KAZAKH NATIONAL CALENDAR

By Kaldarhan A. Kambar

Introduction

If I start, without preparation, hurrying to immediately explain to a Western audience something completely new to them, about the everyday calendars and chronological systems of the ancient nomads of Central Asia, this will inevitably lead to misunderstanding. Worse, for the Western audience it may seem that all this is a concocted story of one person named Kaldarkhan Kambar, based on wishful thinking. This has already been my experience. If I am not mistaken, the British love to express such a moment of life with the words "the moment of truth has come." In such moments, the Kazakhs calmly say “Auzhy kuygen urlep ishedi” – “Those who once burned their mouths with hot soup will be cautious next time.”

How did it all start? In 1997, I spoke to an American woman named Hilda Aizen. With a grant from Japan, she studied the ethnography of the southern Kazakhs. It turns out that she lived for several months in my native village Shaulder and learned the Kazakh language. When she found out that I was from Shaulder, her first question was “Ne elsin?” – “Which tribe are you from?” From surprise, my eyes nearly popped out. Usually this question is asked only by Kazakhs to each other. How not to be surprised if an American woman asks the same question to you? I replied "Konyrattyn ishindegi – Mangytai" – “I am from the Mangytai clan of the Konyrat tribe.” And then she opened her notebook and began to explain to me from where the Mangytai-Konyrat originated. I listened to her attentively and at the same time thought “Aha, so that’s what Europeans are interested in”.

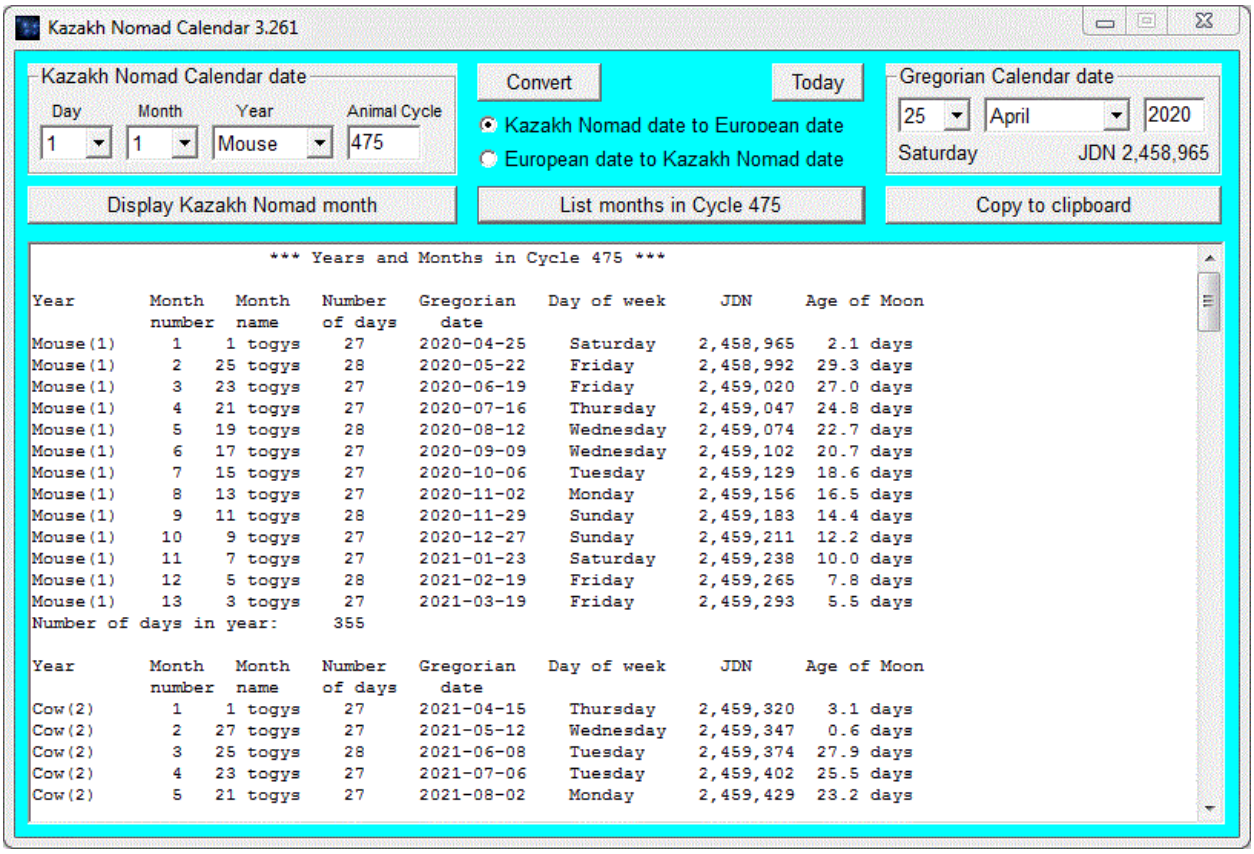
Up to that time, I thought that the Kazakh calendar of the nomads is of interest only to the Kazakhs. From that moment I began to look for Europeans who are interested in the "Kazakh nomad calendar" (*Togys esebi*). In 2008 I accidentally found the calendar forum CALNDR-L at the University of North Carolina (USA). In this forum, I met Karl Palmen, Peter Meyer and others. When I started explaining to them right away and talking about the calendar “Togys esebi” and other calendars, at first they could not understand.

