The last day of the New Sun
or
The day when the Maya invented the Long Count

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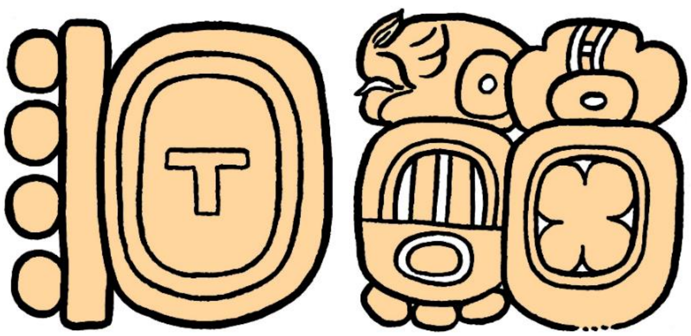


Fig. 1: The Calendar Round 9 Ik´ "20" Yaxk´in in an inscription of Palenque

Today we are going to solve one of the greatest mysteries of Maya research. Actually, we have offered the solution years ago, however, not many seem to have taken notice of our contribution in the chapters of our books, written in German – therefore we want to present the topic again in this article and describe it in a more comprehensive way.

Recently, we came across a very interesting article by Prof. Dr. Nikolai Grube: "The last day of Yaxk´in". In his article, he draws the reader´s attention to the fact that the month of Yaxk´in, which literally means "New Sun", is very often combined with a coefficient which mathematically equals the number 20.

To illustrate this matter, let´s have a look at a typical Maya date. Let´s say, the date is 9.2.15.9.1. 8 Imix 19 Yaxk´in. The first number is the Long Count position. It means that 9 times 400 years, 2 times 20 years, 15 years, 9 months and 1 day have passed since the creation of the world. 8 Imix (8 Crocodile) is the position in the Sacred calendar. This position repeats every 260 days. 19 Yaxk´in is the position in the solar calendar. This position will repeat after 365 days. The Maya used a solar years of 365 whole days, without leap days. It is divided into 18 months of 20 days each. After that, 5 days followed. This "mini month" is called Wayeb. This makes 365 days altogether. There is really no leap year. The following figures show the names of the (Yucatecan) days and months:

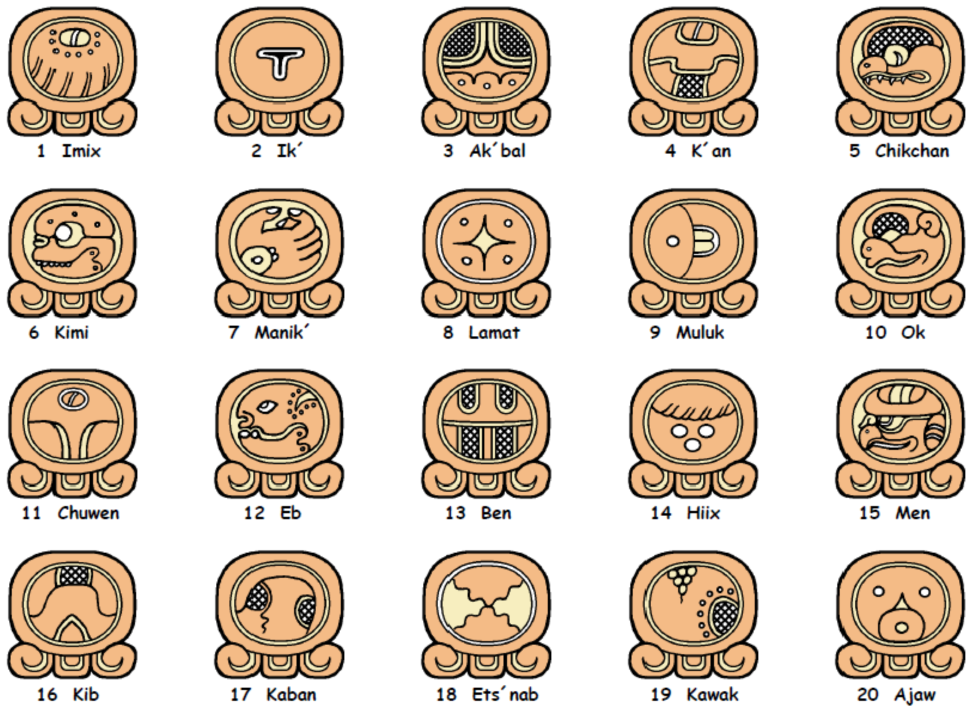
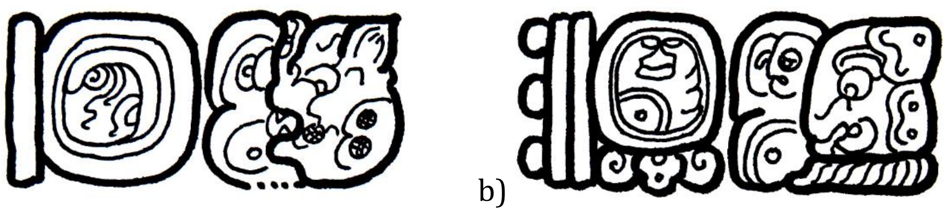


Fig. 2: The day signs

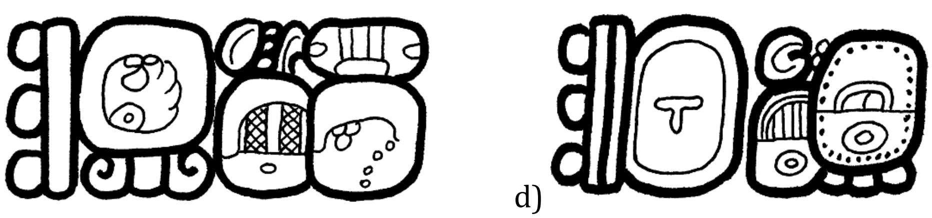
Fig. 3: The month signs

Now, let´s count one day further. What would be the day after 9.2.15.9.1. 8 Imix 19 Yaxk´in? The Long Count changes to 9.2.15.9.2., the day position changes to 9 Ik´, because the day Ik´ (Soul) follows after Imix, and the coefficient of the day increases by 1. And the month position? 19 Yaxk´in is certainly followed by 20 Yaxk´in, we might say, because every month has 20 days, right? Actually, in most cases, the Maya would usually not write the twentieth day of the last month, but the day cero of the next month. If we put the Long Count date 9.2.15.9.2. in a computer program, in order to find the corresponding day and month position, the program would indicate "9 Ik´ 0 Mol" as a result in this case. The truth is that we can find both variants in the Maya inscriptions, whenever we have a final month position, a position which mathematically corresponds to day 20 or 0 of a month. There is no way of recognizing any system. If the Maya scribe preferred to write day 0 or 20 of a month, does not depend on the time period or the Maya city or the Maya scribe. One and the same scribe can employ either one system or the other. Both methods can even occur in one and the same inscription simultaneously. You can find 20 Kej instead of 0 Mak, or 20 Sek instead of 0 Xul.



