

Cracking the Muisca Calendar

The Muisca were a pre-Columbian people who lived in the territory now known as Columbia in South America.

In 1795, Dr Jose Domingo Duquesne, a priest of the church of Gachancipa in Columbia published a paper detailing the Muisca calendar, which information he claimed to have received from the Indians themselves. His paper was later ridiculed as being nothing but an invention of his.

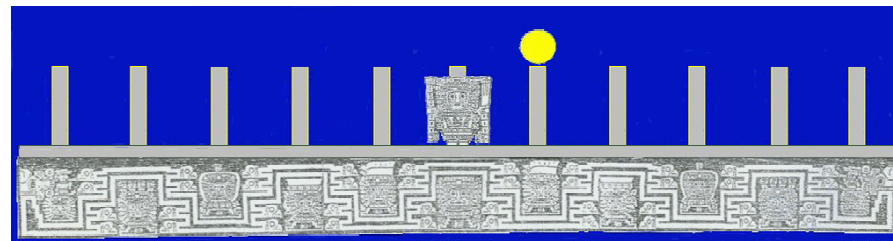
Yet the figures given by Duquesne do in fact relate to a lunar calendar although Duquesne himself may not have fully understood the workings of it since it seems possible that the calendar was more sophisticated than might appear at first glance, and two types of lunar month may have been used, the Sidereal Lunar Month when the moon returns to the same position relative to the stars (27.32 days) and the Synodic Month which is the period between full moon and full moon (29.53 days).



Background

It is worth to consider first the Calendar of Tiwanaku (see <http://www.atlantisbolivia.org/tiwankuacalendar.htm>) which describes how the solar year was divided into 20 months of 18 days which could then be divided into two weeks of 9 days and each of these into 3 x 3 days. This calendar also interlocked with the Inca calendar of 12 sidereal lunar months of 27.32 days (making 328 days) so that 3 x solar years also equalled 40 sidereal lunar months and the two calendars came together every 18 solar years which equalled 20 Inca years when the cycle started all over again (also known as the Saros Cycle).

The calendar at Tiwanaku is not the Gateway of the Sun as some people think, but the row of 11 pillars behind the gateway so that the sun set over a different pillar every 1/20th part of the year, the two end pillars marked the solstices while the central pillar marked the equinoxes. Furthermore, when the sun set over every 1½ pillars, it marked one sidereal lunar month making a truly Soli Lunar calendar.



Above, The sun set above a different pillar each 1/20th of the year at Tiwanaku

Duquesne

At first difficult to read and understand, Duquesne's paper <http://mantaweb.org/kubun/images/6/6e/calendario.pdf> begins with a background about the Americas and the Egyptians and how the Muisca counted by their fingers with names for each number up to ten, and then on to twenty.

He then relates their calendar to harvesting and sowing and begins:

El año constaba de veinte lunas, y el siglo de veinte años (the year consisted of twenty moons, and the century of twenty years) then goes on to relate this to lunar phases and harvests.

The first thought on reading this, was that as at Tiwanku, they might have divided the Solar Year into twenty for their months, but the text implies that 20 lunar months made the year and it also implies that Synodic or phase months were intended. This year of twenty months he tells us was called *Zocam* also sometimes called a vulgar year.

Now a period of 20 x 20 months which Duquesne mentions might seem worthy of fitting into an Aztec or Mayan calendar since 20 x 20 gives 400, but further down the text, if we read closely, Duquesne says that

