back button.)

If you want to be picky, the plane of the galaxy should actually be labeled “angle of the plane of the galaxy” or “a plane parallel to the plane of the galaxy” since the plane of the galaxy does not go exactly through the center of the earth. But this does not change the validity of our model since we are interested in the angles. Because of this, we are not even introducing an approximation.

Part 1: The Actual Astronomy and Our 3-Dimensional Model

The Plane of the Earth-Sun Orbit and the Earth's Axis of Rotation



Here is an edge view of the plane of the earth-sun orbit, the ecliptic.



The wobble of the axis

The first thing we want to look at is the orbit of the earth around the sun. Imagine the sun in the middle of a big tabletop with the earth always staying on this tabletop as it travels around the sun in its yearly orbit. This tabletop is called “the plane of the earth-sun orbit” or “the plane of the ecliptic” or more simply, “the ecliptic.” The earth does not bob up and down; its orbit around the sun is perfectly flat. At all times, the earth and the sun can be found on this tabletop, on the plane of the ecliptic.

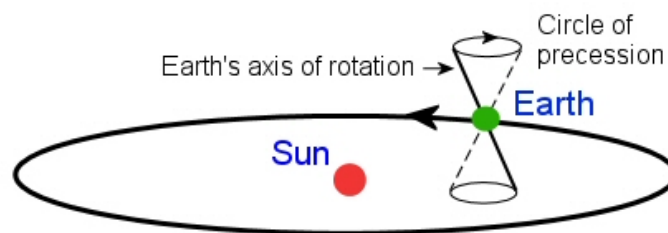
As you may know, the earth's axis of rotation is always tilted about 23.5 degrees shy of vertical from this plane and it's this tilt that creates the seasons. When the axis is leaning away from the sun as much as possible, we have the winter solstice and our shortest day. As the earth continues in its orbit, the axis will no longer point away from the sun as much as possible and the seasons change. When it is leaning towards the sun as much as possible, we have the summer solstice and our longest day. (2)

The Precession of the Earth's Axis of Rotation

In addition to its motion around the sun, the earth is slowly wobbling much like a spinning top that is not standing straight up. This is the action of precession and it's what makes the event of 2012 unfold as it does.

Earth's Precession - It Wobbles Like a Top

The earth completes one wobble every 25,800 years.
The axis of rotation remains tilted by 23.5 degrees.



As the earth orbits the sun, it also slowly wobbles. When viewed from above, the earth's orbit is counterclockwise but the direction of precession is clockwise.

Since the earth is floating in space, this wobble is centered around the center of the earth. In other words, both the north and south pole make circles while the center of the earth remains still relative to these circles. As the axis makes these circles, the tilt remains fixed at 23.5 degrees. From the side, it looks like two cones, one right side up and the other upside down with the tips of the center of the two cones touching one another at the center of the earth. We will soon see diagrams of the top cone since we will focus on the northern hemisphere where the Maya live. Our 3-D model is also focused on the top cone. It does not show the bottom cone.

It takes about 26,000 years for the axis to make one circle and this long cycle has several names. One of them is “the great year.” (3)

Natural Cycles of Rebirth: The Day, the Year and the Great Year

Before we go on, let's review some very familiar natural cycles. As you know, the day is the fastest astronomical cycle and there are four distinct points that naturally divide the day: sunrise, high-noon, sunset and midnight. There are significant physical changes at each of these points and the sunrise can be seen metaphorically as the rebirth of the sun on a daily time frame.

The year is similarly divided into the four seasons by its two solstices and two equinoxes. Something physically significant happens at each point as we travel in our orbit around the sun. We can look at the winter solstice as the rebirth of the sun on a yearly time frame since the days will start to grow longer.

It turns out that the great year also has four naturally occurring points of distinction and we will clearly see them all in just a few minutes. Is one of them related to the rebirth of the great year itself? We will look more into this very soon.

I want to again emphasize that these three natural cycles are divided into their four parts in a purely natural manner. In other words, the dividing points are not created by the mind of man; they are shifts in actual astronomical layouts.

Now let's learn about the last part of our 3-dimensional model, the plane of the galaxy.

Our Milky Way Galaxy

Imagine that you step outside one clear night and you see the stars that make up the brightest section of the Milky Way. As you know, this part of the sky is filled with so many stars that it looks like a bright cloudy area with many distinct stars shining here and there. Why does it appear like this?



Here we are looking towards the bright center region of our Milky Way galaxy. The dark rift is easily visible.

It turns out that our Milky Way galaxy contains hundreds of billions of stars and it's shaped like a huge, flat disk with spiral arms that spin around a bulge in the center. It's like a big pancake with a bump in the middle and our entire solar system is an extremely small dot that is in this pancake, just over half way out from the center.



Top view of our galaxy.
Artist's conception.



Edge view: Telescopic near-infrared image of the center of our galaxy from just outside our atmosphere. The dark rift is not visible in this spectrum.

Because we are in the pancake, it makes a ring that goes all the way around us. At any time of the year, given good viewing conditions, we can always see a section of the Milky Way. When we look towards the center of our galaxy, we are looking into the thickest part of the

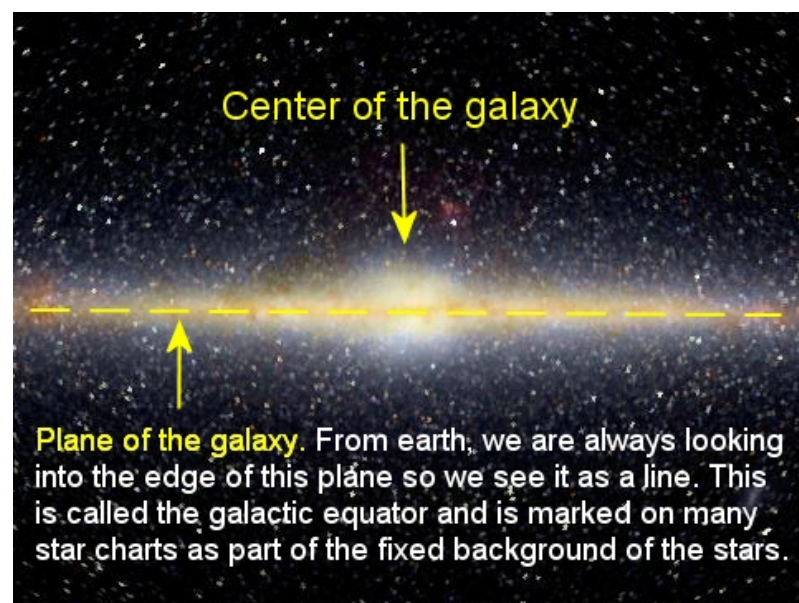
Milky Way and the event of 2012 is concerned with this section of the sky, the brightest section of the Milky Way. Interstellar dust blocks some of the light from certain parts of this region and this creates an interesting pattern in the Milky Way called “the dark rift.” This dust is not in our atmosphere; it is scattered throughout deep space between us and the center of the galaxy and the Maya metaphorical stories speak specifically about this area of the sky.

From the northern hemisphere, the summer midnight sky offers the best view of the center of the galaxy. On the other hand, during the winter, the sun is constantly near the center of the galaxy and the sun obscures the brightest section of the Milky Way with its brightness. In other words, during the winter, the center of the galaxy is always in the sky during the day. (By the way, since the Maya live in the northern hemisphere, I will often make statements based on that viewpoint.)

I bring this up because on December 21, 2012, the sun will travel along its regular path and everything will appear to be perfectly normal yet if we could push a magic button and make it so that we could see both the sun and the stars around it, we would clearly see the sun moving near the brightest section of the Milky Way, right across the middle of the dark rift. We'll learn more about that very soon.

The Plane of the Galaxy

Now, if you can imagine our galaxy, our pancake, being flattened all the way, you'd be left with something called “the mid-plane of the galaxy.” This is also known as the plane of the galaxy or the galactic plane.



From our viewpoint on earth, we are always looking into the edge of this plane so we “see” it as a line. This line is called the galactic equator since it simply divides the Milky Way into two equal halves. In this way, we can picture the galactic equator as a line in the sky drawn through the middle of the stars of the Milky Way, very near the middle of the dark rift. Astronomers have precisely defined the position of the galactic equator and you can see it marked on many star charts because it is part of the fixed background of the stars. Since the dark rift is irregularly shaped, it has no precisely defined midline. If we focus on the part of the dark rift that the sun travels across and pick the mid-point of that crossing, that mid-point would be within about a quarter of a degree from the galactic equator. Since the sun's diameter is about a half of a degree, we see that the galactic equator is fairly close to the middle of the dark rift.



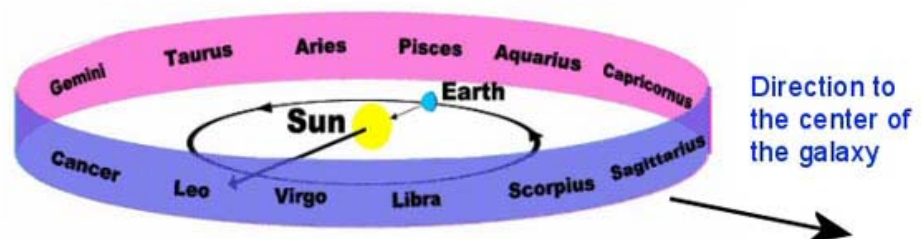
This is the approximate location of the galactic equator. As the night unfolds and the earth rotates, the angle it makes with the horizon will change significantly.

I am using the word “see” a little loosely. It's like seeing the equator of the earth. Obviously, there isn't a line painted on the ground at the equator of the earth but the nature of the earth's equator does give rise to a precisely located imaginary reference line. So it is with the galactic equator; it can't be seen yet it is precisely located.

As I mentioned earlier, in order to understand the astronomy of 2012, you only need to be concerned with the motion of the earth. Now of course, everything in the galaxy is flying through space in different directions and at tremendous speeds but the distances are so vast that the relative motion is too slow to make any difference at all with regards to what we see happening around 2012. While the Big Dipper is not specifically a part of 2012, let's use it as an example of things appearing to be fixed from our viewpoint on earth. In reality, the stars that make up the Big Dipper are moving rapidly in different directions. But it will take many thousands of years for the shape to change significantly. The same can be said about all the background stars. While it is true that in the very distant future, all the stars will be in new locations and all the constellations will have new shapes, for our purposes, they can be considered fixed in their locations. This means that for our study of 2012, we can focus our attention strictly on the motion of the earth.

Before we move on to our next topic, I want to mention that our entire solar system orbits the center of the galaxy approximately once every 250 million years but this has nothing to do with the event of 2012. Yet I often hear people say that as our entire solar system moves around the center of the galaxy, it will move through the mid-plane of the galaxy in 2012. While the entire solar system does indeed bob up and down across the mid-plane of the galaxy as it orbits the center, the time frame for this is extremely long and it is not going to happen again for about 30 million years. This real crossing of the galactic mid-plane is being confused with an apparent crossing that will indeed be seen from earth in 2012. But the crossing in 2012 is only a visual illusion and we will learn more about that very soon. (4)

The Fixed Background Stars of the Zodiac



The zodiac is a band of stars surrounding the solar system. It's in the plane of the earth-sun orbit, the ecliptic. The earth is the only thing in this diagram that moves.

In order to understand 2012, it is helpful to understand the zodiac, so here's a little information.

Throughout the year, as the earth orbits the sun, you can draw a line from the earth through the sun and out into the background stars that surround the solar system. All these stars are on our big tabletop, the plane of the ecliptic, and can be considered fixed in their positions.