The more deeply I studied Togys esebi, the more I began to notice similarities with the Mayan Calendar. Then I wrote an article entitled “A New Look at the Modern Codification of the Mayan Calendar”. My article was edited by Karl Palmen (to whom many thanks) and he wrote an abstract for it. And only at this time did he, for the first time, pay attention to the “Kazakh calendar of nomads” (*Togys esebi*). He then drew the attention of his colleague Peter Meyer to my article. After reading my article, Peter published it on his website [1a]*, and later I published it on the Academia.edu website where it has been viewed over 100 times.

After much further discussion with Peter about the Kazakh nomad calendar (Togys esebi), with many misunderstandings due to my almost total ignorance of the English language, he finally managed to develop Windows software for conversion between Togys esebi dates and dates in the Gregorian Calendar (Figure 1). [1b]*

Endnote references are in square brackets **[].*

Figure 1 Screenshot of the "Kazakh Nomad Calendar" date conversion software



*** Years and Months in Cycle 475 ***

Year	Month number	Month name	Number of days	Gregorian date	Day of week	JDN	Age of Moon
Mouse(1)	1	1 togys	27	2020-04-25	Saturday	2,458,965	2.1 days
Mouse(1)	2	25 togys	28	2020-05-22	Friday	2,458,992	29.3 days
Mouse(1)	3	23 togys	27	2020-06-19	Friday	2,459,020	27.0 days
Mouse(1)	4	21 togys	27	2020-07-16	Thursday	2,459,047	24.8 days
Mouse(1)	5	19 togys	28	2020-08-12	Wednesday	2,459,074	22.7 days
Mouse(1)	6	17 togys	27	2020-09-09	Wednesday	2,459,102	20.7 days
Mouse(1)	7	15 togys	27	2020-10-06	Tuesday	2,459,129	18.6 days
Mouse(1)	8	13 togys	27	2020-11-02	Monday	2,459,156	16.5 days
Mouse(1)	9	11 togys	28	2020-11-29	Sunday	2,459,183	14.4 days
Mouse(1)	10	9 togys	27	2020-12-27	Sunday	2,459,211	12.2 days
Mouse(1)	11	7 togys	27	2021-01-23	Saturday	2,459,238	10.0 days
Mouse(1)	12	5 togys	28	2021-02-19	Friday	2,459,265	7.8 days
Mouse(1)	13	3 togys	27	2021-03-19	Friday	2,459,293	5.5 days
Number of days in year:			355				