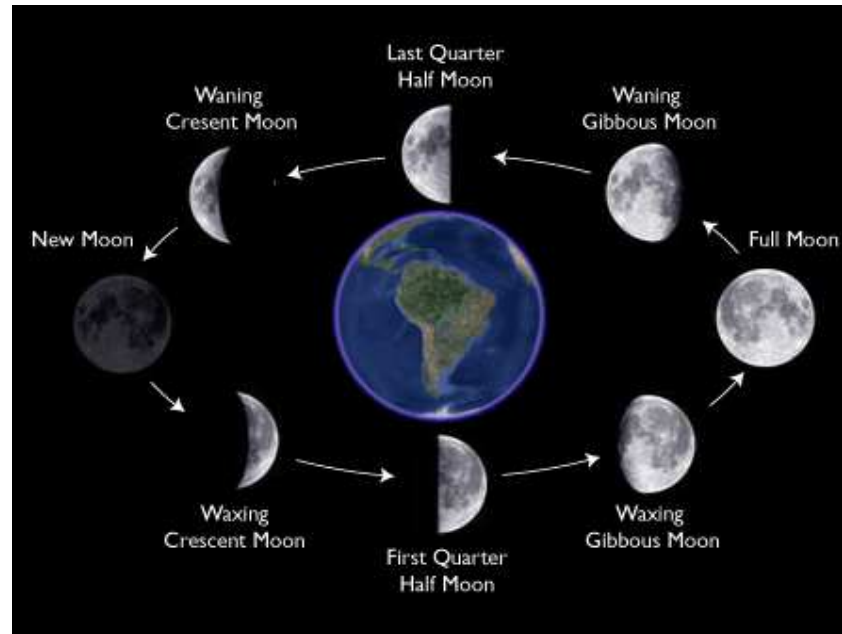
Veinte lunas, pues, hacían el año. Terminando estas, contaban otras veinte, y así sucesivamente, rodando en un círculo continuo hasta concluir un veinte de veintes. La intercalación de una luna, que es necesario hacer despues de la trigésima sexta, para que el año lunar correspond al año solar, y se guarde la regularidad de las estaciones, la ejecutaban con suma facilidad.

“Twenty moons, then, made the year. When these were finished, they counted another twenty, and thus succesively, continuing in a continuous circle until concluding twenty times twenty. The inclusion of one moon, which it is necessary to make after the thirty-sixth, so that the lunar year corresponded to the solar year, and thus they conserved the regularity of the seasons, which they did with consumate ease.”

Now, here is a question, not of translation, but of meaning. Because a little further along, Duquesne explains how the year of 37 months was a period of 36 months plus a “deaf” month so that the year adjusts to the solar year. This year of 37 months is sometimes called a “sacerdotal” or “acrotom” year. He also tells us that 20 x 37 of these months corresponds to 60 of our years, divided into four parts so that each part was ten Muisca years which equalled fifteen of ours.

(El siglo pues de los Muyscas constaba de veinte años intercalares de 37 lunas cada uno, que corresponded a 60 años de los nuestros, y le componian de cuatro revoluciones contado en cinco en cinco, cada una de las cuales constaba de diez años muyscos, y quince nosotros...)

From this we can easily work out that 60 of our solar years divided by 20 x 37 gives a month of 29.61 days suggesting that here, the synodic or phase month from full moon to full moon was intended since the synodic month has an average of 29.53 days.



Above, the Synodic month is based upon the time taken from full moon to full moon

But returning to the earlier statement

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There are three possible explanations here, (a) that 20 x 20 Synodic months were intended, but the resultant 400 Synodic months does not seem to have any significant relationship to the other numbers involved, (b) that instead of 20 x 20 it might have been 20 + 20 because 40 Sidereal lunar months would be equal to 3 x solar years which in turn would be equal to the 37 synodic months of the Muisca calendar or (c) what I think is meant here, is that they counted in twenty times twenty then added an extra month in the same manner as they added an extra month to 36 months to make 37, so the real figure here is not $20 \times 20 = 400$ but $20 \times 20 + 1 = 401$.

There is also another difference. I think they were running two calendars in parallel with each other, so the 37 month calendar was in Synodic Months of 29.53 days while the 20 month and 401 month calendar was in Sidereal Lunar Months of 27.32 days, although at the same time Duquesne counts the 37 month year as being 20 months + 17 months (because the counting system was based on twenties) making 37 months when the solar and lunar calendar synchronised, in this instance these 20 would be synodic months the same as the 17 months and he also explains this another way, as the extra month being inserted at the end of every three lunar years so they counted two x lunar years of 12 months then one of 13 months, the thirteenth month being the “sordo” (deaf) or extra month. So after 1 x Muisca year of 37 synodic months (3 solar years), sowing would begin again on the same day in January, while the intervening two years had a system of counting the months on the fingers as Duquesne puts it...

But returning to the calendar of 20 months running continuously as 20 x 20 months with an extra month inserted to give 401 months, we can check the figure of 401 Sidereal Lunar Months to see if it relates to a solar year and 401 x 27.32 days comes to a great period of 30 Solar Years, which in turn equals 10 Muisca (sacerdotal or acrotom) years of 37 x synodic months of 29.53 days....