As the year unfolds, we change our point of view, and, looking away from the sun at night, we eventually get to see all the stars that lie in this big circle. This circular band of stars is known as the zodiac and it's divided into twelve regions. The most distinct constellation in each region has a name, such as Leo, Virgo, Libra and so forth. Of course you recognize them as the signs of the zodiac.

As you look down on our tabletop, the plane of the ecliptic, you can imagine this huge circle of the zodiac surrounding our solar system with the twelve signs in their fixed positions. The circle of the zodiac is much larger than the circle of the earth's orbit since the stars are so far away.

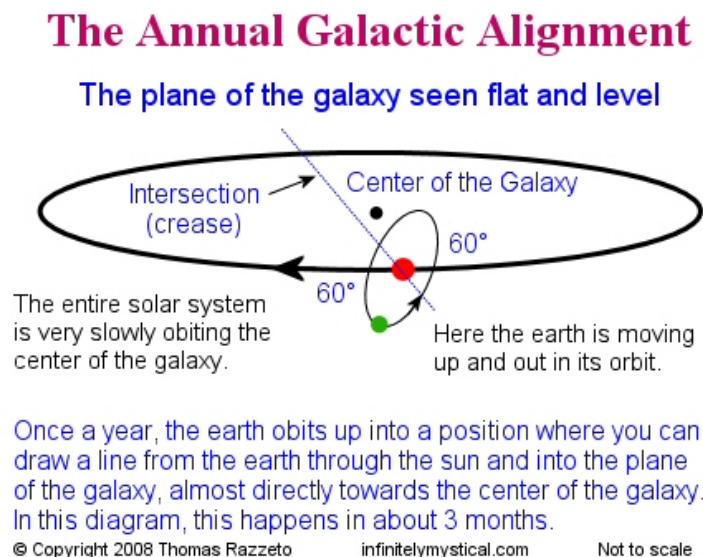
By the way, the solar system is pretty flat. In other words, the orbits of almost all the planets are close to the orbital plane of the earth around the sun. (5) Additionally, the moon's orbit around the earth is also near the plane of the earth's orbit. This means that you can draw a line from the earth through Jupiter, for example, and then out to one of the constellations of the zodiac. This is why you hear people say that Jupiter is in Gemini, for example. You can do this with the sun, the moon or any of the other planets. In the picture above, the sun is in Leo. One month later, the earth will move around in its orbit and the sun will be seen in Virgo. But it is the earth that has moved, not the sun!

As I mentioned before, the plane of the galaxy, which includes the center of the galaxy, is part of the background stars and therefore fixed in its position. As it turns out, the direction towards the center of the galaxy is always towards Sagittarius. This does not change as the earth changes its position in its orbit around the sun since the center of the galaxy is extremely far away. In other words, the diameter of the earth's orbit is microscopic compared to the distance to the center of the galaxy. (6)

All this leads us to the subject of the annual galactic alignment, which, as you might expect, always happens when the sun is in Sagittarius. In our picture of the zodiac above, this will happen in about four months.

Now let's take a closer look at this alignment.

The Annual Galactic Alignment



The annual galactic alignment between the earth, the sun and the galactic plane.

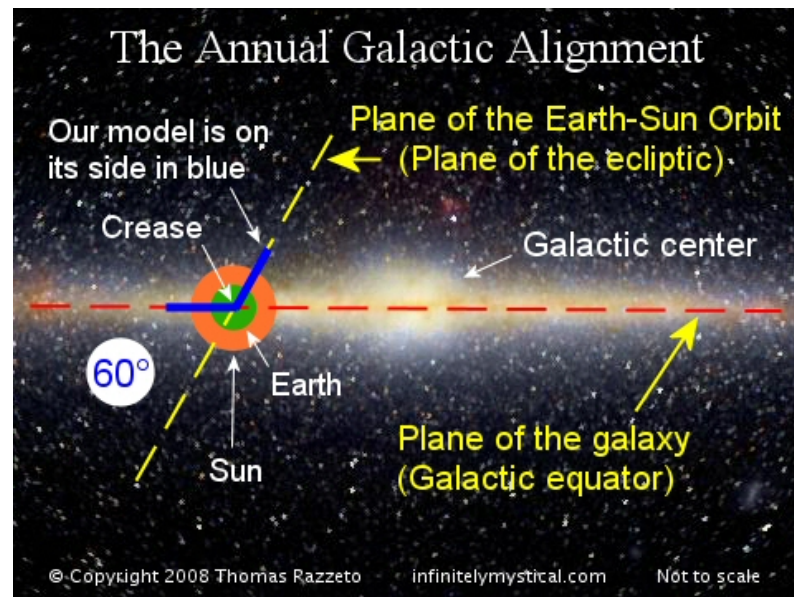
First, let's consider our two planes: the plane of the galaxy and the plane of the earth-sun orbit. It turns out that they are not parallel planes; they intersect each other at an angle of 60 degrees. This angle never changes. (7) In our model, as we shall soon see, this intersection is the crease in our folded paper and in our diagram above, we see it as the blue dotted line. The diameter of the earth's orbit around the sun is greatly exaggerated so that you can see this important layout.

You quickly see that once a year the earth orbits up into a position where you can draw a line from the earth, along the crease, through the sun and into the plane of the galaxy, almost directly towards the center of the galaxy. This is the annual galactic alignment and you can see from the layout why it repeats itself every year. For our purposes, it's helpful to remember that the earth is the only thing in this picture that moves since the orbit of the solar system around the center of the galaxy is too slow to matter.

Notice what happens 6 months after the alignment. At that time, the earth will have the center of the galaxy behind it as you draw a line from the earth, through the sun, along the crease and out the other edge of the plane of the galaxy, the shorter edge that faces away from the center. While this alignment is also with the galactic equator, it's not near the center of the galaxy and therefore has nothing to do with the special event of 2012.

The important point is that once a year, the earth orbits into the special position that creates the galactic alignment and once every 26,000 years, this happens at virtually the same moment as the winter solstice. This was the case in 1998 as shown by the work of Belgium astronomer Jean Meeus.

Now let's examine another diagram that shows the view looking right along the intersection of the two planes at the time of the alignment. Again, the diameter of the earth's orbit around the sun, shown as the yellow dashed line, is greatly exaggerated.



Our model in the sky at the time of the annual galactic alignment. The crease is always pointing about six degrees away from the center of the galaxy.

Here we see that when we look exactly along the crease, we see the galactic equator, not the center of the galaxy, although the center of the galaxy is somewhat nearby. It is only about six degrees away from being aligned with the earth and the sun and this angle never changes.

(Note: The path of the sun crossing the galactic equator looks the same every year. In other words, there will not be a year when the sun travels closer to the center of the galaxy, as some people seem to suggest. This confusion arises because on the day of the winter solstice in 2219, the sun will be closer to the center of the galaxy than any other winter solstice date since the sun will be higher on the dashed yellow line in the above diagram. On the day of the winter solstice in 2219, the line you draw from the sun towards the center of the galaxy will be perpendicular to the dashed yellow line hence the shortest distance. But on the day of the winter solstice in 2219, there will not be a galactic alignment for precisely the same reason: the sun will be higher on the dashed yellow line away from the galactic equator.)

So we see that the galactic alignment is correctly stated as being between the earth, the sun and the galactic equator rather than the center of the galaxy. Nevertheless, when we look in the general direction of the crease, we will always see the Milky Way and the region of the sky around the center of the galaxy if we have good viewing conditions and the sun is not obscuring them with its brightness.

The Annual Galactic Alignment - The Pancake and the Coin

The annual galactic alignment is so central to 2012 that I want to go over it again with two other ways of visualizing it. The first way will look very much like our previous diagram, the one titled, "The Annual Galactic Alignment."

Let's use a coin to represent the plane of the earth-sun orbit. The sun is at the center of the coin and the earth orbits around the edge of the coin. First, pretend that the plane of the earth-sun orbit is not tilted and that the coin and the plane of the galaxy, our pancake, are both flat and level with the coin inside the pancake. Put the center of the coin, our sun, a little more than half way out from the center of the pancake. Now tilt one edge of the coin up 60 degrees, 30 degrees shy of straight up, while tilting the opposite edge of the coin down 60 degrees.

Notice that this causes the coin and the pancake to intersect and that that intersection is a line. Make sure that you have the center of the coin a little more than half way out from the center of the pancake and the line of intersection pointing approximately towards the center of the pancake, about six degrees to the left of the center of the pancake. Again, this direction never changes.

Now let's imagine that the earth is at the bottom of the coin. If we draw a line from the earth through the sun, it will continue out the top of the pancake and into deep space. There's not much of interest at this time.

Three months later, however, the earth will orbit up and out into a position where we can draw a line from the earth, through the sun and into the pancake, through the edge of the pancake, almost directly towards the center of the pancake. Notice that this line will be

exactly along the crease, the intersection of our coin and our pancake and that we again have a galactic alignment.

The Annual Galactic Alignment - The Big Room and the Zodiac

Now let's go through this annual galactic alignment again but on a bigger scale and with our tabletop, the plane of the earth-sun orbit, flat and level rather than having the pancake flat and level. It doesn't matter which plane we have flat and level as long as we keep the angle between them at 60 degrees.

So let's imagine our tabletop in the middle of a big room with the sun in the center and the earth going around it flat and level. Viewed from above, looking down on the north pole, the earth is traveling counterclockwise and the sun is staying in its fixed position. As before, the earth is the only thing in this picture that will move. Imagine that the room does not have four walls but instead is surrounded by one circular wall with the constellations of the zodiac painted in their fixed positions.

Now, paint a somewhat vertical line on the wall. This line is the plane of the galaxy seen on its edge, the galactic equator. To get the correct angle for this line, move the top part to the left so that the galactic equator is 30 degrees shy of straight up. This line should be near the constellation of Sagittarius but you don't really need to concern yourself with its precise location, you only need to realize that it is present and fixed in its position.

Now examine the situation as the earth orbits the sun. Let's draw a line from the earth through the sun and into the background stars of the zodiac. Let's call this line "the line of conjunction." You will notice that the line of conjunction sweeps around the room such that once a year, it points right at the galactic equator, our painted line on the wall. So we again see that at this time, the line of conjunction goes from the earth, through the sun, right along the crease, the intersection of our two planes, and into the plane of the galaxy.

As this line of conjunction sweeps across the plane of the galaxy, the disk of the sun appears to move from one side of the plane of the galaxy to the other, as seen from the earth. Due to the size of the disk and the speed of the orbit of the earth, this crossing takes just about 15 hours. As you might imagine, the alignment happens at the middle of this crossing.

By the way, six months after this crossing, the sun crosses back to the other side of the galactic plane but this crossing takes place with the shorter part of the plane of the galaxy, the part that faces away from the center of the galaxy, so it is not involved in 2012.

I want to again point out that the center of the galaxy is on the line made by the plane of the galaxy. It's below the point of intersection by about six degrees. So again, when we look along the crease, we see the plane of the galaxy, not the center of the galaxy.

The Key: Our 3-Dimensional Model in Action

Now that we have covered the basics, it is time for us to build our 3-dimensional model.



Our 3-dimensional model. [Click to see the video.](#) (1)

(Technically speaking, the plane of the galaxy is should actually be labeled "angle of the plane of the galaxy" but this does not change the validity of our model.)

Take a sheet of paper and fold it in half. Then place it on the table and open it up a little more than half way. The half that's lying on the table represents the plane of the earth-sun orbit.