Year	Month number	Month name	Number of days	Gregorian date	Day of week	JDN	Age of Moon
Cow(2)	1	1 togys	27	2021-04-15	Thursday	2,459,320	3.1 days
Cow(2)	2	27 togys	27	2021-05-12	Wednesday	2,459,347	0.6 days
Cow(2)	3	25 togys	28	2021-06-08	Tuesday	2,459,374	27.9 days
Cow(2)	4	23 togys	27	2021-07-06	Tuesday	2,459,402	25.5 days
Cow(2)	5	21 togys	27	2021-08-02	Monday	2,459,429	23.2 days

At this time Peter is the only other scientist who is well versed in the structures and principles of Togys esebi. His work will greatly help the Western audience in the correct understanding of this calendar. However, Peter's explanation on his website at https://www.hermetic.ch/ of Togys esebi lacks many details, which is certainly not his fault, and it is the purpose of this article to reveal those details and to to make them available for the first time to a Western audience.

I also wish to thank Peter for editing this article (which was originally written in Russian and then machine-translated into English, with many infelicitous renderings) and for preparing it for publication.

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PART 1: ANCIENT NOMAD CALENDARS

Preface

The book of the Kazakh researcher Kaldarkhan A. Kambar, *The Kazakh National Calendar* [1], allows one to realize and appreciate the enormous contribution that nomadic civilizations made to the development of astronomical science and the calendar.

Sometimes we do not fully realize that the peoples of vast Eurasia have enjoyed these achievements for many centuries and even millennia.

World history, developed by Western historians and clerics, has not allowed many people to fully appreciate and understand this contribution.

Only today, thanks to gaining independence from the colonial yoke, there begins a true understanding of the astronomical achievements of the nomads of Central Asia and Kazakhstan, which took place not only in these vast spaces of Eurasia, but also on both continents of America.

This is not an exaggeration. How else to explain the similarity of some words and calendars of Eurasia (nomads) and America (Mayan-Aztecs) .

The relevance of studying the calendars of nomads as a historical phenomenon is primarily related to the need to understand the emergence of advanced scientific knowledge in the framework of individual civilizations and at the level of intercivilizational interactions with other regions of the world.

In this regard, the study of the theory and scientific practice of using calendars of nomads allows us to more deeply understand the mechanisms of internal and external achievements in this field of science.

The popular scientific aspect of the relevance of this topic is augmented by the latest information on the development of astronomy and the types of calendars in the nomadic community.

The Mystery of the Calendar of the Nomads is Known Only to the Nomads

For observers on the ground it is very difficult to track the exact time when the Moon covers the Pleiades. These observations are complex for astronomical and meteorological reasons. Nevertheless, the nomads of Central Asia and the Kazakhs not only observed this phenomenon, but also created a unique calendar called “Togis esebi”. During 1985-2018 the author of this article tried to understand not only Togys esebi but also other calendars of his ancestors, that is, the nomads of Central Asia. It turned out to be a very complex and confusing topic from “A” to “Z”, which took a lifetime in the literal sense of the word. In his book *The Kazakh National Calendar* [1], the author tried to describe this topic to the smallest detail. However, it is certain that in time more and more new questions will arise.

Excerpts and principles of the basic calendars of the Kazakhs (namely, *Urker Esebi*, *Zhuldyz Esebi* and *Togys Esebi*), which have been handed down orally and from generation to generation for many millennia, have reached the current

computer-using generation only verbally and in very poor condition. Despite this, compared to the forgotten Mayan and Aztec Calendars, the basic calendars of the Kazakhs are more successful in the sense that the descendants of those Kazakhs who knew by heart the subtleties of their folk culture and calendar, live in the 21st century. These calendars were not preserved on paper, which could be destroyed by fire [2] [3] [4] [5], rather they were preserved in the deep consciousness of the nomads.

I think that in comparison with Western researchers studying the calendar of disappeared civilizations, I had some advantages. Firstly, I am a descendant of nomads who, from ancient times, lived in the endless deserts of Kyzylkum (Southern Kazakhstan), and I often visited these lands of my ancestors. And also important is the fact that in my youth I often saddled camels and horses to graze cattle, and at night looked at the mighty starry sky from the dome of the yurt (*kyiz ui* – house of felt). [6] In a word, I grew up among the topic I later researched and knew everything from the inside.

