

## Determining the Equinox

by Matthew Janzen

Sometimes people object to using the spring equinox to determine the Biblical new year on the basis that we do not know how the equinox was calculated anciently. I believe such an objection stems from a lack of study on the issue. First off, please notice these two quotations from the Israelite historian Philo that clearly show people knew how to determine the equinoxes anciently, with precision.

WHO IS THE HEIR OF DIVINE THINGS 29(149)

From **the spring equinox** to the summer solstice, day receives an addition to its length, and night, on the other hand, submits to a diminution; until the longest day and the shortest night are both completed. And then after the summer solstice the sun, turning back again the same road, neither more quickly nor more slowly than he advanced, but always preserving the same difference in the same manner, having a constantly equal arrangement, proceeds on till **the autumnal equinox; and then, having made day and night both equal**, begins to increase the length of the night, diminishing the day until the time of the winter solstice. (150) And when it has made the night the longest night, and the day the shortest day, then returning back again and adopting **the same distances as before, he again comes to the spring equinox.**

THE SPECIAL LAWS 4.42(232)

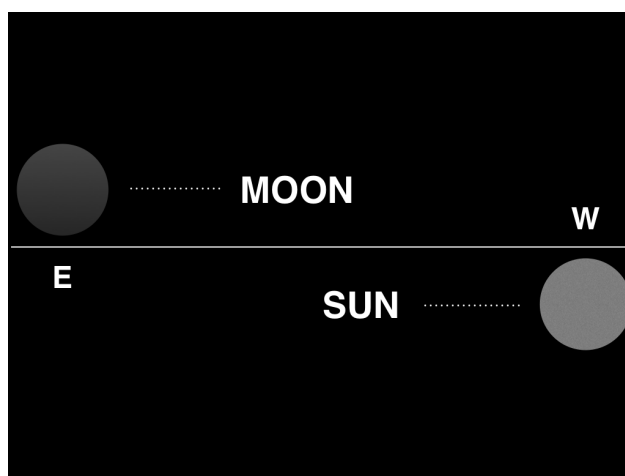
...for who does not know that the relation of days to nights and nights to days is regulated by the sun according to intervals of proportional equality? **The dates in spring and autumn** every year, **whose name of equinoxes** is derived the facts observed, **are so clearly marked out by nature, that even the least learned perceive the equality of length in the days and nights.**

The word equinox is based on the Latin language, stemming from two Latin words; *aequus* meaning equal, and *nox* meaning night, thus equal-night. The understanding of this word is that this is the time when the night is equal with the day. All ancient peoples that tracked the path of the sun noticed that the sun always rose in the east, but it did not always rise due east. The sun would go to one extreme in the year and rise far north-east (summer solstice), and also go to the other extreme in the year and rise far south-east (winter solstice). Directly in between these two extremes is due east. The sun rises due east twice a year, and because at these two times there is an equal amount of night with day later peoples used the word equinox to describe these two days. These days fall out on our current Gregorian calendar in the spring on March 19-21, and in the fall on September 22-23. Every single ancient civilization or ancient author that I'm aware of believed this very thing. Of course our current Gregorian calendar was not known to them, but the equinoxes that fall at the end of March and September today are the same equinoxes that all ancient peoples used.

The ancient Hebrews reckoned equal day and night by the heavenly light of the sun in the sky, as well as the moon and the stars. So long as the sun ruled, it was considered day. Anytime the moon ruled the night, or the stars, it was considered night. This means that day was from sunrise to sunset as Yahweh tells us in Genesis 1:16, "The greater light to rule the day." He also speaks of this in Psalm 113:3 where it says, "From the rising of the sun to the going down of the same Yahweh's name is to be praised." This speaks of the time period that is opposite of the night, namely the day.

In the Springtime, on the Gregorian March 21, you will have an amount of night (the time the sun is *not* ruling, but the moon and stars rule) that is equal with the amount of day (the time the sun *is* ruling). Anyone can mark this day by simply watching the path of the sun in the sky. This is how the ancients were able to know the precise days of the two equinoxes every year.

