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Published: 1906
Source: Project Gutenberg
Edition: The University press, Cambridge, 1906
1906



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It has long been well known that the Mexican numeration is vigesimal, and, as far as I know, there is no proof that it was ever used in the calculation of long reaches of time. The Cakchiquel numeration is also vigesimal, and Brinton states (Maya Chronicles, p. 44) that the Maya numeration is also vigesimal, giving

20 units = one kal = 20
20 kal = one bak = 400
20 bak = one pic = 8000
20 pic = one calab = 160000, etc.

But this Maya system is never used in connection with days. Wherever a long number of days is referred to, we find invariably the following system in use:

20 units = one of the second term
18 of the second term = one of the third term
20 of the third term = one of the fourth term
20 of the fourth term = one of the fifth term.

And this system is, as far as we know, used for nothing else but for reckoning days. The only difference between the first system and the second is that in the first system twenty of the second term equal one of the third, while in the second system eighteen of the second

equal one of the third. This difference is, of course, essential, and it seems most probable that the change was introduced in order to bring the third term as near the length of the year as possible, and to conform the day numeration to the number of days and months in the year.

Professor Cyrus Thomas is unwilling to see in this anything more than the counters by which to count the days, and denies to it the name of a calendar; but as the system of day numeration is different from the usual system, and is used only for counting days, and as this system counts forward in almost every case in the inscriptions, and in a majority of cases in the Dresden Codex, from a fixed date, 4 Ahau 8 Cumhu, it seems impossible to see any difference between it and a calendar system.

It was certainly to be hoped that the designations which Dr. Seler gave to these Maya periods of time in his "Die Monumente von Copan, etc.,"[1] would have been accepted by Americanists, especially since very good reasons were given by Seler for their adoption. But this view does not meet the approval of Dr. Förstemann or Dr. Thomas. The latter in his "Maya Calendar, Part II.," published in the "Report of the Bureau of American Ethnology," still calls the period of 20 days a chuen and that of 360 days an ahau, while the former in his article on "Die Lage der Ahaus bei den Mayas," published in Part I. of the 1904 issue of the "Zeitschrift für Ethnologie," makes the following statement: "The katun has also been supposed to be 24 × 365 = 8760 days long (and I held this view for a long time), indeed the long period of 52 × 365 = 18,980 days is also occasionally designated with the word, while the sixth multiple of this member or 113,800 is called an ahaukatun." He uses the terms "day," "uinal," and "ahau" for the periods of 1, 20, and 7200 days respectively.

[1] See Seler, "Gesammelte Abhandlungen zur Amerikanischen Sprach- und Alterthumskunde," Vol. I. p. 722.

Such statements from such learned scholars must attract attention, especially as it is not the first time that they have made similar statements. If they give a correct statement of facts, it shows that the system of the Maya numeration or calendar was in a woful condition, as far as its nomenclature was concerned. It will be well,

therefore, to take up this question of nomenclature anew. In all matters of this kind it is wise, while giving due value to the views of later writers, to place the most dependence for the solution of such questions upon contemporary or nearly contemporary evidence.

And where is such evidence to be found? Though there are several Spanish writers who lived in the sixteenth century who have written on the Nahuas, Bishop Landa is the earliest Spanish authority who has dealt with Maya customs and history. And the only Maya authorities of an early date that the student has access to are the papers contained in Brinton's Maya Chronicles, the principal of which are the Books of Chilan Balam, which Dr. Brinton declares "to constitute about all that remains to us ... of the ancient history of the peninsula" as far as he knows. Yet, in making objection to certain views of Dr. Seler, Dr. Förstemann says, "It is based on certain statements in the Books of Chilan Balam, a very dubious source according to Seler's own assertion." I am at a loss to know why such sweeping condemnation should be made of these books, for though the copies from which Dr. Brinton quotes may not be very old, these copies hand down to us records which must be of very great age. Dr. Förstemann himself quotes from them with approval, and it is certain that whatever may be their historical value, the evidence which they give incidentally cannot fail to be of great value. This evidence will, I think, prove—

First, that the period of 20 times 360 days was called a katun and not an ahau.