Secondly, I know my native Kazakh language not from distorted translations of researchers, but from the original, from which all our nomadic history, culture, literature and, of course, the calendar are felt.

Thirdly, the village in which I lived was not far from the vast ruins of ancient cities such as Otyrar-Farab (GPS: 42°51'9.04"N 68°18'12.09"E) [7] and the native city of the great scholar Abu Nasir al-Farabi (known in the West as Alfarabius, 872-950). The old bricks from this fortress, which were destroyed in the 13th century by the Great Genghis Khan, constantly made me feel the breath of time and inspired me even more to go on new searches.

Like many of my peers, since childhood I strove for knowledge, like our great compatriot al-Farabi, and to my happiness during the time of the USSR I received excellent training both at school (1970-1980) and at university (1985-1990).

In addition, my father, Aliseit Kambaruly, the grandson of Baikabil-kazhi (1922-2003), was a man who survived the great famine of 1930-1933 in the Kazakh steppes, in which 38% of Kazakhstan's population died (1.3 million Kazakhs) [8] [9] and he was one of the few surviving soldiers in the Great Patriotic War of 1941-1945.

It is gratifying that my father knew very well the lunar sidereal calendar of the nomads "Togys esebi" and, in parallel, also the Gregorian Calendar. Seeing my desire to learn the ancient calendars of my ancestors, he willingly told me what he himself knew and what his nomadic ancestors knew about it. [10] When my father first showed me the full occultation of the Moon and the Pleiades, I was only 9 years old (GPS: 42°47'18,25"N 68°21'19,93"E, SkyMap Online Stellarium-0.18.2, 18.12.1972, UTC 17:54 +06:00 Shaulder 23:54). What I saw in the sky that night left a deep impression on my soul for life.

My mother, Apazhan Saduakaskyzy (1929-2002), the daughter of a national poet and writer known in the district, graduated from the Shymkent Pedagogical Institute in Mathematics. Over time, she invented her "math", simplifying modern complex mathematics to my childish level. This knowledge of mathematics has been useful to me in my life, and also in my research. The various interesting equations presented in this article are the fruit of my mother's mathematics, which she coined and instilled into me in childhood.

When I seriously began to study the topic of the calendar of the Kazakhs and wrote my first book, "Uakyt Kerueni" (*Time Caravan*), in 1988, my reviewer was the famous Kazakh professor Akzhan Zhaksybekuly al-Mashani (1906-1997). He was an expert not only in geodetic measurements, but in the field of the history of the Kazakh calendars. [11]

All of these and other factors that occurred in my life eventually led me to carefully study and write a book, to which I devoted my whole life.

Part 1, Section 1: "ESEPSHI" AND "AMAL" – ONE WHOLE CONCEPT

1. Who are “Esepshi”?

The calendar cycles (day, month and year) are structured in such a way as to better follow the corresponding astronomical cycles: 1. Daily [day and night] rotation of the Earth around its axis with a period of a solar day. 2. Irregular movement of the moon around the earth [month]. 3. Uneven motion of the Earth around the Sun [year]. Problems arising from the listed astronomical cycles are resolved in calendar cycles by using the rules of intercalation (from Latin, intercalate – attachment, inset). To correspond to the length of a sidereal or synodic month or a tropical year, periodically days and months are added to the calendar year. For example, in order to coordinate the lunar cycles with the solar year, the nomads in certain years in the calendar "Togys eseby" introduced an additional sidereal month.

In any calendar system, the correct calculation of days and weeks, as well as their correspondence to the lunar month or the solar year, depends on the correct application of the rules of intercalation. Not everyone can understand these complex rules. This requires deep knowledge of astronomy, mathematics and other related disciplines.

Among the nomads were some quite talented people. The Kazakh people called them "Esepshi". This word can be translated as "timekeeper" or as "priest, wizard, sorcerer, sage, dream interpreter, astronomer, astrologer" in one person.