This does mean that both the dusk period (after sunset) and the dawn period (before sunrise) are counted in with the night. Why count these grey periods in with the night? The answer is because the sun does not rule during either of these two periods. For example, let's use the sun and the biggest phase of the moon, the full moon. The full moon always rises in the east opposite from the sun, and rises at the same time the sun sets in the west. In other words, just after sunset, at dusk, the full moon rises and is ruling the sky. This lets us know that we are not in the time period where the sun is ruling, but rather we are in the time period where the moon is ruling, that is, the night. Remember that Scripture teaches the moon and stars rule the night. I'll speak more about this full moon in relation to Philo's writings in a bit.



Now a person may ask this question, "Why would we count the dusk period after sunset or the dawn period before sunrise in with the night when it is not complete darkness?" The reason we would do so and should do so is because at these points darkness is mingled with light. Sometimes these periods are called by the name "twilight" which etymologically means "mingled light." Pure light only exists when there is no darkness at all. For example, First John 1:5 tells us that, "The Almighty is light, and in Him is no darkness at all." There is not even 1% or for that matter .001% of darkness in the Almighty. He is fully light or fully righteous. When you begin to mix *any* amount of darkness in with light it can longer be grouped with light, but rather grouped with darkness or night. Such is the case with the periods of dusk and dawn which in actuality mirror one another. Both periods contain darkness. One period gently receives darkness (after sunset) while the other period gently dissipates darkness (before sunrise).

The Israelite historian Philo speaks of day and night like this in his work titled *On the Creation*, Chapter 9 beginning at (33). He says that "Yahweh ...did not only separate light and darkness, but did also place boundaries in the middle of the space between the two, by which he separated the extremities of each." He goes on to say under (34) "[that] these boundaries are evening and morning; the one of which heralds in the good tidings that the sun is about to rise, *gently dissipating* the darkness: and evening comes on as the sun sets, *receiving gently* the collective approach of darkness."

I believe Philo here recognizes the evening and morning mentioned in Genesis 1:5 as boundaries between the extremities of light and darkness. At the same time notice carefully that *Philo mentions these boundaries as darkness and not light*. Gently dissipating darkness means that darkness gently leaves. Gently receiving darkness means that darkness is gently collected. Therefore Philo here groups these periods in with the night and not with the day. Why are they grouped with the night instead of completely thrown out and not counted at all? It is because darkness has begun to mingle with light. Philo could have said "gently receiving the light" or "gently dissipating the light" but he did not because he considered these periods as night rather than day.

This is exactly how the New Testament author John described the morning period known as dawn in John 20:1 where he writes (KJV), "The first *day* of the week cometh Mary Magdalene early, when it was yet dark, unto the sepulchre, and seeth the stone taken away from the sepulchre." The parallel account in Luke 24:1 says this was "early in the morning," and Mark 16:2 says this was "early in the morning." How does John describe this early morning period? He calls it "when it was yet dark." These authors grouped the dusky period of morning in with the darkness because they (just like Philo) recognized that darkness was gently dissipating. I know our minds are trained to think that darkness has to be extreme blackness, but don't lean to your own understanding. This is not according to Scripture. Any darkness mixed in with light is grouped in with the dark period.

Let me illustrate this to make it simpler. Suppose there were 100 pennies lying on the floor, a dollars worth of pennies. I could gently receive those pennies into my hand one at a time. From the moment the first penny went into my hand I would have 1/100th of the total. With each new penny placed into my hand I would gain more and more of a percentage of the 100 pennies until reaching the last one. I agree that my hand would not have a dollars worth of pennies until finished, but the point is that from the moment I begin placing them in my hand, my hand is no longer empty. I could then gently dissipate the pennies from my hand by placing them one by one onto the floor, but as long as I had any pennies at all in my hand, even one, there would still be something in my hand. This helps us see how that once darkness is mingled in with light it is counted as darkness.

Consider another example or analogy. Think about false doctrine. Usually the most deceiving false doctrine is the doctrine that has a majority of truth, but a small amount of error. Here's the thing with this, once error creeps into doctrine, the doctrine is erroneous. Why? Because it is no longer pure. A little bit of error corrupted the pure doctrine.