Second, that each of the constituent parts of a katun was called a tun.

Third, that no such period of time as an ahaukatun is mentioned in the Books of Chilan Balam.

The first assertion may seem difficult to prove when in far the larger number of cases where a separate katun is mentioned in the Books of Chilan Balam the word "ahau" seems to be substituted for "katun." This is true in all five of the Books of Chilan Balam published by Brinton. But the reason of this is very evident, for it will be seen by a careful perusal that the word "ahaus" is never used when katuns in general are spoken of, and that whenever the word "ahau" is apparently given as a synonym of "katun," it is merely the name of a

particular katun and it always has a number attached to it and this number is the number of the day ahau with which a given katun ended. Further, this number is never an ordinal number, as translated by Brinton, but a cardinal number. Therefore 1, 2, 3, 4, 5, 6, etc. should be substituted in Brinton's translation for 1st, 2d, 3d, 4th, 5th, 6th, etc., and in the quotations from Brinton this substitution is made.

It may be here stated that the inscriptions all show that where an even uinal is given (and therefore where an even tun, katun, or cycle is given) the day is Ahau. If then it was desirable to distinguish the katuns from each other, two methods could be used: either count them numerically, 1, 2, 3, 4, etc., or name them from the day Ahau with which the preceding katun had ended. The former method is found in the inscriptions and the Dresden Codex, the latter in the Books of Chilan Balam. The second method would not be possible if each katun ended with the same numbered ahau. But 7200 is not divisible by 13 without a remainder, but equals $13 \times 553 + 11$. If then a particular katun ended with 13 Ahau, the next would end with Ahau, but the number attached to Ahau would be 13 + 11, or, deducting thirteens, 11. The next katun would end with 9, the next with 7, and so on. The katuns then would be known as katuns, 13 Ahau, 11 Ahau, 9 Ahau, 7 Ahau, 5 Ahau, 3 Ahau, 1 Ahau, 12 Ahau, 10 Ahau, 8 Ahau, 6 Ahau, 4 Ahau, 2 Ahau, 13 Ahau, etc.

Taking up, therefore, No. I. of the Books of Chilan Balam, published by Brinton—that of Mani—we find in the paragraph numbered 1 by Brinton "This is the arrangement of the katuns" not "of the ahaus," and in paragraph numbered 2 "Four katuns had passed, etc." not "four ahaus." This is followed by the statement "When they set out for this country, it was Ahau 8," not "the 8th Ahau." And then follows "6 Ahau, 4 Ahau, 2 Ahau, fourscore years and one year, for it was Tun 1, 13 Ahau when, etc." That 6 Ahau, 4 Ahau, 2 Ahau refer to the katuns is very clear, and that 4 katuns with the names 8 Ahau, 6 Ahau, 4 Ahau, and 2 Ahau are called fourscore years is equally clear. In paragraph 4 we have "4 Ahau, 2 Ahau, 13 Ahau—threescore years they ruled Ziyan caan, etc." Here three katuns are called threescore years.

This would seem to show that the katuns called 4 Ahau, 2 Ahau, 13 Ahau, were each equal to a score of years of 365 days each. When, however, we try to account for the numbering of the katuns on this basis, we find that the numbers of the ahaus ending each katun would come in the following order: 11. 5. 12. 6. 13. 7. 1. 8. 2. 9. 3. 10. 4. 11, etc., while the real order is given in the books as 11. 9. 7. 5. 3. 1. 12. 10. 8. 6. 4. 2. 13, etc. If the word "haab" or the Spanish "años,"[2] which occurs in paragraph 3, is taken literally, there would seem to be no explanation of this difficulty; but if we consider that these books used these words as we often use them now as meaning approximately "years," and if we substitute the third term of the numeral series as found in the codices for the word "years"—in other words, if we substitute 360 for 365—we find then that the katuns or scores of 360 days will end with a day Ahau with the numbers 11. 9. 7. 5. 3. 1. 12. 10, etc., as has been said and as given in the Books of Chilan Balam. This has been shown by Seler, Goodman, and others. [2] It is very probable that "años" is merely a gloss—and an erroneous one at that.