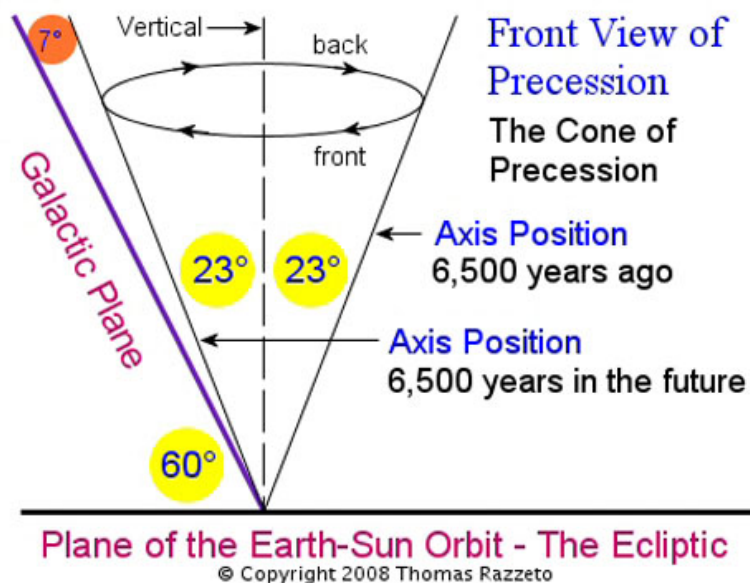
The other half represents the plane of the galaxy. Again, the crease in the paper points almost directly towards the center of the galaxy.

Note that we have rotated the previous two diagrams clockwise 60 degrees to make the plane of the earth-sun orbit flat and level, which makes the plane of the galaxy come in at a 60 degree angle, 30 degrees shy of straight up. We will be focusing on the precession of the earth's axis of rotation and this is a better view for that. Again, it doesn't matter which plane we consider flat and level as long as we keep the angle between them at 60 degrees.

I should point out that neither the sun nor the earth is exactly on the plane of the galaxy, they are both a little bit above it. Some people think that this invalidates our model but when we look more closely, we can see why our model is still perfectly valid. Technically speaking, the plane of the galaxy should actually be labeled "angle of the plane of the galaxy" rather than just the "plane of the galaxy." Or it could be labeled "a plane that is parallel to the plane of the galaxy." But a parallel plane does not change any of the angles at all. And since we are only interested in the angles, we are not even introducing an approximation. This can be seen in the diagram below. Just imagine a line parallel to the plane of the galaxy and notice that the angle between this line and the axis of the earth is unchanged. Because of this, I will continue to use the simpler term "plane of the galaxy" rather than "a plane that is parallel to the plane of the galaxy" or "the angle of the plane of the galaxy."

As you have seen, we are going to use a pencil to represent the earth's axis of rotation. Take the pencil and put one end in the middle of the crease and keep it there. This point is the center of the earth. Stand the pencil up about 23 degrees shy of vertical and make the top of the pencil go around in a circle while maintaining the 23-degree tilt. By the way, as you look down on our model from above, you should make the pencil go around in a clockwise direction. Again, imagine that one time around takes 26,000 years.

I encourage you to actually build this simple model and examine it closely as you move the top of the pencil around in a circle. Now let's consider what this looks like from the front.



Looking directly at the front of our model, we see the cone of precession.

This diagram looks at the front of our 3-dimensional model and allows you to see the cone of precession. The tip of the cone is the center of the earth and it is always on the crease. You are looking directly along the crease in such a way that it only appears as a dot: the intersection of the plane of the galaxy and the plane of the earth-sun orbit. (The crease is not the vertical dashed line. That line just helps you see the tilt of the earth's axis.)

You can see that since the earth's axis is tilted 23 degrees shy of straight up and since the galactic plane is 30 degrees shy of straight up, there is a time during the precessional cycle when the axis of the earth is almost directly aligned with the plane of the galaxy. It only misses by 7 degrees. This is when the pencil is closest to the folded half of the paper and will happen in 6,500 years.

You can also see that there is a time when the pencil is pointing away from the plane of the galaxy as much as possible. At this time it misses by 53 degrees, which is $7+23+23$. (Note that here we are talking about the plane of the galaxy and not the center of the galaxy.) This occurred 6,500 years ago and this is where the pencil is in the above photograph of our 3-dimensional model.

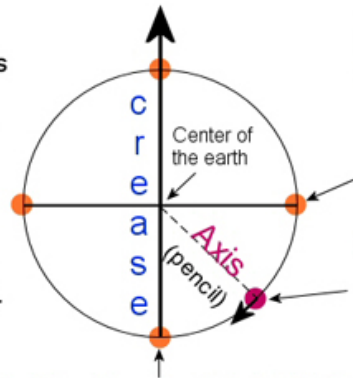
Next, let's consider the most important view: what it looks like from above.

Top View of the Circle of Precession

Direction towards the center of the galaxy

The vertical line is our crease in the paper. It is where the plane of the galaxy meets the plane of the earth-sun orbit.

The crease points almost directly towards the center of the galaxy.



Axis Position

6,500 years ago

Pointing right, away from the plane of the galaxy as much as possible.

Circle of Precession

North Pole. The top of the pencil moving clockwise.

Axis Position in Mid-1998

Over the crease and pointing down

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Looking down on our model, we see the circle of precession and the four parts of the great year.

This diagram looks down on our 3-dimensional model from above and allows you to see the circle of precession. Basically we see that twice during the cycle of precession, the axis is directly over the crease and twice the axis is exactly perpendicular to the crease. These positions are marked by the four points of distinction as shown by the small orange circles. They naturally and equally divide the great year into four periods of approximately 6,500 years. These points are not artificially created by the mind of man. They are as natural as sunrise, high-noon, sunset and midnight or the points that divide the year into the four seasons.

To get a feel for how slowly precession unfolds, imagine that the circle is made out of 26,000 equally spaced dots and imagine that each year the top of the pencil moves to the next dot.

Now, let's take a closer look at the position of the axis in mid-1998. Since the axis moves so slowly, let's start by imagining that the axis will be virtually directly over the crease during the entire year. While the year unfolds, the winter solstice will occur and this means that the axis will also be pointing away from the sun as much as possible since this is what makes the winter solstice. This means that on this day the sun will also be on the crease and that you will be able to draw a line from the center of the earth, which is the center of the circle, up along the crease through the center of the sun and then out through the plane of the galaxy!

This is why the moment of the winter solstice and the moment of the galactic alignment come together near the time when the axis is over the crease. When we take into account that the axis was over the crease in mid-1998 and not during the entire year, we see that both 1997 and 1998 had these two events happening very near each other. It turns out that they happened within about 9 minutes of each other for both 1997 and 1998. Upon very close inspection, it turns out that 1998 is the year that these two events are the closest but 1997 only differs by less than approximately one minute. (8)

It is important to note that without the galactic plane, which makes the crease, each and every point on the entire circle of precession would look basically the same. There would be no naturally occurring points of distinction. But when we add the galactic plane to our model, we see that this gives rise to the four naturally occurring points that we are talking about.

Several Ways to Think About the Special Alignment of 1998

Our paper and pencil model gives us a great way to clearly see the axis in its position over the crease. I think this is the best way to understand the alignment of 1998 but there are others.

A common way, as we will soon see, is to look behind the sun every winter solstice. For each year as 1998 approached, the center of the sun moved closer to the galactic equator at the moment of the winter solstice. For 1999 and each year thereafter, the center of the sun has moved farther away from the galactic equator at the exact moment of the winter solstice. In the next 13,000 years, the "solstice sun" will continue to move farther away from the galactic equator. In the 13,000 years after that, the conditions will shift and it again will move closer.

Yet another way to look at this event is to stay focused on the yearly conjunction of the earth, the sun and the plane of the galaxy and examine the direction of the tilt of the earth's axis. You only examine the angle once a year during the conjunction. Once every 26,000 years, the angle of the axis will create the winter solstice and we again have this special event.

If you understand why all three ways are equivalent, you really do understand the basic astronomy very well. For many of you, this solid astronomical foundation will be sufficient

and you may choose not to dig any deeper. Dwelling on the simple beauty of just this can be quite fulfilling. Yet in my opinion, some of the more detailed aspects of the special event of 2012 are quite amazing. If you are inspired, I invite you to continue. You won't be disappointed!

Part 2:

A Deeper Understanding of the Sacred Triple Rebirth of the Sun

The Maya Long Count Calendar



Five cycles of the Maya calendar add up to the great year.

As you may know, the Maya used several different calendars for business, social, scientific, and religious purposes. It is their Long Count calendar, which is over five thousand years long, that is restarting on December 21, 2012. I want to point out that many researchers say that the Long Count calendar **ends** on that date, rather than **restarts** on it. Yet after careful analysis, it is clear to me that that date marks the birth of a new calendar cycle. In other words, December 20, 2012 is the last day of the cycle that we are currently in and December 21, 2012 is the first day of the next cycle since the calendar is continuous and just starts again the next day. So the Maya are linking that particular winter solstice with the start of a new calendar cycle.

Michael Coe and others traced the origin of the Long Count calendar back over 2,000 years to the little-known pre-Maya site of Izapa in the southernmost tip of Mexico, near the Pacific Ocean, south of present day Chiapas. (Don't confuse Izapa, pronounced es-AH-pa, with Ixtapa, pronounced eeks-TAH-pa, which is up the Pacific coast.) In Izapa, we find more than sixty carved stone monuments that display ancient esoteric cosmology. Even though it appears most likely that the Olmec, rather than the Maya, created the Long Count calendar, I will be like everyone else and continue to call it the Maya calendar. (9)

In Izapa, we also find a supremely important ball court. It is long and narrow and it points towards the location on the horizon where the sun will rise on the day of the winter solstice and it has been doing this like clockwork for thousands of years. As you may know, the sun does not rise from the same location everyday. On the summer solstice, it rises from its northernmost point and on the winter solstice, it rises from the southernmost point. During the year, it swings back and forth between these two points. So we see that the ball court marks the location of the southernmost sunrise. At one end of the ballcourt, there is a throne, which gives the king the best view of this special sunrise. On the front of this throne is a carving of a large round ball, symbolic of the sun in the birth canal coming forth into our world. This is just one of the many examples that demonstrate the importance of the winter solstice and the fact that the Maya saw it as a rebirth. In addition to that, there are many non-astronomical metaphors in Izapa that also point to transformation and rebirth but since this essay focuses on the astronomy so I will just continue. It certainly is not a coincidence that the ball court points towards the winter solstice sunrise. Likewise, I don't think that it's just a coincidence that the calendar also restarts exactly on a winter solstice.

The Long Count calendar is 5,125 years long. Five cycles of the Long Count calendar add up to the great year to within one-half of one percent and the Maya show all five cycles in their artwork and talk about them in their folklore. (See the five-pointed star above.) Notice that the Maya have gone through less than one Long Count. What is most interesting is that they did not start using it as if they were on the first day. It appears that it was shifted intentionally in order to place its restart date exactly on the winter solstice of 2012. In other words, the error of one-half of one percent did not come into play at all and they are pointing to the exact day that they want. Yes, the exact day!

So this brings us back to December 21, 2012, which is the winter solstice. To correctly pinpoint a winter solstice from several thousand years away shows a precise understanding

of the length of the year. And again, the length of the Long Count calendar clearly demonstrates knowledge of the length of the great year. So it seems to me that the Maya are saying, "Yes, we understand the year and yes, we understand the great year. We have extremely precise values for both." But it even goes beyond that. By picking the year 2012, they also show that they knew where they were in the precessional cycle. It is this complete understanding of the rhythms of nature that allowed the Maya to create their calendar. At its heart is the sacred triple rebirth of the sun. Let's take a closer look.

The Sacred Triple Rebirth of the Sun

It is my opinion that the special event of 2012 is the sacred triple rebirth of the sun. Let's go over these rebirths one at a time.