I could also illustrate this with a glass of water. You can have a pure glass of water, but then place *one drop* of poison in the water and the water is no longer pure, it is poisoned. You don't have to pour all of the water out of the glass and then pour 100% poison into the glass for there to be poison in the glass. One drop of poison makes a glass of water corrupted or poisoned.

Think about this. My children like to drink sweet milk, but sometimes they like to drink chocolate milk. From the moment I place any amount of chocolate powder into the glass of pure sweet milk the white color of the milk changes to a darker texture. Why is this? It is because I have begun to mix something dark into something light. It can no longer be counted as light, *but it can be grouped with darkness*. It's not sweet milk anymore, it's chocolate milk. Now I can place 5 table spoons of chocolate powder in the mix or 1 tablespoon. Either way, it's now mixed and counted as chocolate milk.

Getting back to the works of Philo. Philo recognized that the daylight portion of the day was the time when the sun was above the horizon. In his work titled QA on Genesis 1 he says under (84) that "...the sun is the cause of day and night, performing his revolutions by day above the hemisphere of the earth, and his course by night under the earth." Notice again that Philo described the day and the night in this place. He said that the sun was *above* the hemisphere by day and *below* the hemisphere by night. This means he counted the dusky or mingled portions of evening and morning in with the night.

Philo also talks about day and night at the time of the full moon in The Special Laws 2.33(210) where he says that "...the beginning of [the Feast of Tabernacles] is appointed for the fifteenth day of the month... [so] that the glorious light which nature gives should fill the universe, not only by day but also by night, because on that day the sun and moon rise in succession to each other with no interval between their shining."

Philo speaks of this 15th day of the month as being full of beautiful light, not only by day but also by night. He explains how this could be, by recognizing that the sun and the moon rise opposite to one another on this 15th day of the month. This shows that Philo believed the night began at sunset and the day began at sunrise. This is because (as we can still observe today) on the day of the full moon the moon rises above the horizon just as the sun sets below the horizon. Likewise, after the moon rules all night in the sky it sets below the horizon and the sun rises above the horizon. Here we recognize that Philo had to have counted the "dusky" periods of evening and morning in with the night when the moon ruled, specifically the full moon.

Ask yourself this question: when the sun sets below the horizon (and is no longer ruling) and the beautiful full moon comes up at the same time above the horizon, what heavenly body is ruling? Surely it is not the sun; the sun can't even be seen, while the moon is in full brilliancy. The moon is doing the ruling here and thus it is night time because the moon rules at night, and not during the day (Psalm 136:7-9; Jeremiah 31:35-36). It is important to understand that equal day and night at the Spring and Fall Equinox was always measured by sunrise and sunset in ancient times. It was never measured any other way.

Sometimes verses like Genesis 15:17, Amos 8:9, and Micah 3:6 are used to prove that sunset doesn't occur until complete darkness, but these Scriptures do not prove that at all. These Scriptures actually prove that sunset is the *beginning* of darkness. Biblically, sunset was considered the time when the sun ceased to rule in the sky and night began. *Ereb*, the Hebrew word for evening, is a word with more than one solid meaning that can describe dusk, night, and dark night. Strong's defines the word as "dusk" and Brown, Drivers, Briggs defines it as "evening, night, sunset."

Now I want you to also notice that the common word for evening in the Tanak is #6153 in Strong's. There are other words that are closely related to this common word, containing the same consonants in Hebrew. The only difference is the vowel pointing.

- #6154 - "the web, also a mixture or mongrel"
- #6151 - "to commingle"
- #6150 - "covering with a texture, to grow dusky at sundown"

The idea here is that evening begins at dusk, when there is a mixture or grey color over the land. Darkness has begun, but it will not be complete darkness until the zenith of the sun at midnight. The same mixture is seen on the opposite end of the spectrum with the period know

as dawn before sunrise. Dawn is actually a mirror image of dusk. It contains the same mixture or grey color, but goes from dark to light instead of light to dark.

This is made plain by correctly reading a verse of Scripture in Nehemiah 13:19. This text shows that sunset begins the period of evening, but this verse has been misunderstood by those who claim that the day ends at the time of what they refer to as total darkness.