It will then be a good working theory that the score of 360 days is called a katun, and that each katun is distinguished by the name of an ahau with its proper number, with which a katun ended. That the ahau and its number are merely the name of the katun and not the katun itself is shown in No. 5 of Brinton's Books of Chilan Balam,—the Book of Chumayel. Here in paragraph 1 we have "4 Ahau was the name of the katun," in paragraph 3 "4 Ahau was the name of the katun," and in paragraph 7 "11 Ahau was the name of the katun." To say that "ahau" was a synonym for "katun" would be as foolish as to say of a family containing John Smith, Mary Smith, and James Smith, that John and Mary and James were all synonyms of Smith, when they were merely names to distinguish one Smith from another.

This is also shown in the Book of Mani (pp. 96 et seq. of Brinton's "Maya Chronicles"), where

Par. 8 says "Lai u katunil cabil ahau," "In the katun 2 Ahau."
" 9 says "Lai u katunil buluc ahau," "In the katun 11 Ahau."
" 10 says "Laili u katunil uaxac ahau," "In the katun 8 Ahau."

” 12 says “lay u katunil uac ahau,” “In the katun 6 Ahau.”
” 15 says “u katunil ho ahau,” “In the katun 5 Ahau.”
Also in the Book of Tizimin (pp. 139 et seq. of Brinton):
Par. 6, “Uaxac ahau—lay u katunil,” “8 Ahau—in this katun.”
” 14, “Bolon ahau—lai—u katunil,” “9 Ahau—in this katun.”
” 15, “Vuc ahau—u katunil,” “7 Ahau—in this katun.”
Also in the first Book of Chumayel (pp. 154 et seq. of Brinton):
Par. 2, “Uaxac ahau—layli u katunil,” “8 Ahau—in this katun.”
” 8, “Bolon ahau—u katunil,” “9 Ahau—in this katun.”
Also in the second Book of Chumayel (pp. 166 et seq. of Brinton):
Par. 3, “Uaxac ahau u katunil,” “8 Ahau in this katun.”
“laix u katunil,” “in this katun.”
” 5, “Hun ahau—lay u katunil,” “1 Ahau—in this katun.”
” 8, “Buluc ahau—laix u katunil,” “11 Ahau—in this katun.”
“Buluc ahau. Laix u katunil,” “11 Ahau in this katun.”
” 9, “Bolon ahau—lay katun,” “9 Ahau—in this katun.”
“Uac Ahau—lay u katunil,” “6 Ahau—in this katun.”

I can find no excuse for considering “ahau” as a synonym for “katun” in these Books of Chilan Balam. And *a priori* it is difficult to conceive of a numeral system being made up by a nation as cultivated as the Mayas, by which the name of a day should be taken to mean a period of time, with all the chances of error which might arise from such use. Moreover, if this were the case, it would be natural to suppose that in the inscriptions and codices the day sign ahau might be found meaning 7200 days, and yet I am unaware that a single instance of this exists on the monuments or in the codices. There are one or two cases in the inscriptions where this has been suggested as being possible, but it is very far from being proved or from even having strong evidence in favor of such an explanation.

Dr. Förstemann says that at times the name “katun” was given to the period of 18,980 days; but the only authority for this use is, as far as I know, Pio Perez, who says that some applied the name to a “lustre of 4 years,” while others thought that “13 years completed the katun.”[3] Again Pio Perez speaks of “the cycle of 52 years called by the Indians katun.” In none of these cases is any authority given for this use.[4]

[3] Stephens, “Travels in Yucatan,” Appendix, p. 439.

[4] Ibid., p. 440.