All Esepshi, without exception, always carried with them a small leather bag, called "Kise", hanging on the right side of their belt. Therefore, the common people said, "Esepshi keeps all secrets in his Kise". The "Kise" was a folded fabric, divided into two parts. On the white side of the fabric (symbolizing spring and summer) were pockets (symbolizing days) sewn from black fabric. The pockets were arranged vertically (9 and 1 pocket) and horizontally (18 and 1 row). On the black side of the fabric (symbolizing autumn and winter) were pockets (symbolizing days), sewn from white fabric. Pockets were located vertically (9 and 1 pocket) and horizontally (18 and 1 row) as the other side of the "Kise", as shown in Figure 2. [12] In “Kise”, not only days, months and years were counted, but also the 24-hour day/night itself, by dividing day and night into 18 parts (24 hours ÷ 18 “mezgil” = 1, 33 hours or 1 hour 20 minutes).

Figure 2 Approximate scheme "Kise" – a leather bag used by Esepshi for counting days, months and years

1) White side (spring-summer)

	1	2	3	4		1	2	3	4		1	2	3	4		1	2	3	4		1	2
1	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
2	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
3	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
4	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
5	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
6	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
7	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
8	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
9	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O
10	O	O	O	O		O	O	O	O		O	O	O	O		O	O	O	O		O	O

2) Black side (autumn-winter)

	3	4		1	2	3	4		1	2	3	4		1	2	3	4		1	2	3	4
1	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
2	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
3	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
4	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
5	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
6	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
7	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
8	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
9	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙
10	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙

3) Box 5-6 "konak-guest" of days (winter-spring) "Kise

⊙ 1 konak	⊙ 2 konak	⊙ 3 konak	⊙ 4 konak	⊙ 5 konak	⊙ 6 konak

Note: One of the original “Kise” was miraculously preserved in the Kyzylorda region, the Aral district, the village of Tokabay, among the descendants of Esepshi Ernazarov Sagyndyk.

"Kise" was used in accordance with the structure of the chosen calendar, for example "Togys esebi" (Calculation of coverage [occultation]), "Togiz tarmak" (Nine offshoot), "Ush Bunak" (Three Segment Calendar), etc.

The name of the time intervals of day and night, “mezgil” in the Kazakh language, is closely related to the phases of the Moon covering the Pleiades (*Aydin Urkermen togysuy*) during the year. It is worth noting that these eighteen moments, mezgil, of the day and night fully correspond to that moment of the day and night, when the Moon in a certain phase covered the Pleiades.

At the same time, this proves that not only Esepshi, but also the main part of the Kazakh people knew about these periods of time and knew how to determine exactly in which part of the day and night the Moon covers the Pleiades (*Aydin Urkermen togysuy*).

The name of the time intervals of day and night (in Kazakh called "mezgil" or "shak") in the Kazakh language are:

1. "Tan kylan beru" – a glimpse of the morning dawn
2. "Tanga zhuyk", "Tan aldy" – the advance of the morning dawn
3. "Tan atu" – the dawn or the coming of the morning
4. "Kun shygu" – the sunrise
5. "Kun arkan boyi koterilu" – the sun at the height of the rope
6. "Saske" – morning hours (8-9 hours of the day)
7. "Saske tus", "Zhalgan tus" – midday clock (10-11 hours of the day)
8. “Tal tus”, “Kun tobege kelu” – noon when the sun is overhead (12 o'clock in the afternoon);
9. "Tus kaytu", "Tus aua" – time after noon (13-14 hours of the day);
10. "Cunnin enkeyui" – the sun is inclined to the west (15-16 hours of the day);
11. "Kunnin zambaska kelui" – the sun approaches the western horizon (17-18 hours of the day);
12. "Aksham", "Cunnin uyasyna enui", "Cunnin batuy" – sunset