The "total darkness" position is problematic because once sunset takes place the sky grows darker and darker until the sun is about 18 degrees below the horizon. This takes place roughly 90 minutes after sunset. One man might say that we should start counting 30 minutes after sunset as complete darkness. Another man may say 60 minutes, while yet another may say 90 minutes. Still another may say 45 minutes, and yet someone else 75 minutes. See, there is no conjunction point, so it is completely subjective. When you use the actual sunset (the time the sun ceases to rule) you have a conjunction point where you can definitively say that evening has begun.

We see a similar problem with defining sunset as anything other than when the sun goes below the horizon. If this is not sunset, then I must ask when sunset is? I ask this because the sun does not stop its course after it goes below the horizon. It continues to revolve under the hemisphere of the earth until it rises after dawn in the east, beginning the next daylight period.

At any rate, what is getting "dark" in Nehemiah 13:19? I've heard this verse incorrectly quoted so many times, and I have misquoted it myself in the past before I took the time to study the text. I hear people who believe the Sabbath begins a while after sunset quote this verse as saying, "As it began to be dark before the Sabbath," but this is not what the verse says at all. It is not the *day* that is getting dark, but the *gates*. Even in the KJV we see this when it says, "As the **gates** of Jerusalem began to be dark." The KJV however misses the most proper translation. Notice a few other translations.

HCSB - "When shadows began to fall on the gates of Jerusalem just before the Sabbath."

NIV - "When the evening shadows fell on the gates of Jerusalem before the Sabbath."

NWT - "As the gates of Jerusalem had grown shadowy before the Sabbath."

The word "dark" in the KJV here is the Hebrew word #6751 *tsalal* and is defined by Strong's as "hovering over, or to shade." It is only used one other time in the entire Tanak and that's in Ezekiel 31:3 where it is translated as a "shadowing shroud." This verse refers to the shade that leafy trees give.

Also, please take a look at #6752 in Strong's which is the Hebrew word *tselel*. This is the exact same word as #6751, the only difference is the vowel pointing. This word is used four times in the Tanak and each of them refer to a shadow like in Job 40:22 where it says, "The shady trees cover him *with* their **shadow**." The word shadow there is the Hebrew word *tselel*. Also in Song of Solomon 2:17 (ASV) we read, "Until the day be cool, and the **shadows** flee away." See, once the sun sets, it cannot cast any more shadows off of any objects upon the earth. The word is a reference to shadows and shade.

Now there is no doubt that in Nehemiah 13:19 the word gates is a reference to open gates. Obviously if Nehemiah had to command the gates to be shut that means they were open prior to being shut. The point I am trying to make is that the shadows that fell on Jerusalem were

specifically tied to the *gates* of Jerusalem somehow, and not to the entire sky. It makes no logical sense whatsoever for the text to specify "as the gates of Jerusalem were shadowed before the Sabbath" if dusk came upon the entire land. In other words, if dusk came upon the entire land of Jerusalem, why just mention the open gates?



The point in Nehemiah 13:19 is that as the sun was setting it cast a shadow at the gates of Jerusalem before the Sabbath. This shows that at sunset, the time when the sun went below the horizon and cast no more shadows, the Sabbath would begin. Sunset is a word that refers to the position of the sun, and not so much the color of the sky.

John Gill, a 17th century commentator on the Bible, states it well when he writes about Nehemiah 13:19, "And it came to pass, that when the gates of Jerusalem began to be dark before the sabbath ... Or "were shaded" that is, as Jarchi interprets it, when the shadows of the eve of the sabbath were stretched out upon the gates; the sabbath did not begin till sun setting, and the stars appeared; but before that, as the sun was declining, the shadows through the houses in Jerusalem, and mountains about it, spread themselves over the gates..."

The Expositors Commentary on the Bible briefly comments on this text by saying, "...the gates began to cast long evening shadows even before the sunset when the Sabbath began." This commentary brings out a good point about the "long" shadows. See, if you observe the sun you will see that the lower it sinks in the sky before sunset, the longer the shadows are that it casts. My wife and I were driving over to my parents house one time about an hour before sunset. Because the sun was sinking low in the sky it casted long shadows off of the trees that were beside us, onto the road. However, once the sun went down, and was no longer ruling, it casted no more shadows, the entire area was in dusk.