Everyday when the sun sets, it goes below the horizon, seemingly under the ground of the earth, and we are left to endure a dark, cold night. Metaphorically, it can be said that the sun leaves our world and travels into the underworld, where it is said to be dead for the duration of the night. Yet at dawn, it rises above the ground and is reborn into our world bringing forth the light and heat we all need to stay alive. Obviously, if the sun would no longer rise, all of life would perish and because of this, the sun has been used for thousands of years by cultures all around the world as a symbol of the Creator's sustaining love.

Since the sunrise is so frequent, it is often taken for granted, but all of us of course know that this rebirth is truly vital. In addition to that, sunrises are often quite beautiful. In fact, this astronomical shift can be one of nature's most dramatic display of beauty with its blaze of red and pink, yellow and gold. This is the shift that naturally awakens us from our slumber.

Next is the winter solstice, which can be seen as the rebirth of the sun in the time frame of the year since the length of the day will now start to grow longer. If the days were to continue to grow shorter, the cold winter would only tighten its grip and we would all perish. So this rebirth is also vital.

Our comfortable homes insulate us from the long, harsh winter nights but when you think of both the daily and yearly rebirths from the perspective of cultures with significantly less physical comfort, you can appreciate that these rebirths of the sun would be experienced in a very tactile way. Add to that the rhythm of the harvest and you can certainly understand the strong motivation to celebrate these turning points in the cycles of time.

With excellent viewing conditions, which the Maya certainly had, it is possible to easily see the bright section near the center of the galaxy without a telescope, although the dark rift intrudes into it. For the Maya, the massive ball of bright lights at the center of the galaxy was seen as the pregnant belly of the mother of creation and the dark rift was seen as the galactic birth canal. In this way, the third rebirth occurs when the sun moves into the middle of the dark rift and this can be referred to as the galactic rebirth and it happens once a year. So the three rebirths of the sun can be referred to as the daily rebirth, the solstice rebirth and the galactic rebirth. *A triple rebirth of the sun occurs in the years around 2012 when all three rebirths happen on the same calendar day.*

By the way, the solstice rebirth happens once every tropical year and the galactic rebirth happens once every sidereal year. A sidereal year is about 20 minutes longer than a tropical year and this difference is caused by the slow wobble of the earth's axis. This is what causes these two rebirths to come together in the years around 2012. I will go into this more in just a minute but for right now, let's just continue.

Now let's take a look at what I call the galactic crossing of 2012. On December 21, 2012, the sun will appear to cross both the middle of the dark rift and the galactic equator. While I think that the Maya focused on the middle of the dark rift for their rebirth metaphor, the following section will focus on the galactic equator but bear in mind that it is only a slight shift from the galactic equator to the middle of the dark rift. Again, the reason that I am covering this material by focusing on the galactic equator is because almost all other 2012 researchers focus on the galactic equator so by understanding the following material, you will be able to understand these other researchers.

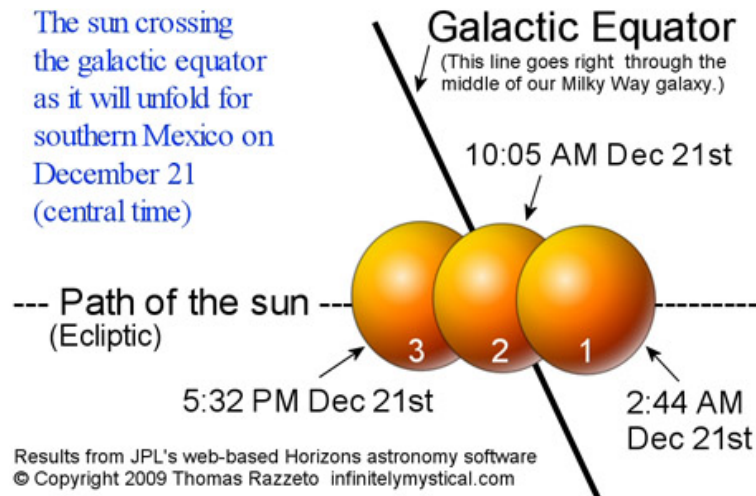
The Galactic Crossing of 2012

Throughout the year, due to the orbit of the earth around the sun, from the viewpoint of earth, the sun appears to be continuously moving slowly against the background stars and it is this apparent motion that creates a visual illusion of the sun crossing the galactic equator since the galactic equator is part of the fixed background of the stars.

As I already mentioned, this crossing takes about 15 hours and the midpoint of the crossing is a perfect alignment of the earth, the sun and the galactic equator. Again, if we could push a button and make it so that we could see both the sun and the stars during this time, we would see the sun appear to cross the galactic equator very near the middle of the dark rift of the Milky Way. Please note that from the viewpoint of the Maya, both the background stars containing the galactic equator and the sun appear to move in the sky from left to right due to the spinning of the earth. But the apparent motion of the sun is not as fast as the background

stars due to the counteracting effect of the orbit of the earth around the sun. This results in the sun moving from right to left against the background stars and this makes the sun appear to cross the galactic equator. Let's take a look.

The Galactic Crossing of 2012



The following simple exercise will help you correctly understand this crossing. Hold your left arm straight out with your thumb straight up. Your thumb will be like the galactic equator. Imagine it to be very far away. Now, close one eye and hold your right index finger straight up about halfway between your thumb and your open eye. Make it so that your finger appears just to the right of your thumb. Your finger will be like the sun. Now, without moving either your thumb or your finger, move your eye from your left to your right. Your eye is like the earth orbiting the sun. You will see your finger appear to move from the right side of your thumb to the left side of your thumb.

This is just like the sun crossing the galactic equator. At the peak of the crossing, your eye is perfectly lined up with your finger and your thumb. While the alignment is real, it is an illusion that your finger moves across your thumb; only your eye is moving, not your finger. So it is with the sun crossing the galactic equator; only the earth is moving, not the sun. Since this point is so important and so often misunderstood, I want to be perfectly clear: the sun does not actually cross the galactic equator, it only appears to do so from our viewpoint on earth.

The sun crossing through this region of the Milky Way was seen by the Maya as father sun mating with the galactic mother. In 2012, this special lovemaking results in the birth of what the Maya called "a new world age," which is represented by a new cycle of the Long Count calendar. Yes indeed, lovemaking and creation is at the core of 2012, not death and destruction.

Now let's take a look at what will actually unfold in the sky above the Maya in Izapa, Mexico, which is in Central Time.

What Will Actually Happen on December 21, 2012

Venus will start things off by rising above the horizon at 4:46 AM. It will be extremely easy to see in the black predawn sky and it will lead the sacred tree on its journey across the sky throughout this special day. The fact that Venus will rise before the sun should not be taken lightly with regards to the question of why the Maya picked 2012. Jim Reed, editor of the Institute of Maya Studies's newsletter, said:

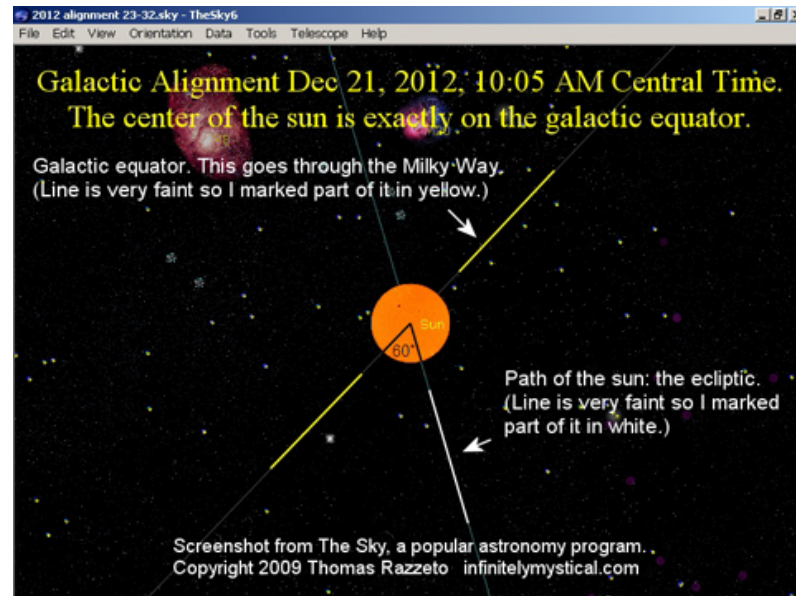
I think it is important that they chose a date of a winter solstice and a winter solstice when Venus would rise up before the sun. Venus is there to witness the rebirth.

Yes, of course the Maya would have had a vision that included the planets, especially Venus, which they tracked with a very precise calendar. The Maya were so concerned about Venus that they could even predict when it would pass as a black dot across the face of the sun. This is called a Venus transit and there will be one in June 2012.

Now, let's get back to the unfolding of the day. At 5:11 AM, the moment of the winter solstice will arrive and the sun will be reborn with the days becoming longer. Mercury will rise at 5:23 AM and it will be visible even with dawn's increasing light. It will be the second object on the sacred tree. Next, the sun will enter our world with a blaze of color at 6:29 AM to become the most important object on the sacred tree. Obviously, by this time, the sky will be so bright that both Mercury and Venus will be obscured from view but nonetheless, they will continue their journey across the sky. Pluto, which is never visible to the naked eye, will rise at 7:03 AM and finally Mars will rise at 8:24 AM, making it the last object on the sacred tree. Notice

that the sun will rise 103 minutes after Venus and that Mars will rise 115 minutes after the sun. This means that the sun will be close to the middle of these two planets! (10)

A few hours later, at 10:05 AM, the center of the sun will be exactly on the galactic equator. This is the galactic alignment of 2012 and the peak of the celestial love making! This is the moment of cosmic orgasms!

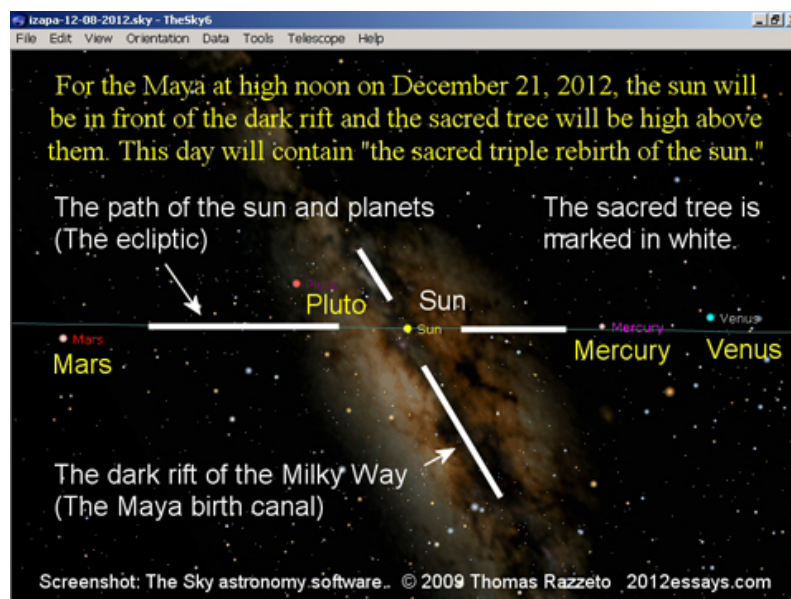


Screenshot showing the center of the sun exactly on the galactic equator.