13. "Inir uyirilu" – the coming of the evening
14. "Inir karangysy tusui", "Kas karayu" – the arrival of evening darkness
15. "Tunnin tusui" – nightfall, the approach of the night
16. "Tun ortasy" – midnight
17. "Tun ortasy aua" – after midnight
18. "Tan karangysy tusu" – a short dark time before dawn

The time of the onset of these periods depends on the time of the year, on the duration of the day and night in spring, summer, autumn and winter. Each time interval is approximately one to one and a half hours. [13]

2. What is "Amal"?

In previous centuries, when the Kazakhs uttered the word "Esepshi", after it followed another word "Amal." For example, "Esepshinin amaly". These are subconscious, automatically expressed words developed by centuries. In a word, it is impossible to separate these words and use them separately. They eventually merged with each other.

It is not difficult to guess that the definition of “Amal”, which I write for an English-speaking audience, will be perceived as an exotic rarity, but for nomads the ancient rules of “Amal” were a vital necessity.

Some researchers claim that the word "Amal" originated in connection with the name of the month "Nauryz" (March) in the Arabic language "Hamal". This is absolutely not acorrect. “Amal” is originally a Kazakh word, it literally translates as “ingenuity, resourceful technique, method, cunning, trick”.

The nomads were always in the steppes. Therefore, compared to urban residents, they felt the rhythms of nature much better. From time immemorial, nomads began to regard time as “short periods” or so-called “Amal esebi”. “Amal esebi” should not be regarded as an unknown calendar unit. In the literal sense of the word “Amal esebi” means “calculate the time for short periods in which the weather changes in the local climate”. Amal is a period of time from 3-5 to 7-9 days.

Modern science with precise tools and computers is only now approaching the knowledge of Esepshi and the nomads that they knew thousands of years ago. We will cite only one quotation from such a scientific work:

> As is clear from Fig. 1, where the computed tidal fluctuations of the Earth rotation velocity ν (nu) are given for 2012, four regimes of the Earth rotation with the unequal duration change during the lunar month: Two periods of acceleration with the duration m1 and m3 and two periods of deceleration m2 and m4.The change of regimes takes place in $m \approx 27.3/4 = 6.8$ days on average. However, due to the slow movement of the perigee and nodes of the lunar orbit, this period varies from 5 to 9 days. For example, the acceleration was registered from May 2 to May 8, 2012, the deceleration, from May 8 to May 13, the acceleration, from May 13 to May 22, and the deceleration, from May 22 to May 30, i.e., the lunar month was made up of the intervals of 6+5+9+8 days. [14]

In simple language, the nomads call these short periods of 6 + 5 + 9 + 8 (28) days – “Amal”.

At the official level of the country, Amal is described as follows: "Amal is the name and order of weather prediction in popular folk rules related to natural phenomena in the twelve months of each year." [15]

In national numerical concepts, there is a “Zheti amal” (“Seven amal” or “Seven methods”):
1) Kunnin tokyrauy (Summer and winter solstice)
2) Karashanyn kaytuy (First snow in the month of November)
3) Urkerdin batuy (Sunset Pleiades)
4) Muzdyn katuy (First icing)
5) Kiyktin matauy (Antelope mating)

6) Kys toksan (Winter 90 days or toxan [quarter])
7) Ay togamy (Occultation by the Moon) [16]

These are only seven names "Amal", preserved in the memory of the Kazakhs. It is easy to calculate that these names reached approximately “Forty amal” (9 days × 40 amal = 360 days).

The basic calendars of the Kazakhs (*Urker esebi, Zhuldyz esebi and Togys esebi*) are based precisely on these short periods “Amal”. I do not claim, but I assume, that the ancient people (except for nomads) from Europe, the Middle East, East Asia, etc. also knew about these “short periods”. Later, they called these short periods "weeks".