Let me mention The Complete Jewish Bible too with Rashi's Commentary. It states at Nehemiah 13:19, "Now it came to pass when the gates of Jerusalem cast shadows before the Sabbath, that I commanded, and the doors were closed." Rashi then states in part, "When the shadows of the Sabbath eve fell on the gates, I ordered the doors of the city to be closed and not re-opened until after the Sabbath."

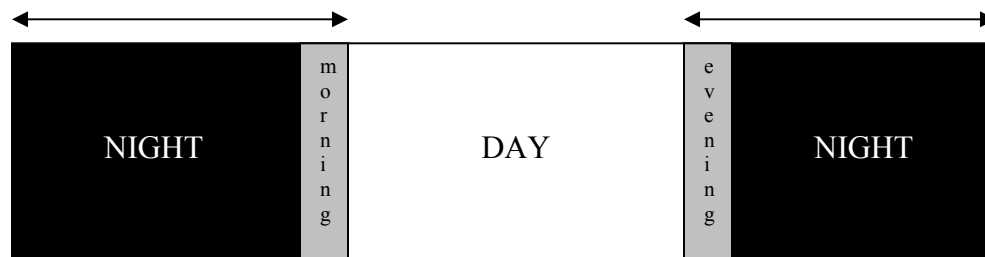
Nehemiah 13:19 is significant because it shows sunset begins the evening or night period of a 24 hour day. **Consistency demands that sunrise begins the light period of the 24 hour day.** At the time when these two are of equal length is how what we call the equinox was measured anciently.

In Nehemiah 13:19 the gates were commanded to be shut by Nehemiah *before sunset ever got there* because the day ended at sunset or dusk. Please remember my point earlier in this book

about the hours of the day in the New Testament. This is key. How did the people in the New Testament know what hour of the day they were in? How did Peter know in Acts 2 that it was but the 3rd hour of the day? The way they knew what hour they were in was by the *position of the sun in the sky*. They only counted the hours of the DAY (that is, the day period opposed to the night) when the sun was ruling in the sky. Before the sun came up, no hours were counted, when the sun went down, no hours were counted. This goes perfectly with what Yahweh says in Genesis 1 about the greater light; it rules by day. When the sun rises it begins to rule and when the sun sets it stops ruling. It's very simple, it is not complicated at all.

As I said before, people sometimes give Scriptures that talk about "sundown" and "dark," and I believe all of them. To me it shows that sunset was considered to be darkness. It wasn't complete darkness, but it was the time that darkness *began* because the sun had ceased to rule in the sky. This makes for varying degrees of darkness during the night time.

In Genesis 1 the Almighty divided the light from the darkness and thus we have both light and darkness. Never forget though that he did this in the context of evening, the time after sunset, and morning, the time before sun rise. The chronology here is (1) darkness over the face of the deep, (2) the Almighty speaks light into existence, (3) He divided the light from the darkness, (4) it then became evening, and (5) it then became morning, day one.



In neither of these two dusky times is the sun ruling in the sky. When there is an equal amount of the sun being below the hemisphere as when it is above the hemisphere, we have what is called in Hebrew a *tekufah*, or in English an equinox. Every ancient civilization known to man calculated it in this fashion.

Consider some points about sunrise and sunset at the North and South Pole. What we experience every single day is experienced only twice a year at these poles. Here is what takes place at the North Pole on the days of the equinoxes and solstices. The sun actually rises at the North Pole on March 19-21 (the spring equinox) and stays in the sky all spring and all summer; **it never sets**. From spring equinox to summer solstice it gets higher and higher in the sky every day. After the summer solstice it is at its highest peak. The next day it begins to descend, and continues its descent until September 22-23 (the fall equinox). It then drops below the horizon and stays below the horizon all fall and winter. It does not come back up until the next spring equinox. The brightest day of the year at the North Pole is June 21 (summer solstice) and the darkest day of the year at the North Pole is December 21 (winter solstice).