Every three solar years equals the Muisca “Sacerdotal or Acrotom” year of 37 Synodic Months of 29.53 days and at the same time corresponds to 40 Sidereal Lunar Months of 27.32 days, and every one and a half solar years corresponds to a “sidereal lunar year” of 20 Sidereal Lunar Months which is the true “Zocam” year of the Muiscas.

So to sum up so far,

1 x Tiwanaku Solar year = 20 “months” of 18 days (using a rounded-off 360 day year divided by 20).

1 x Tiwanaku Lunar year = 12 sidereal lunar months of 27.32 days (328 days) – also used by Incas.

1 x Muisca Zocam year = 20 sidereal lunar months of 27.32 days = 1½ solar years

2 x Muisca Zocam years of 20 sidereal months of 27.32 days = 1 Muisca Sacerdotal or Acrotom year of 37 synodic months

1 x Muisca Sacerdotal or Acrotom year = 37 x synodic months of 29.53 days

1 x Muisca Sacerdotal or Acrotom year = 3 x solar years = 40 x sidereal lunar months of 27.32 days

½ Muisca Sacerdotal or Acrotom year = 1½ solar years = 20 x sidereal lunar months of 27.32 days

18 solar years = 20 Inca years = 6 x Muisca years of 37 x 29.61 days = the Saros Cycle

10 Muisca Sacerdotal or Acrotom years = 30 solar years = 401 sidereal lunar months of 27.32 days = 20 Zocam years.

20 Muisca Sacerdotal or Acrotom years = 60 solar years = 2 x 401 sidereal lunar months of 27.32 days = 40 Zocam years.

It might appear that Duquesne made an error when stating that *“the ‘century’ of the Muiscas consisted of 20 intercalated years of 37 months each, which corresponded to 60 of our years, which comprised four revolutions counted in fives, each one of which equalled ten Muisca years, and fifteen of ours until completing the twenty....”*

“El siglo pues de los Muyscas constaba de veinte años de los nuestros, y le componian de cuatro revoluciones de cinco en cinco, cada una de las cuales constaba de diez años muyscos, y quince nuestros, hasta completar los veinte.....”

Since 1 x Muisca year of 37 months equals 3 solar years, then 10 x Muisca years should be 30 solar years as per the table above, and since Duquesne was talking about how they counted up to twenty in periods of fives which corresponded to five fingers, he should have said here was that each of the five was *five* Muisca years of 37 months equalling fifteen of ours. But in fact he is correct except it is 10 x *Sidereal lunar month* years of 20 x 27.32 days which equal the fifteen solar years.....

5 Muisca Acrotom years of 37 synodic months of 29.53 days would be 15 solar years
10 Muisca Zocam years of 20 sidereal months of 27.32 days would be 15 solar years

I suspect therefore, and it is fairly clear, that the 20 month year which Duquesne called the “Zocam” year was actually the sidereal year of 20 sidereal months but the name may have been mis-understood by Duquesne as a period of 20 synodic months if Duquesne were unaware of a different type of lunar month in use, otherwise there would have been little point in having years of 20 synodic months running continuously when they were actually grouped in 37 month years and by contrast 2 x 20 sidereal months mesh both with the Acrotom year and solar year at 3 year intervals and over longer periods.

To see how they compare at three year intervals,
37 synodic months of 29.53 days would be 1092.61 days
40 sidereal months of 27.32 days would be 1092.8 days
3 solar years of 365.2524 days would be 1095.72 days

Because of the small discrepancy, over long periods of time some adjustments would probably be necessary such as the extra month inserted after 400 sidereal months on the Zocam calendar making
401 sidereal months of 27.32 days = 10955.32 days
10 Muisca Acrotom years = 370 synodic months of 29.53 days = 10926 days
but if they added another month that would bring them to 10955.5 days and back into line with the Zocam sidereal lunar calendar and closer to the 30 solar years of 365.24 days = 10957.26 days

The Muisca “Acrotom” 37 month synodic month calendar with the phases of the moon was probably a more “user friendly” calendar for the man in the field, whereas the “Zocam” 20 month sidereal lunar calendar was probably of more interest to the time keeping priesthood and for bringing the other calendar into alignment periodically.