[Note to astronomers: I used The Sky version 6 for this screenshot BUT this version has a bug regarding the location of the galactic equator. While there is no doubt that The Sky locates the galactic equator incorrectly, I can only speculate what the problem is. In this regard, it seems to me as if The Sky is locating the galactic equator with B1950 coordinates rather than the correct J2000 coordinates since the error amounts to what one would see if that were the case. It is important to note that since the galactic equator is a precisely located *imaginary* reference line and not a visible object, this error has gone undetected. No one could ever look into their telescope and noticed that it was incorrectly located. To determine the precise time that the center of the sun will be on the galactic equator, I used the NASA JPL Ephemeris online calculator called "Horizons" and looked for a galactic latitude (GlxLat) of zero degrees. At some point in the future, I may post all my work showing the exact details but for right now, I will just give the results as shown. Horizons is an excellent tool but its results are in table format with cryptic labels and this is not ideal for the general public. That is why I use the Horizons data but the screenshot from The Sky. The screenshot is valid as an image but if I were to show the date and time, the time would be inaccurate. So I just show the image and omit the date and time.]

The next moment that I want to present is the moment when sacred tree is at its highest point of the day. It is at this time that the sacred tree is properly oriented in the sky over the Maya. The sun and the four planets are virtually exactly horizontal. This is what we saw at the very beginning of this essay. Let's take another look.

The Sacred Tree



The sun will be in the middle of the dark rift, the Maya birth canal, on the solstice.
The sacred tree will be above the Maya with the sun exactly between Mars and Venus.

While I have already mentioned the sacred tree several times, let's go into it a bit more right now. The sacred tree is in the Maya folklore and other cultures around the world also concern themselves with it. It has several names such as "the sacred cross," "the tree of life," "the sacred tree of life," and "the world tree." The Maya sacred tree has been shown to be an astronomical reference to the cross made by the galactic equator and the ecliptic near the center of the galaxy. (The ecliptic is the path of the sun, as seen from earth.) It is important to note that the sacred tree is part of the fixed background of the stars; its shape and location with respect to the other stars never change.

Yet in the eyes of the Maya, things might have been slightly different. As we have already seen, it looks like the galactic equator goes very near the middle of the dark rift. This creates some uncertainty with regards to what the Maya were really talking about. When you take into consideration that you can actually see the dark rift and that you cannot see the galactic equator as such since it is an imaginary line, it makes sense that the Maya were referring specifically to the dark rift rather than the galactic equator. Likewise, the other part of the sacred tree might not be restricted to the razor thin line of the ecliptic. While the sun always moves exactly along the ecliptic, the planets also move along the ecliptic, although not necessarily exactly on it. Because of this, the Maya might instead have been referring to the "road" that the sun and all the planets travel on since this is what the Maya actually witnessed. This slightly broader path would be quite useful for their metaphor.

In this way, the sacred tree might be better stated as the cross made by the dark rift and the path made by the sun and the planets rather than the galactic equator and the ecliptic, although these two phrases amount to very nearly the same thing.

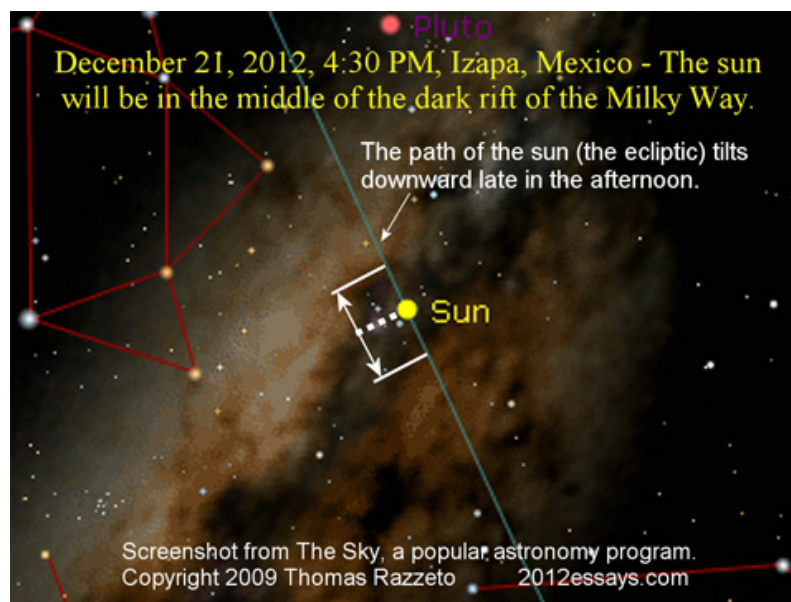
By the way, notice that the tree of life is made up of one crossbar of darkness and one crossbar of light since the light of the sun and the planets can only be found along the ecliptic. Thus we see that the tree of life represents the yin-yang quality of duality exhibited by all of creation. And right on the intersection of these two crossbars on this special day, we have the sun, which bring us the light and warmth of the day when it rises and the darkness and coolness of the night when it sets. So in this way, the sun can be seen as the most powerful creator of the duality that we witness in our world. It even bringing us life itself and invites us to inquire about the most mysterious duality that we all face: our very own life and death.

We should also consider the location of the center of the galaxy, the Maya womb of creation. On this day, at this time, it is at the bottom acting as the source, the root system, of the sacred tree. So everything comes forth from the source into our world of duality! What a beautiful metaphor! This makes much more sense than the false yet often repeated statement that the sun will be on top of the center of the galaxy on this special day. When we look at the configuration at mid-day - the moment of the sun's greatest strength - we have the sacred tree being exhibited in an extremely interesting way. When we consider the sun's presence in the middle of the dark rift while it is also in the middle of these four planets, I think we have found something that is quite remarkable!

Now let's continue with the unfolding of this special day.

What Will Actually Happen on December 21, 2012 - Continued

For the rest of the afternoon, the sacred tree will travel across the sky, sinking slowly towards the horizon. As it does so, the sun will continue to shift slowly against the background stars. As I mentioned earlier, it looks like the sun will be virtually exactly in the middle of the Maya birth canal at about 4:30 PM. Let's zoom in for a closer look.



The sun will be in the middle of the dark rift in the late afternoon on Dec 21, 2012

This is it! The position of the sun is the main reason why the Maya picked this exact day. We will have the sun in the middle of the dark rift, the birth canal, on the same day as the winter solstice! This will create the triple rebirth of the sun! In addition to that, the sun will be virtually exactly in the middle of four planets on the sacred tree with Venus leading the parade across the sky! This combination is why the Maya picked 2012!

About 70 minutes later, at about 5:44 PM, the sun will set and Mother Nature herself may provide another spectacular scene of glorious colors. Finally, at 7:37 PM, Mars will be visible against the night sky as it sinks below the horizon, marking the end of the sacred tree's journey across the sky on this fantastic day! I can only imagine that the Maya celebration will continue throughout most of the night!

The Driving Question Behind the Creation of the Long Count Calendar

Now let's go way back in time and imagine being a Maya sky watcher several thousand years ago. In the summer time, you would clearly see the spectacular section of the sky containing the center of the galaxy and the dark rift. There is nothing else in the night sky that looks even remotely like this. It is quite stunning and very intriguing. You would be drawn to it and stories would be created about it. Throughout the year, you would also frequently see planets traveling on or near the ecliptic and at certain times, you would see them travel right across the dark rift. Planets stand out because they are free to wander against the fixed background of the stars - that is the origin of the word, wandering star - but they cannot go just anywhere; they can only travel along the special road near the ecliptic.

Eventually we would also learn that the sun travels across the dark rift - the birth canal - as winter approached and each year it would do this a little bit closer to the day of the winter solstice. This would lead us to ask what year in the distant future will the sun be in the middle of the dark rift on the day of the winter solstice. In other words, when will there be the triple rebirth of the sun? In my opinion, this was the driving motivation behind the creation of the Long Count calendar, not a psychic prediction of any kind concerning the conditions of mankind or the world we live in.

Now let's add a little more to our desired scenario. The Maya would most certainly want to celebrate the sun's presence in the middle of the birth canal at a time when this is actually happening in the sky above them - in other words, during the day. Since the sun is considered to be dead at night, if this astronomical event happened at night, it would not be very useful for their metaphor or very interesting for the purpose of their festivities; they would want the sun to be alive during the rebirth celebration!

So the question now becomes: When will the sun be in the middle of the dark rift on the day of the winter solstice while in the sky over the Maya? If there is more than one year that fits these qualifications, what year will also include an interesting planetary configuration, preferably one that has Venus rising before the sun so that we can easily see Venus rise and it can witness the rebirth of the sun? Remember that Venus is known as both the evening star and the morning star because these are the only times when it can be seen even though it is one of the brightest objects in the sky. In my opinion, it is important to note that these are all very natural questions; I don't think that they are contrived at all.

And there is absolutely no doubt that the sacred tree of 2012 offers us an excellent solution to these questions. While the moment of the winter solstice and the moment of the galactic alignment do happen near each other in the years around 2012, only 2012 has this stunning collection of events. As interesting as this is, it will be helpful for us to learn just a little bit

more about it. Exactly how often does the sun travels across the dark rift? Once a year, right? Yes, but let's go deeper.

The Difference Between a Tropical Year and a Sidereal Year

Most people don't know that there are two different types of years that differ only by about 20 minutes, on average. Yet we all know that basically the year is the amount of time it takes the earth to make one complete orbit around the sun. Astronomers call this a sidereal year and the background stars are used to determine when the orbit has been completed.

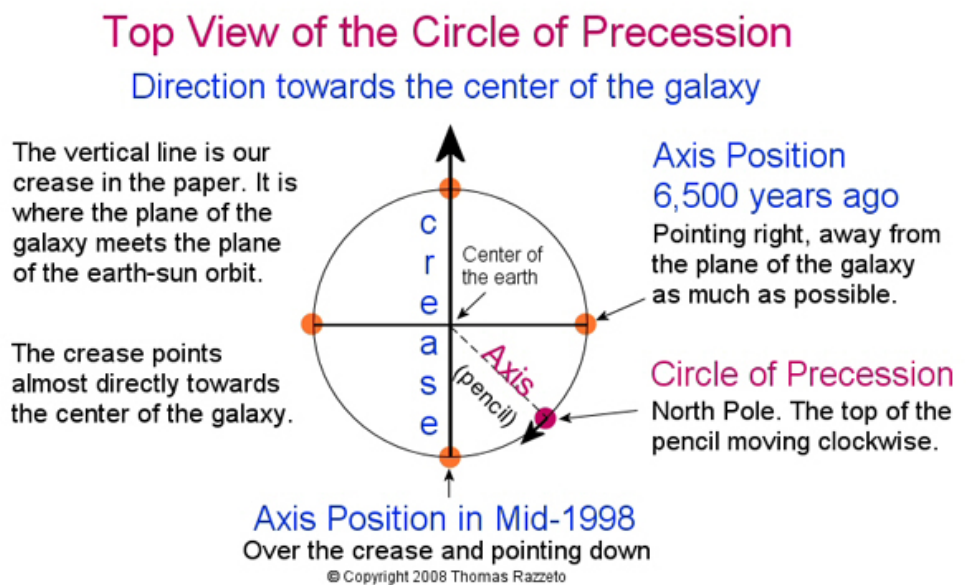
In addition to that, we also think of the year as the amount of time from one winter solstice to the next winter solstice, for example. While the earth is making its journey around the sun, its axis of rotation is precessing very slightly. Since it is the direction of the axis that determines the winter solstice, the solstice line-up occurs about 20 minutes before the earth completes the full orbit. This type of year is called a tropical year or a solar year and it's what we commonly call a year. Astronomers themselves usually mean this type of year unless they make the distinction of a sidereal year. (11)

So we see that the winter solstice happens once every tropical year and that the alignment with the middle of the dark rift happens once every sidereal year. Or to use our rebirth metaphors, there is a rebirth of the sun once every tropical year due to the winter solstice and there is a rebirth of the sun once every sidereal year due to the alignment with the middle of the dark rift. Precession is what causes the relative occurrence of these two rebirths to shift. Precession is what slowly brings these two rebirths together in 2012 and later drives them apart. In about 13,000 years from now, they will be as far apart as possible with the rebirth in the dark rift happening six months after the winter solstice. The following 13,000 years will bring them back together again.