It is probably safe to say that any use of the word “ahau” as meaning a katun, or any use of the word “katun” as meaning anything but 20 times 360 days, or any use of the day symbol ahau as meaning a period of time, does not occur in any evidence which could be called contemporary or even approximately so. Don Pio Perez is, I fear, the only author who can be cited for the other side, and his opinion, though worthy of being listened to, is not to be relied upon without the support of, or against the evidence of, early authorities.

The second question as to the name to be given to the period of 360 days must be decided by the same authority.

We have found that a katun is probably a score of periods of 360 days each, and it would be natural to suppose that the constituent parts of the katun, as mentioned in the Books of Chilan Balam, would be these periods of 360 days, but of this there is no absolute proof in the Books of Chilan Balam. The proof of this, however, is so strong in the Dresden Codex, where the series runs, 20 of the first order equals 1 of the second order, 18 of the second order equals 1 of the third order, and 20 of the third order equals 1 of the fourth, that no time need be wasted upon this part of the question. We do know, however, that each of these constituent parts is called a tun and that they are numbered as high as 13.

The following list gives, I think, all the cases where the word “tun” is used in the Books of Chilan Balam:

Book of Mani, paragraph 2, “Hun piztun oxlahun ahau,” which Brinton translates “the first year of the thirteenth ahau.” I think the proper translation to be “Tun 1 of Ahau 13,” meaning that 1 tun had passed of Katun 13 Ahau.

Paragraph 9, “tu lahun tun uaxac ahau” is translated by Brinton, “and it was the tenth year of the eighth ahau,” while it should be “in Tun 10 of Katun 8 Ahau.”

In the Book of Tizimin we find that in

Paragraph 1, “tu humpiztun ahoxlahunahau” is translated “to the first year of the thirteenth ahau,” while it should be “to (or in) Tun 1 of Katun 13 Ahau.”

Paragraph 11, “Cabil ahau; oxlahun tun” is translated “The second ahau; on the thirteenth, etc.” It should be “on Katun 2 Ahau Tun 13, etc.”

Also in the second Book of Chumayel, we find in

Paragraph 2, “tu yoxpiztun ychil hun ahau,” which is translated “on the third year in the first ahau,” when it should be “in Tun 3 of Katun 1 Ahau.”

Paragraph 3, “Tu uucpiztun uaxac ahau u katunil” is translated “in the seventh year of the eight Ahau katun,” when it should be “in Tun 7 of Katun 8 Ahau.”

Paragraph 8, “tu hunpiztun Buluc ahau. Laix u katunil” is translated “in the first year of the eleventh ahau, it was also in this katun,” when it should be “on Tun 1 of Katun 11 Ahau. In this Katun, etc.” Also “tu uucpiztun Buluc ahau u katunil” is translated “in the seventh year of the eleventh ahau katun,” when it should be “in Tun 7 of Katun 11 Ahau.”

These two katuns are evidently the same—one date being in Tun 1 and the other in Tun 7 of the same katun—and yet Brinton translated the first as being in the 11th katun and the other as being in the 11th ahau katun.

Paragraph 9, “tu uacpiztun ychil ahBolon ahau katun lae.” is translated “in the sixth year of the ninth ahau katun.” It should be “in Tun 6 of Katun 9 Ahau.”

Although Brinton has almost always translated “tun” by “year,” it is very evident from the above that the Mayas called the native division of the katun “tun.”

It may further be noted that the word “kin” is used for day in the way of numeration in the Book of Mani, paragraph 13, “9 Imix was the day on which Ahpula died” and in paragraph 13 of the Book of Tizimin and paragraph 7 of the first Book of Chumayel, the same statement is made.

May it not then be fairly assumed that the Mayas called the day or the unit of their calendrical numeration “kin,” their 360-day period “tun,” and the period of 20 tuns “katun,” as Dr. Seler has suggested?