a) b)

Fig. 4: Two examples for the coefficient 0 of a month: 5 Kaban 0 Sots´ and 13 Manik´ 0 Xul



c) d)

Fig. 5: Two examples for the coefficient 20 of a month: 8 Manik´ 20 Kej and 13 Ik´ 20 Mol

However, there is one single rule, as it seems. This is a rule which Dr. Grube underlines in his article: Whenever the last position of the month of Yaxk´in is reached, the Maya scribes always write it as 20 Yaxk´in. The alternative spelling 0 Mol never shows up. The German epigrapher draws our attention to another quite curious fact: Out of 25 known cases of the variant "twentieth day" of such and such a month, 14 cases alone fall on 20 Yaxk´in. This means that there are more cases of 20 Yaxk´in as with all the other months combined, which equally have a coefficient of 20. Many Maya researchers have certainly noticed the unusual frequency of the 20 Yaxk´in position. Compared with 25 cases of a "twentieth day of a month", Dr. Grube found 35 cases of a "day cero of a month". We can say without doubt that there is something strange going on with the month of Yaxk´in. Certainly, the position of 20 Yaxk´in must mean something.

Next we will have a closer look at the exact spelling of the coefficients for cero and 20 of the months. In Figure 4 we have two examples for the coefficient cero of a month. Here we will never see a shell or a flower, which otherwise represent a cero, but instead a sign is used which reads “chum”, meaning “it was seated”. This means that the month starts. In Figure 5 we have two examples for a day 20 of a month. Likewise, no proper sign for 20 is used, instead there are two phonetic elements which together read “ti´ haab”, which literally means “the end of the year”. This seems a bit strange. One might suspect that “the end of time” is also a possible interpretation. In any case, this sign occurs in the Long Count as a year sign. Here we can see it again:

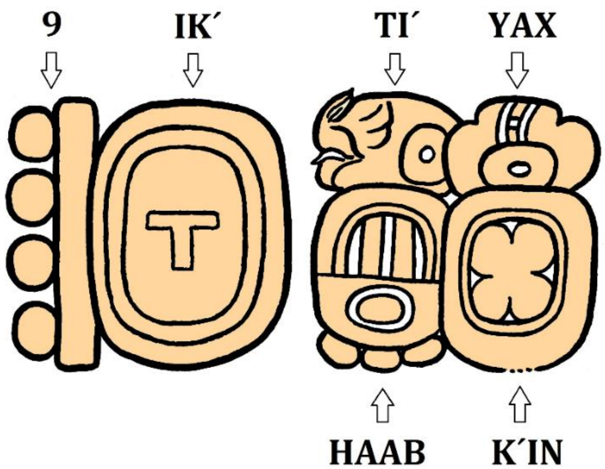


Fig. 6: The Calendar Round 9 Ik´ “20” Yaxk´in in an inscription of Palenque

We can compare it with the signs for the time periods of the Long Count. It is the same sign as the sign for a year of 360 days.

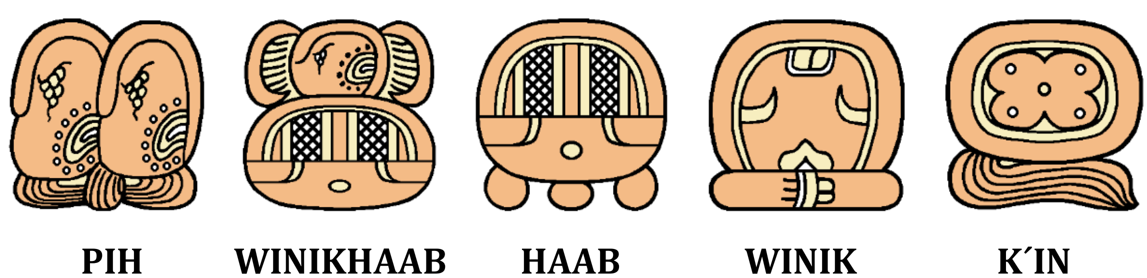


Fig. 7: The signs for 400 years, 20 years, one year, 20 days and one day of the Long Count.

We must now reflect upon the fact that the expression of the twentieth day of the month means “the end of the year“, especially for the month of Yaxk´in. Normally, the end of the year is reached with the month of Kumk´u, or with the end of the last 5 days, called Wayeb, respectively.

This is certainly so, since we also know that the day 0 Pop was considered the New Year´s day. How is it possible then, that the end of the month of Yaxk´in was also, at least originally, considered the end of the year? According to Dr. Grube this can be explained by the fact that originally, when the solar calendar was invented, the month of Yaxk´in coincided with the end of the dry season, which would be around the end of April, beginning of May. After that a new year began, let´s say, a new agricultural year. We remember that the Maya do not use leap years. It is conceivable that at the moment the solar calendar was invented, the end of the dry season coincided with the end of the month of Yaxk´in, and later on this relationship shifted. As a matter of fact, even today, we find many entries for "Yaxk´in" in Maya dictionaries with the translation "dry season" or "summer". This led Dr. Grube to the question: When was the solar calendar invented? According to him there was only one time period in the Preclassic when Yaxk´in coincided with the end of the dry season, and this was between 600 and 500 before Christ. Let´s check this. We will take the date of the 3rd of May, which in most Maya areas is the official day for the beginning of the rainy season, and will equate it with the day 20 Yaxk´in. What will be the result? The 3rd of May 541 BC (Gregorian) falls on 5 Manik´ 20 Yaxk´in. The 3rd of May 540 BC falls on 6 Eb 20 Yaxk´in. The 3rd of May 539 BC falls on 7 Kaban 20 Yaxk´in. The 3rd of May 538 BC falls on the Calendar Round 8 Ik´ 20 Yaxk´in. As we can see, the information given by Dr. Grube is correct, the month position 20 Yaxk´in fell on the end of the dry season in the sixth century before Christ.

Does that mean we can conclude that the solar calendar of the Maya was invented in the sixth century before Christ, between the years 541 to 538 BC? We say No. We have additional information which leads us to another century. Even though the information presented by Dr. Grube seems logical so far, we have good reasons to refuse his hypothesis that the month Yaxk´in or the end of that month for that matter was originally associated with the end of the dry season. We will show instead that the day 20 Yaxk´in corresponded to a different, very specific astronomical point in time at the moment of the invention of the solar calendar. To solve the mystery of the day 20 Yaxk´in, the last day of the month "New Sun", we must ask ourselves: When was the famous Long Count of the Maya invented?