So on the day that the calendar itself is reborn, we have the sacred triple rebirth of the sun! How fantastic!

A Bigger Idea: The Rebirth of the Great Year

I find the triple rebirth of the sun to be fascinating. But perhaps the Maya are actually using it to point to something even bigger: the rebirth of the great year. Let's revisit our diagram of the top view of the circle of precession for some more insights.



Looking down on our model, we see the circle of precession and the four parts of the great year.

The fact that the great year is naturally divided into four parts leads directly to this question: Is it reasonable to metaphorically view the great year as having four seasons, just like the regular year? When we look closer at our diagram, we notice that the four points of distinction have an interesting correlation with the solstices and equinoxes of the regular year. At each of the four points, the galactic alignment takes place at the same time as one of the solstices or equinoxes of the regular year. Remember, at the moment of the galactic alignment, the sun is on the crease, above the center of our circle, which is the center of the earth. Also remember that from above, the earth orbits the sun counterclockwise. Here is what we find from the perspective of the northern hemisphere where the Maya live:

- Top Point = Galactic Alignment + Summer Solstice
- Right Point = Galactic Alignment + Fall Equinox
- Bottom Point = Galactic Alignment + Winter Solstice
- Left Point = Galactic Alignment + Spring Equinox

So an analogy that uses these points in a way that is similar to the solstices and equinoxes of the regular year is perfectly reasonable. Notice that we have the same order of the seasons for the great year as we do for the regular year. With this in mind, we can easily make the analogy that the great year is now being reborn during its own winter solstice! How interesting!

And let's consider the following. Everything in the galaxy slowly orbits the center of the galaxy. So the galaxy is analogous to the solar system with the center of the galaxy playing the role of the sun. And furthermore, the center of the galaxy is, in fact, millions of suns all grouped closely together.



The center of our Milk Way galaxy

I bring this up because I want us to consider the orientation of the axis of the earth with respect to the center of the galaxy, similar to how its orientation towards our own sun determines our regular seasons. I know that this analogy is flawed since the crease of our 3-D model does not point exactly towards the center of the galaxy but it is only off by just over six degrees. So for the purpose of an analogy, I feel that this is acceptable. In this way, we see that when the axis is at the bottom point of distinction, it is leaning away from the galactic center, a posture that is akin to that of the winter solstice of the regular year. So we have another configuration supporting the view that we are now in the time of the rebirth of the great year. Very interesting.

And have you been wondering about this: Since the day, the year and the great year are naturally divided into four pieces, why didn't the Maya setup the length of the Long Count calendar to be one-quarter the length of the great year, rather than one-fifth, and use a square or some other four-stroke symbol to denote the great year, rather than the star?

I wondered about that, too. If they had set the calendar to one-fourth the great year, each of the four restart points would correspond with one of the points of distinction. All four points of distinction would be highlighted, but they would be highlighted equally. With the approach that they took, only the approaching restart point in 2012 corresponds to the point of distinction of mid-1998. In other words, this particular point of distinction is held forth as more important than the others.

And there is something else that happens in 2012 that might have contributed to its selection by the Maya - a Venus transit! On June 6, 2012, Venus will visibly cross in front of the disk of the sun. When using the proper safety precautions, you can actually see the small dot made by Venus as it slowly moves across the sun. Venus transits have an unusual rhythm to them. They alternate between happening 8 years apart and then either 105 or 122 years apart, approximately, and the Maya have a calendar to track this rhythm. (That is to say: 8, 105, 8, 122, 8, 105, 8, 122 and so forth.) The connection between the Venus transit in 2012 and the restart of the Long Count calendar is perhaps circumstantial but I still think that it did play a factor. Few people ever get to see even one Venus transit in their entire lifetime so with so many other factors pointing to 2012 as an excellent restart date, I think that this event also made the designers of the Long Count calendar smile. You can read all about the Venus transit that we had in 2004 and see some fabulous pictures [here](#).

Now we see that from the viewpoint of the Maya, December 21, 2012 is more than just another winter solstice; it is the most important winter solstice of all the winter solstices throughout the entire great year. This therefore makes this day the single most important day in the entire great year! There are over 9.4 million days in the great year and the Maya have picked this day as the day the great year restarts!

The concept of precession is in the Maya mythology and also in their calendar. The calendar's restart date undeniably contains all this amazing astronomy that is keyed to precession and the position of the planets. The poetic beauty is breathtaking; the actual astronomy is profoundly precise! How can all this be a coincidence? I find it to be completely mind-blowing!

To my knowledge, I am the only researcher who describes the special event of 2012 exactly like this with consideration for the position of the planets, and the Venus transit. Some researchers focus on 1998 and the years surrounding it. But I don't think that that is what the Maya were trying to pinpoint with their calendar, though missing it by 14 years. I think that they successfully hit exactly what they were aiming at: the sacred triple rebirth of the sun as a marker for the rebirth of the great year!

How difficult was it for the Maya to pinpoint the winter solstice?

What level of precision is required to hit the exact day of the winter solstice from over 2,000 years away?

Let's approach this problem by focusing on the length of the tropical year, which is the amount of time from one winter solstice to the next. Astronomers record this value as 365.24219 days, on average. Let's see how accurately the Maya would need to know this number in order to make their calendar.

As a starting point, let's say that we want a calendar that restarts on the winter solstice 10 years from now. We would multiply the above number by 10 to get 3,652.4219 days from our current winter solstice to the one 10 years later. If we were using only a 365.0-day year, our results would be 3,650 days, which is about 2 and a half days short.

Now suppose we want to restart our calendar in 100 years. We would just move the decimal point two places to get 36,524.219 days. Again, if we were using a 365.00-day year, we would be short, this time by about 24 days. So of course you see that if we wanted our calendar to restart in 1,000 years, we would have 365,242.19 days and, just for completeness, let's note that for 2,000 years, we would have 730,484.38 days. Note that I will talk about this 0.38-day fraction in just a minute.

I stepped you through this slowly so that you could easily see how the numbers after the decimal point are so important. As the time frame gets longer, the precision required increases.

You can see that if the Maya intentionally restarted their calendar on the exact day of December 21, 2012 because it is a winter solstice, they needed to know the value of the tropical year to within at least 3 decimal places.

Let's look at this in even more detail. Basically, what we have is a tolerance of one day over a period of 2,000 years. To calculate this as a percentage, we multiply this one day by 100 and divide by the total number of days in this period. This results in a tolerance of 0.0001369 percent, which means that the Maya needed to know the length of the tropical year to a level of 99.9998631 percent correct or better! Wow!

This works out to knowing the value of the year to within about 45 seconds, which can be stated as plus or minus 22 seconds. In other words, even a small error would build up as we add together all 2,000 years and the resultant total error needs to be such that we still land on the correct calendar date of the winter solstice. If you multiply 45 seconds by 2,000, you see that it is just under one day so we are on the right track. To help you get a better feel for what this level of precision is like, consider measuring the width of the United States to within 20 feet or the distance from Los Angeles to Tokyo to within 40 feet. Good luck!

But there is even more to this. If the winter solstice for 2012 was at noon, then our evenly split tolerance would be fine. But since the solstice is at 5:11 AM central time for the Maya, calculations that are just 5 hours and 12 minutes too early would result in the wrong calendar date. So the level of precision required is even higher.

And you probably already realize that the 0.38 day fraction from the total number of days in the 2,000 year period also needs to be considered since it amounts to over 9 hours and this can easily push the time of the winter solstice across the boundary of a calendar date. Indeed, if this factor were ignored, the winter solstice for 2012 would be calculated as being at about 8 PM on December 20th central time, which is the wrong calendar date.

So you see that great care must be taken in order to correctly calculate the exact date of the winter solstice several thousand years in the future.

In addition to an accurate value for the length of the year, the Maya also need to know an accurate value for the rate of precession and an accurate value for the number of degrees the sky needed to shift during the 2,000 year period in order for the sun to be in the middle of the dark rift on the day of the winter solstice. I should further point out that the value of precession is not a constant. It is getting shorter by about 36 days every year. But even this rate will change! When I take all this into consideration, it is hard to believe that the Maya used naked-eye astronomy to build their calendar; the level of precision required is just too demanding to be achieved without sophisticated measuring equipment. It seems to me that it is either absolutely astounding that their calendar restarts when it does or it is a meaningless coincidence. It is so difficult to believe that the Maya could have had this level of precision that it is easy to understand why mainstream science denies them this knowledge and attributes the restart date to mere coincidence. But is this justified? Is the restart date landing on the winter solstice a coincidence?

If the Maya were Christian and the restart date was Christmas, would we be justified in stating that it was just a coincidence? Of course not! It would be obvious that it was intentional. And yet the winter solstice plays the role of Christmas for the Maya. It is their most important day of the year. It is too much for me to think of this as just a coincidence.

As a side note, consider that in about 130 B.C., the same time frame as the creation of the Maya calendar, the Greek astronomer Hipparchus estimated precession to be 36,000 years or less. He was off by 10,000 years! Even so, Hipparchus is very famous for his work on precession and he wrote two books on the subject. He is considered by some people to be the greatest astronomer of antiquity. I can only add that it's a good thing he was not in charge of creating the Maya calendar! (12)

By the way, some researchers argue that the Long Count calendar does not restart on December 21, 2012 but on various other dates. While most researchers agree with the winter solstice date, the next most popular end date is only two days later and a very small number of researchers have picked dates that are years away. A change of two day would hardly affect the calculations above; we would now have a tolerance of two minutes.

Furthermore, no matter which date we choose to use, or even if the restart date really is coincidentally the solstice, it still seems undeniable that the Maya knew a fairly precise value for the length of the great year. Remember, five cycles of the Long Count calendar add up to the great year to within one-half of one percent or 140 years. (Or is this just a coincidence, too?) So they knew the number to at least that degree of accuracy. I feel that we should at least give them credit for this. But was their astronomical understanding vastly superior to even this? Can anyone prove that it wasn't?

The structure of the Long Count calendar demonstrates to me beyond a reasonable doubt that the Maya knew a lot about astronomy. It is not a lucky guess or a coincidence that the calendar works the way that it does. In my view, there is no getting around this, no matter how uncomfortable modern mainstream researchers are with attributing this sophisticated knowledge to them.

It required great ingenuity and scientific understanding to create this calendar. The two most important aspects of it are that it accurately reflects the underlying astronomy while being easy to manage on a daily basis. The Maya accomplished this beautifully.

Pinpointing the Winter Solstice and 2012 Separately

The Maya hit the day of the winter solstice exactly. It might seem that if they hit the day they wanted, they must have also hit the year they wanted since the year is a bigger target. While I do think that 2012 is indeed the exact year that they wanted, let's see why it is possible that they hit the day exactly, but only came close with the year.

As we have seen, in order to hit the day that contains the moment of the winter solstice, you need to know the length of the year with a certain degree of accuracy. But to correctly pinpoint the year that the sun will be in the middle of the dark rift on the day of the winter solstice involves knowledge of the rate of precession, which, obviously, is a different astronomical phenomenon than the length of the year.