The third question is as to the so-called period of “ahau katun.” I give below all the cases in which Brinton has used the word, and in all but one of them the Maya has “ahau u katunil”; and in one case

Brinton has translated a sentence as “it was the eleventh ahau katun,” while exactly similar phrases (with the exception of the number) have been translated by him as “4 Ahau was the name of the katun.” In the phrase in paragraph 9 of the second Book of Chumayel, where “ah Bolon ahau katun” appears, the whole context makes it evident that a katun and not an ahau katun, if there was such a period, is meant. The paragraph says “9 Ahau; no stone was taken at this time; in this katun came the Bishop Brother Francisco Toral; he arrived in Tun 6 of Katun 9 Ahau”; and yet Brinton makes it read in the first clause that while Bishop Toral came in a katun called 9 Ahau, he “arrived in Tun 6” of the “ninth Ahau katun.”

Dr. Tozzer, whose knowledge of the Maya languages, gained in long residence among the Maya Indians of Yucatan and Chiapas, enables him to speak with authority, writes me as follows: “The form u katunil of ahau ukatunil, for example,” in paragraph 3 of the second Book of Chumayel, p. 167, “is probably possessive, and it would then be literally ‘the Ahau 8, its Katun’ (the Ahau’s Katun) which might strengthen the point against joining the two together as Ahaukatun.”

In the second Book of Chumayel, p. 167, paragraph 3, “uucpiztun uaxac ahau u katunil; laix u katunil, etc.” Brinton translates “in the 7th year of the 8th Ahau katun, in this katun, etc.” There is no authority for translating ahau u katunil “ahau katun.” It should be “In Tun 7 of Katun 8 Ahau, in this katun, etc.,” or, as suggested by Dr. Tozzer, “In Tun 7 of Ahau eight’s Katun.”

Again, in paragraph 5, the translation of “Hun ahau—tu hunpiztun ychil hun ahau u katunile” is given, “The first ahau—in the first year of the first ahau katun.” It should be “1 Ahau—in Tun 1 of the Katun 1 Ahau, &c.”

Again, in paragraph 8 “tu uucpiztun Buluc Ahau u katunil” is translated “in the seventh year of the eleventh ahau katun,” when it should be “in Tun 7 of Katun 11 Ahau.” Just above “Tun 1 of 11 Ahau” is given and followed by “in this katun.”

Again in paragraph 9 we read “Bolon Ahau—lay katun yax ulci obispo Fray Fran’co to Ral huli tu uacpiztun ychil ahBolon ahau katun lae,” which Brinton translates “The ninth ahau—in this katun first came the bishop Brother Francisco Toral; he arrived in the sixth year of the ninth ahau katun.” It should be “9 Ahau—in this katun—in

Tun 6 of Katun 9 Ahau." This is the only place in the Maya where the words "ahau katun" appear together. But the context makes it clear that "ahau katun" is not a period of time. The paragraph begins with "9 Ahau," and speaks of it as a katun during which Bishop Toral arrived, and then proceeds to say that he arrived in Tun 6 of this "ahBolon ahau katun," which can mean nothing else than the "Katun 9 Ahau."

In the third Book of Chumayel, paragraphs 5 and 6, Brinton translates "Can ahau u katunil" as "The fourth ahau katun" instead of "Katun 4 Ahau."

In paragraph 7 "Uaxac ahau u katunil" is translated "The eighth ahau katun" instead of "Katun 8 Ahau" (note here that this is the same "8 Ahau," when Chichen Itza was deserted for Champoton).

Also "Oxlahun ahau u katunil" is translated "In the thirteenth ahau katun" instead of "Katun 13 Ahau."

Also "Buluc ahau u kaba u katunil" is here translated "it was the eleventh ahau katun," while in paragraph 3 a similar sentence is translated "4 Ahau was the name of the katun."

Thus an ahau katun is not mentioned in the Books of Chilan Balam in spite of Brinton's translation, and neither is it mentioned by Landa, in spite of Brasseur de Bourbourg's insertions. In fact the only evidence of it is the assertion of Don Pio Perez. I do not mean to say that the period of 6 × 52 years = 312 years may not have had a name, nor that "ahau katun" may not be the name of some period, but so far we have no trustworthy contemporary evidence of either of these statements.

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