The concept of the Long Count of the Maya, just as the topic of the month coefficient cero or 20, is of a dialectical nature. On the one hand, the Long Count has a cyclical nature, on the other hand it has a linear quality as well. We can count the Long Count up to 13 times 400 years, but also up to 20 times 400 years, and in the following we can use even larger time periods of 8000 years, 160,000 years and so on. This is not so important now for our purpose. At the moment, we are interested in the starting point 13.0.0.0.0. 4 Ajaw 8 Kumk´u, mentioned several times in ancient hieroglyphic inscriptions. Provided we have done our homework diligently and have not fallen prey to erroneous, politically-correct arguments, we will know that this date corresponds to the second half of the 13th of August until midday of the 14th of August 3114 BC in the Gregorian calendar. We were pleased to see that Dr. Grube has used the correct correlation constant 584285, which corresponds to the 13th of August 3114 BC. As we all know, there is a consensus among Mayanists that at that time the Maya culture, at least a Maya calendar, did not yet exist. The oldest Long Count date falls in the year 36 BC. So, when was the Long Count invented?

Before answering this exciting question, we invite you to relax, lean back and travel back in time, some 27 centuries approximately, into a Maya area which is somewhere on the 15th parallel of latitude. Four shamans are in a meeting in order to discuss about the calendar. They are the guardians of time, they count the days of the sacred year and of the solar year. The solar year has 365 days. Actually it is a fraction of a day longer, that much is clear to them. The sacred year is the year of the maize, the sweet corn. It has 260 days. Those 260 sacred days have names, from 1 Imix, 2 Ik´ and so on, until 13 Ajaw. The first day, 1 Imix, always falls on the day of the ritual of the creation of the world, the measuring of the milpa. The last day, 13 Ajaw, always falls on the day of the celebration of harvest, when the last corn has been taken in. Each year, 8 times 13 days remain, plus one extra day, about 105 days. However, those days do not have names, since they are not sacred, are no part of the sacred year. The shamans have observed that the number 13 is quite useful. The period of 4 times 13 days passes from the longest day of the year, the beginning of summer, until the next passage of the sun through zenith. The period of 3 times 13 days passes from the passage through zenith until the autumn equinox. Also 3 times 13 days pass from the autumn equinox until the day when the sun god arrives at his lowest point, the nadir. From that day on, 4 times 13 days will pass until the winter solstice, the shortest day of the year. Another 4 times 13 days will pass, until the sun has again reached nadir. After that, there will pass about 3 times 13 days until the next spring equinox. Another 3 times 13 days will pass from that day until the next passage of the sun through zenith. After that, 4 times 13 days plus one extra day will pass until the summer solstice. The shamans divide the solar year into 4 quarters. Each quarter of a year lasts 52 plus 39 days, which is 7 times 13 days, or 91 days altogether. At some time around the zenith passage after the spring equinox, they had to add one day in order to get 365 days. The number 13 was also part of the sacred year, which lasts 13 months, 13 times 20 days. Interestingly, there were also 260 days passing between the zenith passage after the summer solstice until the next zenith passage. All this made them abundantly clear that the number 13 was an extremely sacred number.

When the shamans met, they discussed if they should give a name to each and every day of the solar year. Another item on their agenda was the development of a more reliable chronology. In order to be able to have a better control over the movement of the planets, they needed a count of days over a long period of time, a Long Count so to say, which would always allow to exactly know how many days had passed between two events. That would be the only way to precisely calculate eclipses or the periods of revolution of the planets. Already they had realized the advantage of the length of the solar year of 365 whole days. This allowed for a very nice formula: 5 Venus years are exactly 8 solar years (5 x 584 = 8 x 365). The 260 days were of advantage for tracking Mars, since 3 times 260 days correspond to 780 days, which is exactly one Mars year.

The shamans reflected now upon the best way to subdivide the solar year. Since the sacred year has 13 months of 20 days each, they thought that the solar year should also be divided into months of 20 days. That would give 18 months, with 5 extra days. The solar year would have 360 plus 5 days. Furthermore, they concluded that those 360 days should be used as a rounded value for a year in the Long Count, because this value also proved to be very useful. This is where the sacred number 13 came into play again, since 13 times 360 gives 4680. This number is a multiple of a Mars year (6 times 780 days); also, with an error of only one day, it is a multiple of a Venus year

(5 times 585 days); and, again with an error of only one day, it is a multiple of a Mercury year (40 times 117 days; also, the number 4680 is exactly 9 times 520 days, which is double the length of a sacred year, which is a good value for controlling eclipses, for it equals quite well 19 draconitic months.

The shamans discussed if it would be better to preserve the fixed system of the sacred days of the agricultural year or if it would be better, to start again with the first day 1 Imix right after the 260 days have passed, in order to let the sacred year rotate with the solar year. The calculations showed that in this way they would get a repetition of a date, which consisted of the sacred day and the day in the solar calendar, after 52 years, after 52 times 365 days. There it was again, the number 52, which is 4 times 13. This looked really good. (Such a date, consisting of the sacred day and a month position, we will call a "Calendar Round" from now on). One might also say that a Calendar Round lasts 73 times 260 days. This would define the number 73 as a number of interest, which looked good, since there was an elegant connection to planet Venus, because one Venus year lasts 8 times 73 days (8 x 73 = 584).

Next, the shamans reflected upon the way how the date of the Calendar Round of 52 years should be connected with the Long Count. There was also the task of giving names to the solar months. The Long Count should certainly work with the vigesimal system, since the number 20 was, just as the number 13, an important basic number. A human has 20 digits, 10 fingers plus 10 toes. And man is the measure of things. Therefore, they would count 20 times 360 days, then 400 times 360 days. And if necessary, one would always multiply with 20. Again, the sacred number 13 comes into play, because for practical reasons one should limit the Long Count to only 13 times 400 years (of 360 days), for the time being, as one of the shamans suggested. Because 13 times 400 times 360 days equals 1,872,000 days, and this number is a multiple of the sacred year (7200 x 260 = 1,872,000). This means that after 13 times 400 years (5200 years) one would arrive at the same position of the sacred year. There was still the matter of defining the position of the sacred day. There could be no doubt about the name of the day, because one of the 20 sacred days was obviously the most important one: The day Ajaw, which means "lord" or "king". But the day still needed a coefficient. The shamans soon came to the agreement that the day should not be 1 Ajaw, but 4 Ajaw. After all, they were 4 lords as well, four shamans who each one carried the scepter for a year after which they handed the scepter to the next one. The number 4 was also the number of their civilization. Four epochs were necessary in order to reach the level of civilization. After 13 times 400 years they would arrive at the same sacred day, but there would be 73 different possibilities for the position of the solar year. There it was again: The number 73. In the future, it would be possible to distinguish 73 times those 13 times 400 years. In order to remind everyone of the cyclical nature of the Long Count, they agreed to write the "cero date" not as 0.0.0.0.0. 4 Ajaw, but as 13.0.0.0.0. 4 Ajaw instead. One day later would be 0.0.0.0.1. 5 Imix.