“Week” definition: "A continuous seven-day cycle that runs throughout history paying no attention whatsoever to the phases of the moon [and] was probably first practiced in Judaism, dated to the 6th century BC at the latest". [17]

For example, in the ancient Roman Republican calendar of the Numa Pompilius (who reigned from 715 to 673/672 BC), the year consisted of 355, 377 and 378 days. In my book there is the name 42 “amal” (9 days × 42 “amal” = 378 days), which I collected for 30 years. [1, Part III, Togys esebi, pp. 456-461]

These similarities in calendars gave me the idea that modern science should look at the Roman calendar, the nomad calendar and the Maya-Aztec calendar from another point of view.

In order to understand the purpose and meaning of the ancient calendars, we should not use modern computer technology and devices for decoding. No matter how ridiculous this may seem, we should use only 10 fingers on both hands and 10 toes on both feet.

According to my father, the ancient nomads and modern Kazakhs in everyday life used the 9-day simpler "amal". In turn, the “pure bred” Esepshi used a more complicated “amal” in his calculus, which consists of 9.1 days (9.1 or 9 days 2 hours 24 minutes). The ultimate goal of this complex "amal" Esepshi was to achieve an approximate accuracy of “togys aiy” or sidereal month in 27.3 days (9.1 days × 3 “amal” = 27.3 days). [10]

If one carefully examines the leather bag (the so-called "Kise") of Esepshi again, he notices that the vertical columns consist of 9 days, and at the very bottom of each vertical column there is 1 day separately. As a result, this combination of numbers from the columns can be considered as a number of 10 or 9.1 days.

1st option: 10 days × 18 "amal" = 180 days + 180 days = 360 days + 4-5-6 days "intercalation" = 364-365-366 days

2nd option: 9.1 days × 18 “amal” = 163.8 days + 163.8 days = 327.6 days + 27 days “intercalation” = 354.6 days ÷ 12 months = 29.55 days.

3rd option: 9.1 days × 18 “amal” = 163.8 days + 163.8 days = 327.6 days + 28 days “intercalation” = 355.6 days ÷ 13 months = 27.353 days.

4th option: 9.1 days × 18 "amal" = 163.8 days + 163.8 days = 327.6 days + 37 days* "intercalation" = 364.6 days ÷ 13 months = 28.04 days.

* 37 days – from May 14 to June 19, the Pleiades are not visible in the night sky (*Urker zherge tusti* – Pleiades are beneath the horizon). [18]

It can be assumed that the Kazakh board game "Togyz kumalak" ("Nine pebbles") has a close connection with the leather bag (the "Kise") of Esepshi, as well as with the 9-day "amal" of nomads. [19]

Toguz kumalak ("nine pebbles") is the Kazakh name of a mancala game also known as Toguz korgool ("nine dung balls") in Kyrgyz. The number 'nine' has a high significance in the folk beliefs and mythology of Central Asian peoples. It was considered auspicious. The Kyrgyz once divided the year into 40 “weeks” (one for every Kyrgyz tribe), each with nine days. My guess: Esepshi invented this game, with "Kise" as the basis. (Compare with Figure 2.)

The most interesting thing is that this game is closely related to the numbers – 81 and 82, which correspond to three “togys aiy” or three “sidereal months”:

27 days × 3 month = 81 days
27.33 days × 3 month = 82 days

Goal of the game. You can win in two ways:
• to be a winner, you must collect 82 balls or more for your pot
• leave the opponent without moves in a situation where he has not yet scored 81 balls

If the score between players is 81: 81, a draw is declared.

Using 9 intercalary days in his calculations, Esepshi using the method “Togyz tasil amaly” easily determined the average value of the “togys aiy” or sidereal month in just 20 seconds less than modern science:

27 days × 28 days = 756 days + 9 days = 765 days
765 days ÷ 28 months = 27.3214286 days (Togiz tasil amaly)

1) 9 days ÷ 28 "zhuldyz ai-nakshatra" = 0.3214286 days
2) 0.32142857143 or 7 hours 42 minutes 51.4286 seconds
3) 0.321662 - 0.321429 = 0.000233 days or –0 hour 0 minutes 20.1312 seconds

This simple equality was not the limit of the "arithmetic" of nomads. Esepshi could count up to a million, maybe even up to a billion, using only 21 names of numbers. (Table 1)

Table 1 The name (atau) of 19 digits of the nomads is used to this day without change.