So we see that the pinpointing of the day and the pinpointing of the year are really two different problems. First the Maya would have had to find out how many years until the event that they were interested in. Then they would have had to calculate how many days until the day of the winter solstice for the year that they had picked. Under certain circumstances, they could have made an error picking the year but once they had selected that particular year, they could have exactly calculated the number of days until its winter solstice.

2,000 years ago, the sun was about 30 degrees away from being in the dark rift on the day of the winter solstice. To find the correct year to restart the calendar, they would have needed to accurately measure this angle and also accurately measure how much this angle changes from one year to the next. Once you know both the angle and the rate of change, it is trivial to calculate when the angle will become zero. While it is easier to measure the angle than it is to measure the rate of change, you still need to measure both with a high degree of precision.

But even if the results are off by 50 years, just to pick a number, this could still be considered reasonably accurate since the total amount of time is so large. Even if we are only considering the 2,000 years since the calendar has been in use rather than the entire precessional period, being 50 years off is still only about 2.5 percent incorrect. But I think that the Maya did better than that. When I consider the extremely high degree of accuracy that they demonstrated for the length of the year, I can't help but think that they might have also had a very precise value for both the angle and the rate of change for that angle. Their length of the year is 99.9999 percent correct or better. If they brought that level of accuracy to the angle and the rate of change, the year 2012 is also exactly what they wanted.

How Should We Think of 2012?

The Maya's Timeless Message of Transformation and Rebirth

It is my view that the astronomy of 2012 will not cause anything unusual to happen to us, physically or spiritual. Remember that the triple rebirth of the sun is caused by the earth

going through three different motions: it spins on its axis once a day, it travels around the sun once a year, and it wobbles on its axis once every 26,000 years. The triple rebirth of the sun does not come about due to anything happening to the sun itself; it comes about due to the shifts in our relationship with the sun. These three motions have been repeating for billions of years and there is no reason to expect that the astronomy will suddenly cause something unusual to happen to us in 2012. I think that the Maya knew this, too, and this is why it made perfect sense for them to use the astronomy as a timeless rebirth metaphor rather than as an alarm for danger or a time marker for world peace. In my opinion, this is an extremely important point that is completely misunderstood by many people.

If you think that the astronomy might cause some effect - either physically or spiritually - I invite you to consider that the time of change connected with 2012 would be a long period of transformation, rather than a sudden shift. Astronomically, there is very little difference between the position of the earth's axis now and where it will be in 2012. In fact, it is 99.986 percent in that position today (Spring 2009). Add to this the fact that the galactic alignment happens every year and we should completely remove people's fear of imminent global disaster due to some astronomical driving force. Since the precessional cycle is so slow, I think that it is safe to say that not only would this period of transformation be happening now, it would have been happening for hundreds of years and it would continue for the next several hundred years. But again, I don't think there is any effect whatsoever due to the astronomy of 2012. While I do acknowledge that our world today is most certainly heading for tremendous change, I believe it is due to the unsustainable nature of our behavior, not the astronomy of 2012.

But if this astronomy is not going to cause anything unusual to happen to us, why did the Maya bother with all of this? I think that it is important to keep in mind the magnitude of the efforts the Maya put forth with regards to all of this. They were highly motivated. The work required to learn the astronomy, create the calendar, build the monuments, write the metaphorical stories, and create the artwork is absolutely immense. Why did they do all this work when the apparent focal point was over two thousand years in their future? What could have possibly provided that much motivation?

Did they make the calendar simply because they could even though it was difficult? Was it a way of boasting or did they want to give us something, perhaps an invaluable treasure? The calendar clearly points to the rhythms of nature. What could they possibly want us to think or do in response to pondering the cycles of the day, the year and the great year? Their metaphor involves lovemaking and birth. Do they want us to contemplate the question of life itself? Do they want us to contemplate who we are at the deepest level? Do they want us to ponder the process of creation and the source of our very being?

Without providing answers, perhaps they simply wanted to inspire us into being in a state of wonder and awe. Life can be difficult. It takes hard work to maintain our existence on the physical plane. This daily burden can wear people down and even break their spirit. In addition to that, it seems that some people lose their sense of wonder when people explain things with science. Indeed, in today's world, many people believe that science has explained what life itself actually is. But has science really explained the mystery of life? Do you personally feel like you know what life really is?

And in my opinion, the Maya want us to do more than just wonder. They want us to actually find answers. However the Maya do not give us the answers. Why? Perhaps they simply did not have them. Or perhaps it is because answers to questions like this are not appreciated as much when they are simply given to you. Furthermore, these answers are often resisted or even rejected if they are pushed upon you from an apparent authority. Answers to questions this deep really begin to mean something only if you find them for yourself.

The Maya personified the sun because you are like the sun. From our perspective on earth, the sun is born when it rises and it dies when it sets. But from a perspective out in space, we see that the sun is never born and it never dies; it is essentially eternal. Is there a different perspective, a larger framework, that reveals that our true self, our fundamental unconstructed self is indeed also without birth or death? Are we also eternal?

In my opinion, the calendar is not being used to predict a good or bad event. For me, 2012 is about holding each and every new moment in wonder and awe as the eternal now is continually born anew. For me, 2012 is about being born into our eternal awareness.

(For those who are inspired by these comments, I talk much more about this in my essay, [Mystical 2012](#).)

John Major Jenkins's Alignment Zone

First and foremost, I have the utmost respect for John Major Jenkins as a person, as a researcher and as a scholar. Without John's brilliant groundbreaking work linking the restart of the Maya calendar to a certain time in the earth's precessional cycle, millions of people would be completely unaware of this extremely intriguing information and I would not have dug into the question of why the Maya picked 2012. While there is virtually no difference between how John and I understand the actual astronomy of 2012, our difference lies in

what we think is important. As you will see, he emphasizes a multi-year period of time while I focus on what happens in the sky over the Maya on that one special day.

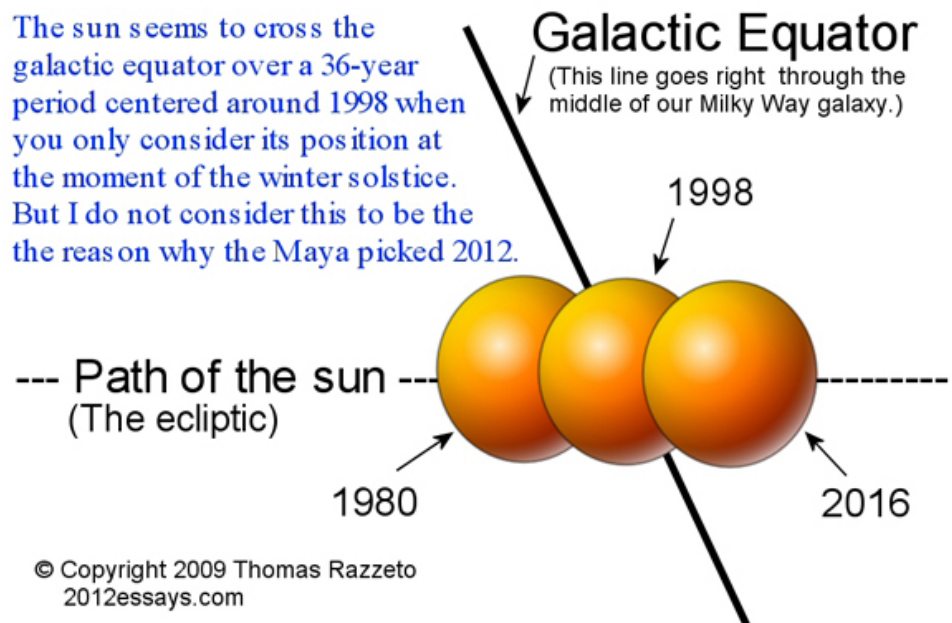
By the way, John clearly gives credit to the authors that helped him become aware of the ancient cultures that knew about precession and created metaphorical stories based on the shifts they saw in the sky. Two important books are *Hamlet's Mill* (1968) (13) and *Maya Cosmos* (1995). These books, along with others, are what made John look for something in our precessional cycle that might be happening in or around 2012, the restart date of the Maya Long Count calendar. This is how he found what he calls "the galactic alignment" or "the solstice-galaxy alignment."

In his book *The Center of Mayan Time* (1995), John discussed "the astronomical fact that the alignment of the solstice meridian with the galactic equator - the alignment the Maya were trying to indicate with their 2012 end-date - in fact occurs sometime between 1997 and 1999." (14)

John zeroed in on 1998 for several reasons and one of the most important reasons was the excellent work of a Belgian astronomer, Jean Meeus, whom I greatly respect. Meeus published material in 1997 that stated that this special event (the axis over the crease of our 3-D model) would occur in May of 1998.

John noted that the center of the disk of the sun would be almost exactly on the galactic equator at the precise moment of the winter solstice in the year 1998. He also noticed that this alignment would occur repeatedly in the years around 1998 with only a slight variation from one year to the next. Because of this, he decided to pick a range of 36 years that he centered around 1998 as the intended target of the Long Count calendar and he refers to these years as the "alignment zone" or era-2012. During these years, the disk of the sun will be touching the galactic equator at the moment of the winter solstice. Here is the way I like to explain it. At the moment of the winter solstice of each year, imagine that you take one picture of the sun and mark the position of the galactic equator. (Remember, since the galactic equator is invisible, you have to mark it rather than photograph it.) I call these pictures "time slices." If you play all these time slices like a movie, you will "see" the sun move across the galactic equator over this 36-year period. But notice that this collection of time slices is not something that you would actually see unfold in the sky above you. It is an unnatural way of "seeing" since you are only "watching" one moment per year. This is an artificially created scenario that seems to indicate motion but it does not really represent what happens in the sky.

The Galactic Alignment of John Major Jenkins



Again, I have tremendous respect for John personally and I like much of his work. While he most certainly discovered that the calendar is linked to the astronomy, I do not find this zone approach to be very satisfying. With so much precision being demonstrated by the creators of the calendar, I seriously doubted that they missed their intended target by 14 years, even though that is still a very small error. I felt there must be something special about the exact day of the winter solstice of 2012 as seen from the specific location of the Maya. This is why I went further with my own original research and thinking and I came to the conclusion that both the triple rebirth of the sun and the unique configuration of the sacred tree flying through the sky over the Maya on that special day was the target of the calendar. Both the restart date and the place where the calendar was created are important. We cannot ignore that this is a Maya calendar, not an Egyptian calendar or a global calendar. While the sun will be

exactly in the middle of the dark rift during the day for the Maya, this event will happen during the night for people on the other side of the world. So the triple rebirth metaphor will not play out very well for those locations. But this is not a problem since the Maya were only concerned with what will be over them during that day, not what will be over others elsewhere. In this way, we see that the Maya hit the exact day that they were aiming at! Completely mind-blowing!

My view focuses on the center of the dark rift, not the galactic equator, although again, these two things are very close to each other. But more importantly, my view focuses on what will happen on that day over the Maya, not what will happen over a long period of time. Please consider the fact that no one can ever look up into the sky and see the galactic equator for it is as invisible as the equator of the earth. Both are precisely located by scientists yet both are imaginary lines. It is important to note that the Maya *could* look up into the sky at certain times and actually see the dark rift with their naked eye and this makes the astronomy useful for their metaphorical folklore. I think this is an essential point in understanding 2012. The idea that the Maya restarted their calendar because of the combination of the triple rebirth of the sun and this unique configuration of the sacred tree is to the best of my knowledge, original with me. While other people are aware of the solar rebirths and the sacred tree in general, to my knowledge no one has connected them to 2012 like I have.