So, this is the initial situation. Next, we must try to follow the way of thinking of those four Maya shamans a couple of thousand years ago. We know that they wanted to equate the cero date with the day 4 Ajaw. We know that the first day of the sacred calendar, also called Tzolk´in, is 1 Imix. Originally, this day was fixed in the solar calendar, and repeated every 365 days. Later it started rotating and repeated every 260 days. When the shamans were about to invent the Long Count and the solar calendar, they must have paid attention to this day, of course. They would hardly have said: “Today we will initiate the Long Count, and we start it with the day 12 Serpent”. This doesn´t make sense. It is also logical that this day 1 Imix fell on the originally fixed day of the solar calendar, when the shamans decided to let the sacred day count rotate. This leads us to the question if we know when this day 1 Imix was. We remember that this day is the day of creation, the day of the measuring of the corn field. The Swiss ethnologist Rafael Girard has painstakingly documented the agricultural and liturgical year of the Chortí-Maya. For decades he had observed and documented all rituals, even rituals which are normally not accessible for foreigners. Thanks to him, we know that the year of the maize started with the measuring of the milpa, followed by several rituals like the capturing of certain storm gods; later on the trees and bushes of the milpa were cut, they let them dry, then followed the burning; then there was the sowing of the Maize kernels, later the bending of the corn ears, then the first harvest, then they sow again, and there is a second harvest at the end of October. This moment was considered the end of the agricultural year, and the time of rest and dry season began. As we know, this maize year lasted exactly 260 days. According to Rafael Girard, it lasted from the 8th of February to the 25th of October in the Gregorian calendar. Given that there might be a margin of a few days, and sometimes there is an extra leap day, we must reckon with a certain margin of error. Let´s say we take those dates with a margin of plus minus 3 days. Then we should place the day 1 Imix as the original starting point of the maize year somewhere between the 5th and 11th of February.

Next we need to think about with which month the shamans started the solar year. They are about to define a Long Count and a solar count at the same time. They knew the length of the solar year already, however, its days had no names yet. Well, let´s think. It is the beginning of February, and the shamans say: “Today is another start of the maize year. It is the day 1 Imix. With which month should we start?” Actually, they were at the very moment of naming the months, of inventing the month names. And which was the first month? Well, there is only one logical answer: Of course it was the month of Pop, which means “throne mat”. This is certainly a name fit for the first month. Now one might object that in Classic times, the first month was not read as *Pop*, but as *K´an Jalew*, as we know from Classic Maya inscriptions. The translation would be something like “the precious ball court” or “the yellow ball court”. The *K´an* glyph is used directly as a symbol of the maize kernel in the iconography of the Maya, since the ripe maize kernel is yellow and precious. Remember the sacred story of the Maya, which describes the ball court as the place of resurrection of the maize god. In any case, this is also a suitable and a worthy name for the first month of the solar year.

We know from the mechanics of the Maya calendar that the combination 1 Imix 1 Pop is not possible. Only 1 Imix 4 Pop is possible, or 1 Imix 9 Pop, 1 Imix 14 Pop, as well as 1 Imix 19 Pop, for that matter. Here we will certainly notice that this coefficient of 4 sounds familiar to us, because we have come across this phenomenon already during the discussion of the cero date of the Long Count. It did not fall on 1 Ajaw, but on 4 Ajaw. As already mentioned, the number 4 is of utmost importance. The number 4 is associated with the forth creation. We remember that first all animals were created. Next, the figures of mud were created, then the figures of wood, and last the real human figures, the maize people. And the maize comes from the maize god, who resurrects on the ball court. This couldn´t be any better.

We can agree on another piece of information: The four shamans started the beginning of the Calendar Round and the Long Count with the day 1 Imix 4 Pop.

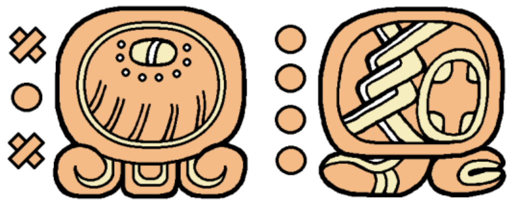


Fig. 8: The Calendar Round 1 Imix 4 Pop

Next we must ask ourselves: What position of the Long Count should this Calendar Round 1 Imix 4 Pop coincide with? What would be logical? We argue that it is logical to conclude that the Long Count position should contain a few ceros. It should not be any completely irregular number. Well, let´s have another look at Dr. Grube´s arguments. He had suggested a start of the Long Count in the sixth century before Christ. As we have seen, there were for dates as a result of equating the 3rd of May with the day 20 Yaxk´in: The 3rd of May 541 BC (Gregorian) falls on 5 Manik´ 20 Yaxk´in. The 3rd of May 540 BC falls on 6 Eb 20 Yaxk´in. The 3rd of May 539 BC falls on 7 Kaban 20 Yaxk´in. The 3rd of May 538 BC falls on the Calendar Round 8 Ik´ 20 Yaxk´in. Let us calculate back in time now, until we reach the position 4 Pop for all those four dates. The result for the first date would be 6.10.9.14.11. 12 Chuwen 4 Pop on 19th of December 542 BC; for the second date it would be 6.10.10.14.16. 13 Kib 4 Pop on the 18th of December 541 BC; for the third date it would be 6.10.11.15.1. 1 Imix 4 Pop on the 18th of December 540 BC; for the forth date it would be 6.10.12.15.6. 2 Kimi 4 Pop on the 18th of December 539 BC. As we can see, only one of those four dates has the Calendar Round 1 Imix 4 Pop. That would be the date 6.10.11.15.1. 1 Imix 4 Pop on the 18th of December 540 BC. First of all, it is apparent that this date 1 Imix 4 Pop, which should be somewhere around the beginning of February, is now in December, which cannot be. But most of all we must ask: Why would the shamans have defined the Long Count position as 6.10.11.15.1.? Why such a strange number? This doesn´t seem to make any sense. It would be much more logical to assume that on the day of the invention of the Long Count they would have used a more or less round number, like 6.10.0.0.1. or 6.0.0.0.1.

We are approaching the decisive question now: How can we know the exact day when the Long Count was invented? Actually, this shouldn´t be all too complicated! We just have to consider all the information we have gathered so far and must focus it into one single result. We will simply investigate which variants of the Long Count show up for the Calendar Round 1 Imix 4 Pop in the first millennium BC, within a time frame from the 5th to the 11th of February, which is the beginning of the agricultural year. What does the calendar program reveal?

We immediately find the only suitable result which is immediately convincing: 6.0.0.17.1. 1 Imix 4 Pop, on the 6th of January 747 BC, Gregorian. It is the only date which falls on the beginning of February. And why is it immediately convincing? It is the only date which contains two ceros in the Long Count!

Fig. 9: The Calendar Round 1 Imix 4 Pop in the first millennium BC.
Program by Mario Krygier. Our dates are in the Gregorian calendar.

A question arises immediately: Why was the Calendar Round 1 Imix 4 Pop not combined with 6.0.0.0.1.? Why is there a number 17 in the position of the 20 days? If we can solve this conundrum, our proposal will certainly look even more convincing.