Here is how it takes place at the South Pole where the seasons are reversed. At the South Pole spring begins at what we call the fall equinox (around September 21). **The penguins at this point in time are very excited to see the sun peek above the horizon in Antarctica on this date. Thousands of penguins rejoice because they have not seen the sun for the past 6 months.**

We must also recognize that throughout the world there exists many hand-built monuments that are constructed in such a way as to highlight the equinoxes (both spring and fall) as well as the solstices. Almost all peoples, if not all peoples, in the B.C. era observed the path and positions of the sun as well as the revolutions of the moon and the zodiac circle of stars. This is the way ancient peoples told time.

The text of Genesis 1:14-18, and many other texts in Scripture reveal the sun and moon as time-keepers for the true calendar (Psalm 8:3; 19:1-6; 104:19; 136:7-9; Jeremiah 31:35-36). We have also seen how Philo recognized the heavenly light calendar. He simply recorded how the many Israelites of his day worshiped, and in doing so made multiple mentions of how the sun, moon, and stars were used in calculating the calendar.

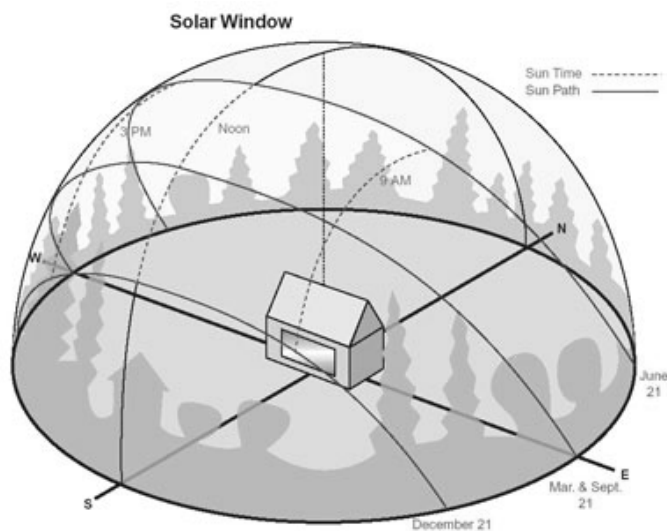
My wife and I have personally researched many of the monuments built thousands of years ago that still to this day mark the equinoxes and the solstices throughout the year. The equinoxes these ancient monuments mark are at the end of March and the end of September on our Gregorian calendar. The solstices these monuments mark are at the end of June and the end of December on our Gregorian calendar. The equinoxes are not "bolted down" to the Gregorian calendar, this is just the days they fall on the current calendar. It is remarkable to actually read about and visually watch these things take place. In studying about this I have come to realize that people today only *think* they are smarter than the primitive people that lived in the B.C. era.

No doubt, many of these monuments were used the worship to other gods. However, that does not make the sun, moon, and stars pagan objects. The path of the sun and moon are created by Almighty Yahweh as is the zodiac. What heathen people do on specific days of the sun and moons path is concocted by them. But these people are not the ones that have made up the paths of the heavenly lights.

Many Bible students recognize today that Yahweh's calendar has much to do with the moon. The new moon is very special in Yahweh's calendar as it marks the beginning of each Scriptural month. It is a fact that we can find that many heathen cultures, not in service to Yahweh, had a special day on the day of the new moon and even the full moon. This does not make the new and full moon erroneous. All this shows is that heathen took what Yahweh created and applied it to their heathen worship of other gods. The exact same thing applies to the path of the sun.

Anciently the equinoxes and solstices were determined by watching the path of the sun throughout the year. The sun always rises in the east and sets in the west, but there are only two days in the year when the sun rises due east and sets due west. These are the days of the equinoxes, the days when there is an equal amount of day (from sunrise to sunset) and an equal amount of night (from sunset to sunrise). The summer solstice is the day when the sun rises the furthest northeast, and the winter solstice is the day the sun rises the furthest southeast.





The reason we can know beyond a shadow of a doubt that these monuments are set to the date of the equinoxes is because many of these same monuments also tell the day of the solstices (or either have other monuments close by them that do). Some also have pictures of the constellations drawn on them. They are clearly calendar time pieces.