Duquesne also tell us that the Muisca “week” was a period of three days, and at face value, this would appear to have no relationship to the Muisca calendar whether using sidereal or synodic months, but then the calendar itself, in spite of Duquesne’s explanation as a usage for agriculture does not seem really practical for agriculture or at least not as practical as the Tiwanaku one but perhaps having the advantage that no construction of pillars or standing stones was required.

The calendar which is practical for agriculture is the one found at Tiwanaku where the solar year is divided by twenty and determined by the setting of the sun over a pillar, so it would be fairly easy to note the same pillar where the sun would return to each year, and this is the calendar which is easily divided into periods of three days, and period of nine days were also known to have been worked in that region.

So perhaps the Muisca also ran a solar calendar, undiscovered but in the same style as Tiwanaku, or perhaps their customs were left over from some forgotten era, based on the same mathematics as Tiwanaku with its interlocking sidereal lunar calendar and counting in twenties.

Return to Tiwanaku

The Muisca calendar then, is another important piece in the jigsaw of the lost knowledge of the Andes.

If the origins of the Muisca calendar were to be found at Tiwanaku, then perhaps they were also built into the Gate of the Sun which gives the clues to the workings of the Tiwanaku calendar.

Many people have studied the icons on the Gate of the Sun at Tiwanaku and tried to relate them to a calendar. The icons are called "chasquis" or *Messengers of the Gods* and because there are fifteen of them on each side, some people have thought that they represented a thirty day month in a solar year of twelve months. But as explained earlier, this calendar at Tiwanaku is not based upon a division of the solar year into twelve, but into twenty, and this is represented by the eleven smaller icons forming the frieze at the bottom which represents the eleven pillars on the west side of the Kalasasayo which is the actual calendar. So if you count from the central icon or pillar out to the right hand end, then back past the central icon to the left hand end, then back to the centre, you will have effectively counted in twenty divisions and followed the path of the sun over a year.

So if the chasquis do not relate to the days in whichever number of days we choose for the months of the year, could it be that the chasquis represent the years themselves?

If each chasqui were to represent a solar year, then each column of three chasquis would represent three revolutions of the sun around the eleven pillar calendar wall and three solar years are equivalent to 1 x Muisca Acrotom year of 37 synodic months of 29.53 days and also equivalent to 2 x Muisca Zocam years of 20 sidereal months of 27.32 days – i.e. 40 sidereal lunar months and 40 condor heads are found arranged in pairs on the lower frieze of the gate.

There are fifteen chasquis on each side of the central figure and each block of 15 chasquis would represent fifteen solar years which would be
5 Muisca Acrotom years of 37 synodic months of 19.53 days or
10 Muisca Zocam years of 20 sidereal months of 27.32 days

The total number of chasquis is thirty chasquis representing thirty solar years which would be
10 Muisca Acrotom years of 37 synodic months of 19.53 days or
20 Muisca Zocam years of 20 sidereal months of 27.32 days



Above, detail of the "Gate of the Sun" at Tiwanaku, Bolivia

The choice of thirty chasquis as thirty solar years is no random figure, because after thirty solar years have gone by, it becomes necessary to add one sidereal lunar month to the Muisca Zocam calendar making it $20 \times 20 + 1 = 401$ sidereal lunar months to bring it back into line with the solar year.

At the same time of adding one sidereal month to the *Zocam* sidereal calendar, it also becomes necessary to add one synodic lunar month to the Muisca Acrotom calendar making it $10 \times 37 + 1$ synodic lunar months to also bring it into line with both the sidereal lunar calendar and the actual solar year.

Each of the sections with fifteen chasquis corresponds to the period of fifteen solar years which Duquesne tells us was one quarter of the great "century" of the Muisca so to sum up, each block of fifteen chasquis represents fifteen solar years which is 10 Muisca Zocam years or 5 Muisca Acrotom years, the two blocks together make 30 chasquis representing 30 solar years which is 20 Muisca Zocam years or 10 Muisca Acrotom years and 2 x the 30 chasquis gives 60 chasquis representing 60 solar years completing the great "century" of the Muisca which was therefore, 40 Muisca Zocam years or 20 Muisca Acrotom years.

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