We are sure that the four shamans have tried to correlate 1 Imix 4 Pop with 6.0.0.0.1. Or 13 Ajaw 3 Pop, which is one day earlier, with 6.0.0.0.0. And surely, one of the four shamans asked right away: "But what would the Calendar Round of the cero date look like in this case?" And this is an important question. As a mythological date, it must have a proper Calendar Round. As we have mentioned already, the cero date 13.0.0.0.0. was supposed to fall on 4 Ajaw. But what happens when we equate 6.0.0.0.0. with 13 Ajaw 3 Pop? In this case, 13.0.0.0.0. would have fallen on the Calendar Round 6 Ajaw 3 K´ayab. This is not acceptable. The sacred day must be 4 Ajaw, by all means. So, how could this flaw be corrected without much hassle? This was the question the four shamans asked themselves. The smallest change would be possible in the Winal position, the position of the 20 day period. Parting from 6.0.0.X.1. 1 Imix 4 Pop we have to find the value for X, so that 13.0.0.0.0. coincides with a day 4 Ajaw. Whoever calculates correctly, will see that there are two possibilities. The first one is 6.0.0.4.1., the second one is 6.0.0.17.1. If we correlate 6.0.0.17.1. with 1 Imix 4 Pop, what the Maya shamans eventually did, then the cero date will be 13.0.0.0.0. 4 Ajaw 8 Kumk´u, as we all know. However, had they correlated 6.0.0.4.1. with 1 Imix 4 Pop, then the cero date would have been 13.0.0.0.0. 4 Ajaw 8 Sek. Sek is the fifth month, and Kumk´u is the last month. To use the last month as a starting date seemed to make more sense to the shamans than to use the fifth month. But there is another reason for using the number 17 as the Winal number instead of 4. If we use the number 6.0.0.4.1. or the number 6.0.0.17.1., of course also influences the Gregorian date of the starting day. Counting back 6.0.0.17.1. from the 6th of February 747 BC, as we all know, leads back to the 13th of August 3114 BC. But where would we land with the date 6.0.0.4.1.? In that case, the cero date would have been 260 days later, on the 29th of April 746 BC. This would have corresponded to the next zenith passage of the sun. We might debate now how accurately the shamans had been able to calculate the equivalent of the Gregorian day for the cero date, since their knowledge of the exact length of the tropical year must have been rudimentary. After all, it was for precisely that reason that they wanted to invent a Long Count, a count which would constitute a reliable day count, to serve as a chronological anchor and basis for all kind of calculations. We suspect that they surely would have known that both possible cero dates would have corresponded to a zenith passage. In that case the shamans might have asked themselves: Which zenith passage is more important, the one of the 13th of August or the other one around the 29th/30th of April? This question is also easy to answer, for since primordial times there is a very special celestial firework going on every year around the 13th of August, presented by the shooting stars of the Perseids. Could there be a better date for the creation of the world? For this reason too, the shamans must have preferred the Long Count date 6.0.0.17.1.

This was the explanation, why the 6th of February 747 BC, which was equated with the Calendar Round 1 Imix 4 Pop, was not adjusted to 6.0.0.0.1., also not to 6.0.0.4.1., but to 6.0.0.17.1. instead.

We will now have a look at the important Maya dates (Long Count plus Calendar Round) for the decisive dates of the year 747 before Christ.

6 February 747 BC	creation of the milpa/world	1 Imix 4 Pop
+ 5 days		
11 February	nadir of the sun	6 Kimi 9 Pop
+ 38		
21 March	spring equinox	5 K´an 7 Sip
+ 39		
29 April	one day before zenith passage	5 Ak´bal 6 Sek
+ 1		
30 April	zenith passage	6 K´an 7 Sek
+ 1		
1 May	one day after zenith passage	7 Chikchan 8 Sek
+ 52		
22 June	summer equinox	7 Kaban 20 Yaxk´in
+ 52		
13 August	zenith passage	7 Muluk 12 Yax
+ 39		
21 September	autumn equinox	7 Lamat 11 Kej
+ 32		
23 October	end of harvest	13 Ajaw 3 K´ank´in
+ 7		
30 October	nadir of the sun	7 Manik´ 10 K´ank´in
+ 52		
21 December	winter solstice	7 Kawak 2 K´ayab
+ 47		
6 February 746 BC	creation of the world/milpa	2 Kimi 4 Pop

Several of those dates look quite interesting. The first nadir passage of the sun falls on the day 6 Kimi 9 Pop. The day Kimi is the day of the death god, a god of the underworld. The sun is in the lowest point of the underworld precisely on the day of the lord of the underworld. Coincidence? The coefficient 6 is also interesting, because the profile god for the number 6 is a god with an axe for sacrifice in the eye. When the 13th king of Copán, King Waxaklajun Ubah K´awiil, was sacrificed by his captor, he was beheaded by such an axe on – guess on which day – on the day 6 Kimi. The position 9 Pop contains the coefficient 9 – a number which is directly associated with the underworld.

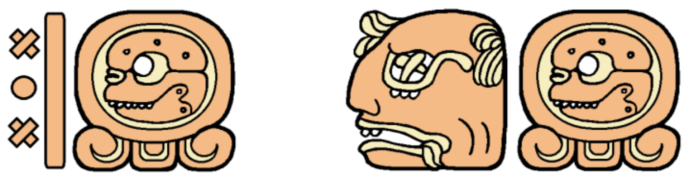


Fig. 10: The sacred day 6 Kimi.
To the left as bar and dot variant for 6, to the right written with the god profile for 6.

Also very interesting is the next important date, the date of the spring equinox 5 K´an 7 Sip. Many Maya put special attention to this moment, because they want to sow the maize 40 days after this date. And the day is K´an, the day of yellow maize kernels. Coincidence?

Fig. 11: The Calendar Round 5 K´an 7 Sip

What calls our attention here, is the month position of 7 Sip. Those who have read the famous account from Yucatan by the Bishop Diego de Landa, may remember that he describes the most important rituals in the annual cycle of the Yucatec Maya. Interestingly, he mentions a day 7 Sip! He writes: "*The hunters and fishermen began to celebrate on the 7th of Sip… Then with worship the hunters invoked the gods of the chase,* Akanum, Suhuy Sip, Sipitabai*, and others; they distributed the incense, which they threw in the brazier; while it burned each one took an arrow and the skull of a deer, which the chacs anointed with the blue pitch…*" (Diego de Landa, by Gates, p. 93/94).[i] Surprisingly, there is an image of a god called Seven Sip in the Dresden Codex, as Dr. Nikolai Grube discovered a few years ago. The name of the god is written syllabically. After the number 7, written with one bar and two dots, follow the syllabic signs –*si* and –*pu*. On his head he carries the antlers of a deer. The connection of this god with this animal is very obvious, because in front of him sits a deer. It is quite remarkable that this deity carried the number 7 in his name, forming the date 7 Sip, the very date mentioned by Bishop Diego de Landa.

Fig. 12: The god of deer hunt 7 Sip in the Dresden Codex. Drawing by Jens Rohark

Every year, for two thousand years, always on the day 7 Sip, the Maya celebrated this day. This way, the Maya commemorated the original spring equinox in the year of the invention of the Long Count in the year 747 before Christ. Since the Maya did not use leap years, the day 7 Sip travels through the whole year in the course of centuries. But no matter on which day 7 Sip fell, the hunters always celebrated this date in order to remember this important day, because originally it coincided with the spring equinox, a day which is good for hunting, because at that time it is easier to hunt the animals which are easier to see without the green vegetation.