John is well aware of the Maya's metaphor of the dark rift as the birth canal and he clearly sees the sun's presence in the dark rift as a rebirth but, as we have seen, he emphasizes the galactic equator rather than the dark rift. This is not surprising since, again, the galactic equator has a precisely defined location while the dark rift is an irregularly shaped image in the sky without a precisely defined midline. Strictly speaking, the dark rift is not even an astronomical object, it is a visual image due to interstellar dust blocking the light from the center of the galaxy. Because of all these reasons, astronomers pay little attention to the dark rift while the galactic equator becomes the main focus.

Why I Believe My View Is Unique and Original

Just to be very clear, it is the work of John Major Jenkins that linked the Maya calendar and the cycle of precession. He was the first one to point out that the sun will be in the middle of the dark rift on the day of the winter solstice in 2012. Yet I find the time slice approach unsatisfying since a full year passes between each slice and the alignment swings through about 360 degrees as the earth orbits the sun. The time slice approach is simply an unnatural way of "watching" the sun cross the plane of the galaxy. In fact, it is not watching at all. My approach of watching what unfolds is completely natural. It is not an artificial reconstruction.

Again, I cannot overemphasize the importance of John Major Jenkins' work. He has focused on this subject since the 1986 and has written over seven books. He is extremely knowledgeable in areas that I know virtually nothing. And again, it is John's brilliant groundbreaking work that linked the restart of the Maya calendar to a certain time in the earth's precessional cycle.

It is almost as if John discovered a huge pyramid deep in the jungles of southern Mexico, a pyramid that was completely hidden and totally overgrown. Then over the course of several decades, he virtually single-handedly removed all the overgrowth so that we all could see this fabulous monument.

Yet I do not want to understate the potential significance of my work. The Maya did not simply miss 1998 by 14 years, they hit exactly what they wanted and perhaps I am correctly pointing out the actual capstone to John's pyramid.

Could the Maya be focusing on another event?

While my research gives me a high degree of confidence that the Maya were indeed using their Long Count calendar to precisely pinpoint the sacred triple rebirth of the sun and the rebirth of the great year as presented in this essay, there are numerous scholars and popular writers who maintain that the Maya had something else in mind. This opens up a complex debate that is beyond the scope of this essay but the solid astronomical understanding that you have gained will give you an excellent foundation to explore those other possibilities. While we presently have no absolute proof as to what the target is exactly, the event of 2012 is immensely fascinating for millions of people. How exciting for us all to see it unfold for ourselves right now!

That's the end of this essay but I invite you to explore the comments and links in the endnotes section. And don't miss my 10-minute video of our 3-dimensional model in action! ([Click here for the video.](#))

By the way, I have several 2012 essays and I may write even more. In one essay, I ask how the Maya acquired this astronomical knowledge and in another essay, I present my own views of what all this might mean for us. Will consciousness shift from "the me" to "the we"? Will we shift from competition to cooperation? And will you experience your own personal triple rebirth? If you are inspired, please check these essays out soon!

Thanks for reading my essay!

Thomas Razzeto

Written: May 2, 2008

Revised: October 24, 2009

All my 2012 essays are [here](#).

My main website is infinitelymystical.com.

[Back to a list of all my essays](#)

Endnotes

(1) This is a simple 3-dimensional model that you can build yourself with just a pencil a sheet of paper. It demonstrates the actual astronomy we are concerned with. As you move the top of the pencil around in a circle, you can see the 26,000-year precessional cycle unfold.

Don't miss my 10-minute video of this model in action:

The Actual Astronomy of 2012 - Absolutely Amazing!

Here's the link: https://www.youtube.com/watch?v=CQkhd_NebXc

(2) The following excellent website gives a simple yet thorough explanation of the seasons:

<https://www.astronomy.org/programs/seasons/index.html>

(3) A more exact figure is 25,765 years but for this essay I use the approximate number of 26,000 because it is close enough and easier to remember. You can find more information here:

https://en.wikipedia.org/wiki/Precession_of_the_equinoxes

This next link shows an animation of a top precessing. There is an important difference between what is shown here and what the earth does. In the animation, we see that the bottom tip of the axis of the top stays still while the rest of the top wobbles. For the earth, it is best to imagine the center of the earth staying still while both the top and bottom tips of the axis of rotation make circles. In other words, the earth still wobbles but there are two cones of precession, one above the other. One is up-side-down and the two are touching at the center of the earth. When we build our 3-dimensional model, we put the tip of the pencil in the crease. This is the center of the earth, not the bottom of the earth.

<https://en.wikipedia.org/wiki/Precession>

(4) The following website discusses the topic of the entire solar system bobbing up and down across the plane of the galaxy. It states that we last crossed the plane of the galaxy 2 million years ago and that we are currently about 50 light-years above the mid-plane of the galaxy. We will continue to get further away for another 14 million years and then we will start moving closer again. While some other researchers have come up with slightly different numbers such as a current distance of 70 light-years, you can clearly see why I don't consider this topic to be relevant to our study of the astronomy of 2012.

By the way, the center of the galaxy is estimated to be just over 25,000 light years away and it is estimated that it takes 240 million years for our entire solar system to make one orbit around the center of the galaxy.

Also notice that since the distance above the galactic mid-plane is very small compared with the distance to the center of the galaxy, our model is still an excellent representation of what is going on in the sky with regards to the annual galactic alignments even though our solar system is not exactly on the mid-plane of the galaxy.

<https://solar-center.stanford.edu/FAQ/Qsolsysspeed.html>

The following forum brings forth a few more points about this topic.

<https://www.bautforum.com/questions-answers/55312-plane-ecliptic-galaxy.html>

(5) While it is true that the orbits of almost all the planets are close to the orbital plane of the earth, the two exceptions are Mercury, whose orbit is tilted at 7 degrees, and Pluto at 17 degrees.

(6) Let's look closer at why the direction to the center of the galaxy basically stays the same. Imaging that you are in Los Angeles and you are pointing to the center of New York City. If you then move 500 miles north and point to New York, you will have to point more south than before since you are now further north. But if instead of moving 500 miles north, you only move 50 feet, the direction to New York will basically be the same. Technically, it is a slightly different direction but the difference is extremely small. So even though the earth is moving

around in its orbit, the change in position is not enough to affect the direction to the center of the galaxy.

(7) The angle between the plane of the galaxy and the plane of the earth-sun orbit (the ecliptic) is about 60 degrees. Astronomy magazine tells us where to look in the summer sky to see it for ourselves here:

<https://cs.astronomy.com/asycs/forums/p/31176/368883.aspx>

Here is further discussion:

<https://answers.yahoo.com/question/index?qid=20071203110530AAMkEYV>

And here is clarification of the confusion between 60 degrees and 63 degrees:

<https://answers.yahoo.com/question/index?qid=20071220173201AAmFoA4>

(8) Technically speaking, we have three independent events, each of which occur at different times: the moment the axis is over the crease, the moment of the winter solstice and the moment of the alignment of the earth, the sun and the galactic equator. Indeed, these events really are independent from each other since one does not cause either or both of the other two. Yet the time when the axis is over the crease is key. Whichever December solstice is closest to this time will have the other two events occurring almost simultaneously and this will be the case in 1998.

The following webpage, written by John Major Jenkins, provides the scientific reference that mentions the calculations of the Nautical Observatory:

<https://www.alignment2012.com/truezone.htm>

That webpage contains some material that I will comment on later, after you have read more of my essay and have a more complete understanding of some of the issues raised on that webpage.

(9) I consider John Major Jenkins one of the most important voices on the subject of 2012. Here are John's brief comments on Izapa as the origin of the Long Count calendar. You can learn much more from his DVD, "Izapa - 2012."

<https://www.alignment2012.com/izapa2012dvd.html>

Here is John's main website:

<https://www.alignment2012.com>

(10) The brightness of stars and planets is reported as their magnitude and this is measured on a logarithmic scale. The brighter an object appears, the lower the value of its magnitude. Very bright objects have negative magnitudes. On this day, Venus's magnitude will be -3.9 and it will look fantastic against the black, pre-dawn sky. Mercury's magnitude will be -0.5 and this will be bright enough to see for a short while even though the sky will be starting to become light at the time Mercury rises.

(11) Detailed information about the sidereal year is here:

https://en.wikipedia.org/wiki/Sidereal_year

Detailed information about the tropical year is here:

https://en.wikipedia.org/wiki/Tropical_year

(12) More on Hipparchus can be found here:

<https://en.wikipedia.org/wiki/Hipparchus>

(13) John Major Jenkins' comments about *Hamlet's Mill* can be found here:

<https://www.alignment2012.com/mill1.htm>

(14) Here I again make reference to John Major Jenkins' short essay, *The True Alignment Zone* (1999):

<https://www.alignment2012.com/truezone.htm>

John uses a phrase that I would like to clarify. Here it is: the alignment of the solstice meridian with the galactic equator. This is just another way of stating that the axis is over the crease in our 3-D model. Initially I found this phrase difficult to understand and visualize. Perhaps the following will help you.

First, here is a definition of the solstice meridian.

Imagine a circle or hoop around the earth that goes through the north and south poles. As you know, there are an infinite number of such hoops and they are all called "meridians." Pick the hoop that is also perpendicular to the plane of the earth-sun orbit, the plane of the ecliptic. There is only one such hoop. Now project this hoop into the sky. This makes a line

that is shown on some star charts and this line is called the "solstice meridian." When the sun is on this line, we have the moment of the winter or summer solstice depending on which way the axis is tilting, towards or away from the sun.

The solstice meridian moves with respect to the background stars at the rate of precession. This line intersects both the line made by the path of the sun (the ecliptic) and the line made by the plane of the galaxy (the galactic equator). When the axis is over the crease, the solstice meridian, the galactic equator and the ecliptic all intersect at the same point. This is the point that you see in my diagrams when you look down the crease of the 3-D model. Perhaps the phrase could have been more clearly stated as the solstice meridian intersecting the galactic equator at the level of the ecliptic.

By the way, I also want to correct a very minor point regarding the topic of water spinning down a drain since John mentions it in his essay. My opinion is that John is very bright and well informed on a wide variety of subjects yet on the topic of water spinning down a drain, he has slipped into the commonly held false belief that it spins one way north of the equator and the other way south of the equator due to the coriolis effect. This is simply not the case yet John's mistake does not affect the core issues presented in the essay. Here is more information:

<https://www.snopes.com/science/coriolis.asp>

Other Notes

(*) This site mentions that the winter solstice sun will be closest to the center of the galaxy in the year 2219:

<https://edj.net/mc2012/truezone.htm>

(*) Here is a 3-D animated movie of the event of 2012. They have it spinning around in an unnatural way so that might add some confusion. Yet it is still helpful for those looking for more ways to understand the actual astronomy:

<https://www.lunarplanner.com/HCmovies/HCmovie300Frame.html>

(*) Here are other interesting links:

https://schools-wikipedia.org/wp/m/Milky_Way.htm

<https://alignment2012.com/lzapa.html>

<https://en.wikipedia.org/wiki/lzapa>

https://en.wikipedia.org/wiki/Mesoamerican_Long_Count_calendar

<https://alignment2012.com/mc-intro.html>

https://en.wikipedia.org/wiki/Maya_calendar

<https://en.wikipedia.org/wiki/Olmec>

https://www.bibliotecapleyades.net/esp_2012_08.htm

Thanks for reading my essay! Have a magical and mystical day!

Thomas Razzeto

If you enjoyed this essay, then you might like some of my other work:

- All my mystical essays are here: [Infinitely Mystical Essays](#)
- Infinitely Mystical, my main website, is here: infinitelymystical.com
- My completely free ESP board game for 2 or more people of all ages is here:
[ESP Mind Power!](#)