There is a 5,000 year old cave in Loughcrew, Ireland. The rising sun on the day of the equinoxes illuminates the back stone of the chamber. There is only one small pathway to enter this particular cave, and the sun shines in this pathway only on the two equinoxes illuminating a drawing of the sun at the very back of the cave. Let me also mention a monument that was found here in America. This particular location is called "Crack Cave" and is located in South Eastern Colorado. On the morning of the equinoxes the sun (rising due east) shines through a small crevice into a cave and perfectly lights up a small drawing that is believed to have been done by early American Indians. It is believed to be 1,500 to 2,500 years old.

Consider the Mayan pyramid in Mexico. This is basically a structure that shows the two equinoxes and the two solstices, and has 4 sides with 91 steps going up to the top for each of the four seasons.  $91 \times 4$  equals 364. It then has a final top step totaling the steps to 365 days, the amount of days in the year. On two days out of the year (the equinoxes at the end of March and September) the sun rises and shines on the temple in such a way as to light up one ridge of the pyramid so that there appears to be the body of a snake traveling downward until it reaches and attaches to its head at the bottom of the pyramid. For these ancient people to have the intelligence to build such a monument is fascinating.

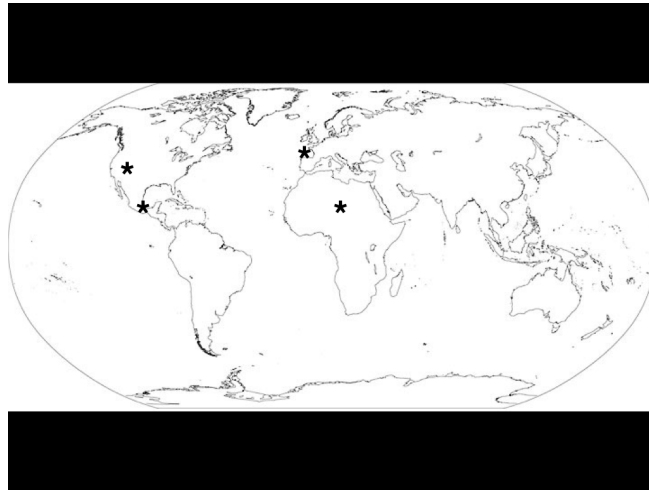


Next is an ancient solar observatory that was unearthed recently, from the year 2000 to 2003 A.D. It is located in Peru and is believed to be over 2,300 years old. Take a look the indentions in this structure.



These indentions form a tooth-like wall and were used to track the risings and settings of the sun throughout the year. The picture above was taken on June 21, 2003 which is the date for the summer solstice. Notice that this is the last tooth on the wall so this is the most north-east the sun will rise and the furthest north-west the sun will set. The opposite end would depict the winter solstice, and right in the middle, directly due east and west, would be the equinoxes both spring and fall.

What is so amazing about these ancient monuments is that fact that they are located in various and separated areas in the world. For example, the Mayans of ancient Mexico had no way of communicating with the Celts in Ireland or the various tribes amongst the early American Indians. They lived thousands of miles apart! **Yet the monuments formed or constructed by these peoples teach us that all civilizations followed the path of the sun with great accuracy in the exact same way.**



I ask you to please take the time to watch a documentary I put together on these ancient monuments titled, "Ancient Monumental Evidence." I truly believe you will find it fascinating.<sup>1</sup>

<http://www.youtube.com/watch?v=znIpnveRlkc>

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<sup>1</sup> I have been asked how the ancients would have measured and thus known that the night time hours were equal with the day time hours. I have explained that they did do this by watching the path of the sun in the sky, and they probably knew of the equal days and nights based on (1) mere perception, and/or (2) water clocks or some other primitive method of time measurement. The equinoxes were not based upon equal day and night down to the very minute as we define the word minute today. They were based upon an accurate approximation of the night time hours (moon and stars ruling) being equal with the day time hours (sun ruling). This is how the equinox should still be based today. The best way to do this is by the east to west rising and setting of the sun.