The name of the month had been chosen with care. To name the third month of the year Sip may have another reason. We should mention here that this month of Sip is connected with the planet Mars. The patron god of the month of Sip is the Mars monster. For more about Mars, see our article about the Post-Classic base date of the Mars table in the Dresden Codex.

Fig. 13: The Mars monster as the patron god of the month of Sip in the introductory glyph of the Long Count

When the month of Sip was seated for the very first time, that means when the position 0 Sip was used the first time, there was a special event observable concerning Mars. The day 0 Sip falls on the 14th of March 747 BC in the Gregorian calendar. The complete date is 6.0.1.0.17. 11 Kaban 0 Sip. The astronomical program works with the Julian calendar here, which in this case is the 22nd of March 747 BC[ii]. We will now have a look at the night sky at 8 p.m. for three consecutive nights. We will pay attention to the relative movement of Mercury and Mars.

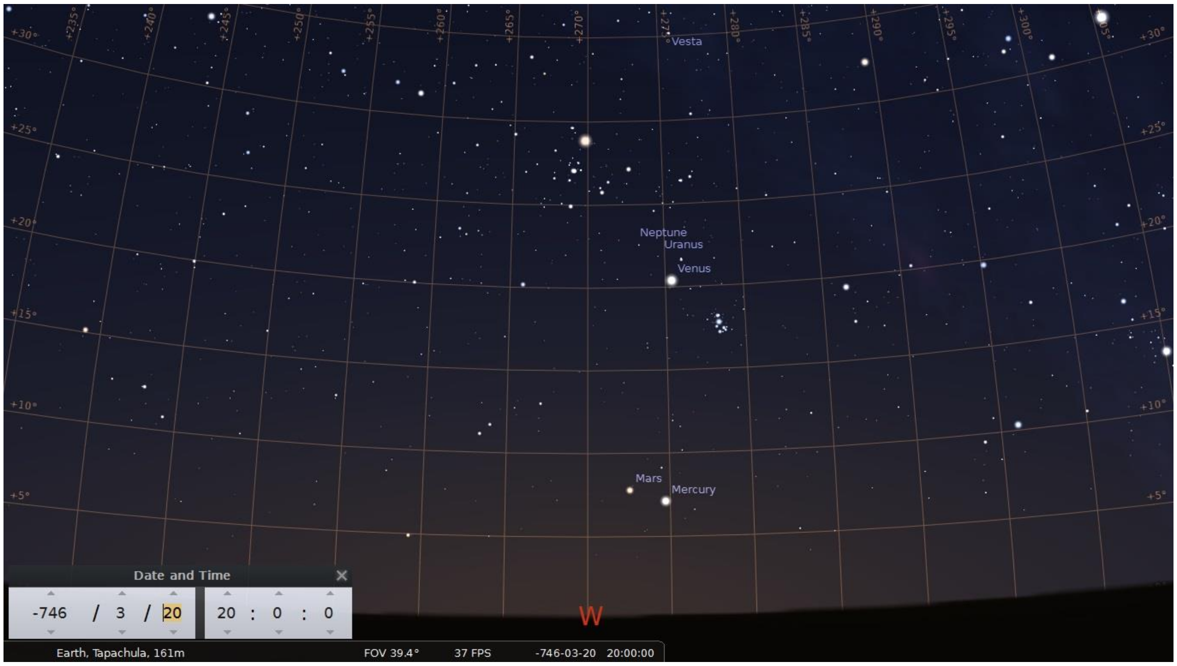


Fig. 14: The night sky at the Maya date 6.0.1.0.15. 9 Men 18 Woh

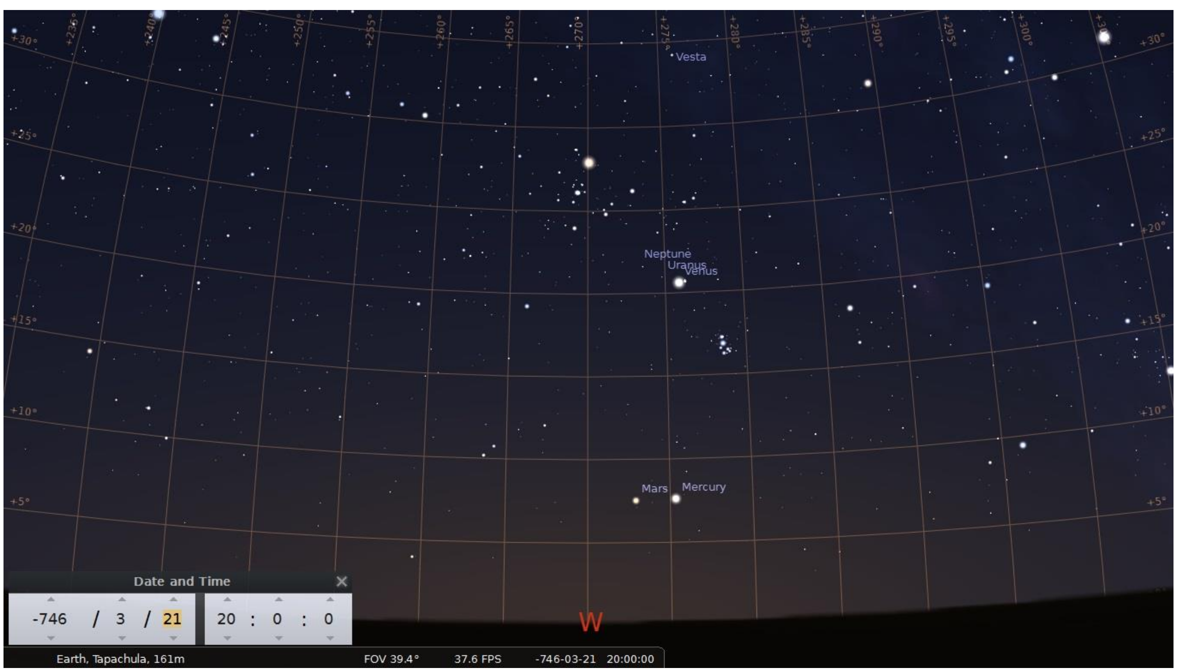


Fig. 15: The night sky at the Maya date 6.0.1.0.16. 10 Kib 19 Woh

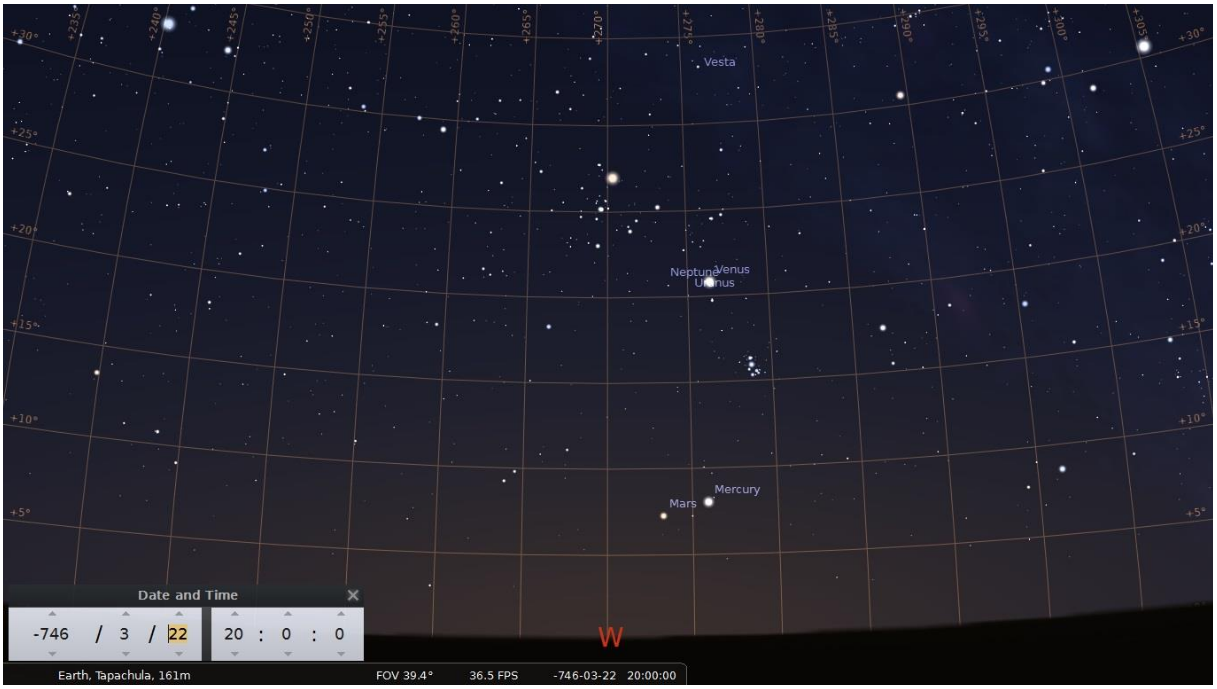


Fig. 16: The night sky at the Maya date 6.0.1.0.17. 11 Kaban 0 Sip

Two nights before the day 0 Sip, Mercury has almost reached Mars. One night before that day, both planets are next to each other. In the night of 0 Sip, Mercury has just passed Mars. This day 0 Sip seems to have been quite important for the Maya in the time to come. A possible sign for that may be the fact that this day shows up at least five times in the hieroglyphic inscriptions, whereas the alternative variant 20 Woh does not appear even once.

Seven days after this date 0 Sip was the spring equinox, on the date 6.0.1.1.4. 5 K´an 7 Sip, which corresponds to the 21st of March 747 BC Gregorian or the 29th of March 747 BC Julian. If the Maya celebrated this date for two thousand years, we can be sure that on the original date there was also something interesting going on in the night sky. As a matter of fact, the shamans had been able to witness something quite special. The planet Mercury, having moved along and approaching its maximum elongation as evening star, stood exactly next to the Pleiades on the evening of the spring equinox. As is well-known, the Pleiades are very important in the Maya astronomy, especially as messenger of rain. The Maya called the Pleiades “the rattle of the rattle snake”, sometimes also simply “the cluster of stars”. Here we have the likely reason why the Maya remembered this date for all eternity.

Fig. 17: The night sky at the Maya date 6.0.1.1.4. 5 K´an 7 Sip

Finally we come to the solution of the mystery, why the Maya mentioned the month position 20 Yaxk´in with such extreme frequency. The careful reader will already have noticed the reason: The month position 20 Yaxk´in falls exactly on the date of the summer solstice in the year of the invention of the Long Count!

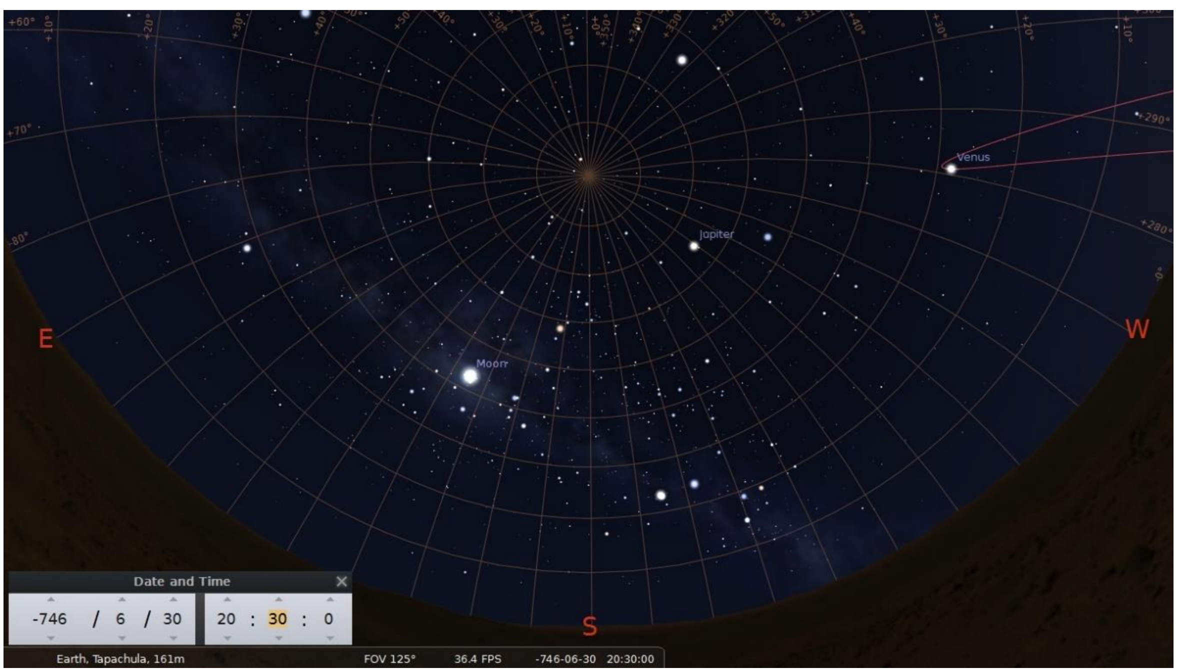


Fig. 18: The night sky at the Maya date 6.0.1.5.17. 7 Kaban 20 Yaxk´in

The 22nd of June 747 BC corresponds to the date 6.0.1.5.17. 7 Kaban 20 Yaxk´in. In this night too, a very special event was taking place, because the planet Venus had reached its maximum elongation as evening star.

As Dr. Grube explains in his article, the name Yaxk´in means "dry season" as well as "summer". If we think about it for a moment, we will realize that "dry season" is not really the same as "summer", because the dry season may go from November to April, whereas the summer goes from, let´s say June to August. Remember that we are here in the Northern hemisphere. In any case, we have seen that originally the moment of summer solstice fell exactly on the day 20 Yaxk´in, and for this reason this day was mentioned so often in the inscriptions, because the summer solstice was the most important moment of the solar year. The day 20 Yaxk´in was originally not associated with the end of the dry season, as Dr. Grube suspected. Interestingly, Dr. Grube was already on the right track, because towards the end of his article he mentions that in the Late Classic there are a number of 20 Yaxk´in dates around the moment of the summer solstice. As he writes, he suspects that a change in the meaning took place from originally "dry season" to "summer solstice". However, we have seen that such a change in the meaning of the expression 20 Yaxk´in from "end of dry season" to "summer solstice" never existed; instead, the last day of the month of the New Sun had always been associated with the summer solstice.

This day 20 Yaxk´in was considered so important to the Classic Maya, that they even accepted inaccuracies in the usage of their calendar. Among the list of 25 dates of 20 Yaxk´in, which Dr. Grube mentions, there is one date which is not accurate: The date 9.10.9.11.3. 6 Ak´bal 20 Yaxk´in corresponding to the 22nd of July 642 AD, Gregorian, from the hieroglyphic staircase of structure 2B10 in Oxkintok. Dr. Grube simply put a question mark behind the Long Count date, without giving more explanations. If we take a closer look at this matter, it turns out that Long Count date 9.10.9.11.3. coincides with the Calendar Round 6 Ak´bal 1 Mol. That means that instead of 1 Mol the Maya considered it as 0 Mol, writing 20 Yaxk´in, what mathematically is the same.[iii]

Fig. 19: The date 5 K´an 20 Yaxk´in on the Dallas Bone

Once we have understood that the two most important moments in the solar year are the spring equinox and the summer solstice, and that the Maya forever remembered their original Calendar Round dates, the possibility opens up to understand inscriptions which until now were of a mysterious nature. Many years ago, David Stuart described the famous Dallas Bone, which contains a beautiful carving of a coronation scene. An exorbitant headdress with the mask of the Principal Bird deity, also called Seven Macaw, is handed over to a king with features of the maize god. The hieroglyphic text begins with a date which we see in Fig. 19, followed by the verb of coronation. The date is 5 K´an 20 Yaxk´in. David Stuart speculates, if there is a sequence of mythological dates. There is the date 1 Ajaw on the vessel of the blow gunner (see Fig. 21); the date 3 Ik´ appears in a mural of San Bartólo (see Fig. 20); and here we have 5 K´an. So, the sequence would be 1 Ajaw, (2 Imix), 3 Ik´, (4 Ak´bal), 5 K´an. However, we are confident that David is on the wrong track here. The apparent sequence is just a coincidence. Der day 1 Ajaw is a play with the name of one of the Hero Twins, Junajpú, called One Ajaw in Classic times. The day 3 Ik´ is a concrete date, the New Year´s date of 7.16.11.17.2. 3 Ik' 0 Pop corresponding to the 12th of August 27 BC, Gregorian, when there was a perfect conjunction between Venus and Saturn. (See our article “Ein Neujahrsdatum in San Bartólo” or “Una fecha de año nuevo en San Bartólo”).

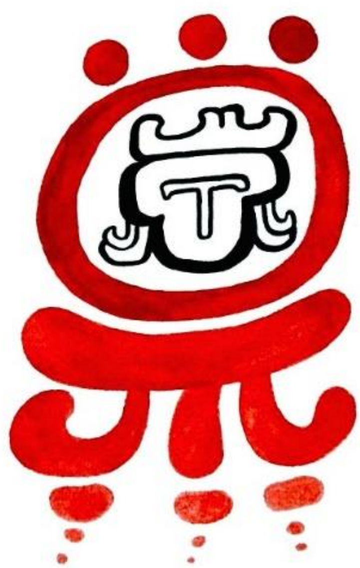


Fig. 20: The sign 3 Ik´ on the West wall of San Bartólo. Drawing by Jens Rohark after Heather Hurst.

So, what does the day 5 K´an on the Dallas Bone mean? First of all, we would like to stress the fact that David Stuart fails to mention a very important circumstance, namely that this Calendar Round is actually impossible. The month position of 20 Yaxk´in can only be combined with the days Ik´, Manik´, Eb and Kaban. What is going on then? We remember that the king of the Dallas Bone receives a headdress with the figure of Seven Macaw. This bird is known from the sacred book of the Maya, the Poopol Wuuj. The same deity is painted on the vessel of the blow gunner, in a scene which is described in the Poopol Wuuj. The bird is shot with the blowgun as a punishment for his arrogance. He even bragged that his jewelry shone brighter than the sun and the moon.

Fig. 21: The date 1 Ajaw 3 K´ank´in on the vessel of the blow gunner. Drawing by J. R.

"Headfirst he fell down towards the earth", it says in the sacred book. Now we must know that this bird is called Seven Macaw for a good reason. His astronomical counterpart is the Big Dipper, a constellation which consists of seven stars. His "fall", meaning the moment he touches the horizon, can best be observed in the Maya area around summer solstice, exactly in the North, at midnight. This same moment can also be observed around spring equinox, but in this case shortly before sunrise. Well, what does this date 5 K´an 20 Yaxk´in mean then? It is the combination of the day of the spring equinox and the month position of the summer solstice in the year of the invention of the Long Count! One single – otherwise impossible – Calendar Round date reminds at the same time of two different mythological dates. Both the spring equinox date as well as the summer solstice date seemed to have been propitious dates for the coronation of a Maya king. Therefore it may be by design that several Maya kings arranged for their coronation on a day 5 K´an or 20 Yaxk´in, as did K´an Joy Chitam I of Palenque, who accessed the throne on the day 9.4.14.10.4. **5 K´an** 12 K´ayab, or K´awiil Chan K´ihnich of Dos Pilas, who was crowned on the day 9.15.9.17.17. 13 Kaban **20 Yaxk´in**.

The month position of the blow gunner´s vase, 3 K´ank´in, the third day of the month of the Yellow Sun, is also very interesting. It is exactly the month position of the 23rd of October 747 BC, the day, when the 260 day maize period came to an end. Surely, we also know this month position from the very last day of the 5200 year old era of the Long Count, which ended on the 23rd of December 2012, which fell on the Maya date 13.0.0.0.0. 4 Ajaw 3 K´ank´in.

Incidentally, now that we know when the Maya invented their famous Long Count, we also know when the Maya invented the concept of cero. The Long Count works with a positional system. Any positional system, however, requires the concept of cero. Therefore it is clear that the Maya knew the cero at least since the year 747 before Christ.

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[i] The Maya words are written in modern spelling.

[ii] The astronomical program does not work with the expression "Before Christ". The year 747 BC corresponds mathematically to the year "minus 746".

[iii] Occasionally we find inscriptions where the month coefficient is reduced by 1. This is not always a mistake, but might be an indication that the event took place in the afternoon. In North-West-Yucatan this spelling became standard in the Late Classic.