No.	Arabic numerals	Kazakh name	English name
1	0	Zhok (Nol)	Zero
2	1	Bar (Bir)	One
3	2	Eki	Two
4	3	Ush	Three
5	4	Tort	Four
6	5	Bes	Five
7	6	Alty	Six
8	7	Zheti	Seven
9	8	Segiz	Eight
10	9	Togyz	Nine
11	10	On	Ten
12	20	Zhiyrma	Twenty
13	30	Otyz	Thirty
14	40	Kyryk	Forty
15	50	Elu	Fifty
16	60	Alpys	Sixty
17	70	Zhetpis	Seventy
18	80	Seksen	Eighty

19	90	Toksan	Ninety
20	100	Zhuz	Hundred
21	1 000	Myn (Bir myn)	One thousand
	1 000 000	**Myn-Myn**	**Thousand-thousand**
	1 000 000 000	**Myn tumen**	**Thousand tumen**

Surprisingly, the number “21” is present in the "Urker esebi" calendar:

6 + 7 = 13 days × 21 amal = 273 days ÷ 7 days = 39 week
6 + 7 = 13 days × 21 amal = 273 days × 4 years = 1092 days or
7 days × 3 amal = 21 days × 13 months = 273 days × 4 years = 1092 days

Explanation of the names of the digits: 0 (zero) – joq (literally "no"); 1 (one) is a "bar" (literally "is", now called "bir"). For example, when Esepshi said: "joktan bar", this meant – 0.1 (zero whole, one tenth); when Esepshi said: “Myn-myn” (1000 × 1000 = 1,000,000), it meant - “million”, or when he said "myn tumen" (1000 × 1000 × 1000 = 1,000,000,000) it meant – "billion", and so on.

However, for an ordinary and illiterate person who lived in the dark ages (who could not count all the fingers on one hand), it was difficult to understand the combination of complex numbers in "Kise". For this reason, in past centuries, very few Kazakhs knew about these equalities. Esepshi made all these calculations for the nomads of the Kazakhs, so that they could be warned about the severe and dangerous weather phenomenon in a timely manner and *zhut* ("death of cattle from starvation in a harsh winter"). There is much legend that the gifted Esepshi predicted the future weather conditions for the year ahead. For these valorous works the nomadic Kazakhs respected and adored Esepshi during their lifetimes; after death they were called "holy people" and buried with all honors, like rulers and kings.

Professor Marikovsky P.I. (botanist and archeoastronomer) in his book writes:

> The priests (Esepshi) who prepared the burial mounds, were a handful that passed their knowledge from generation to generation. Perhaps they were also representatives of the ancient people who disappeared from some kind of disaster, a people with a more developed civilization. Developing their art, they probably also influenced the development of rituals and magic. Their astronomical knowledge reflected the highest knowledge of their time, lost during social disasters. The entire history of mankind is replete with instances of the loss of ancient knowledge. The caste of priests (Esepshi), devoted to the secrets of nature, kept and protected them from outsiders, as they gave an advantage over others. [20]

On the territory of Kazakhstan, many generations of Esepshi built hundreds and thousands of archaeoastronomical objects (burial mounds), [1, I part] the purpose of which was only one thing – how to correctly calculate the time of nomads for different types of calendars.

In the twentieth and twenty-first centuries, many methods and principles of counting time and knowledge of "Esepshi" are forgotten. For more than 30 years, I have been collecting these data and knowledge about "Esepshi" literally in torn pieces.

Part 1, Section 2: THE CALENDAR SYSTEMS OF THE KAZAKH PEOPLE

It should be noted that the Kazakhs were not limited to only one calendar "Togys esebi." At the present time I have learned about nine types of calendars that were used by nomads and Kazakhs in different eras. Since the nomads lived in the vast expanse of the Eurasian continent, it is easy to suppose that the number of types of calendars could be even greater, because in each region the climate and weather conditions differed. This is clearly expressed in the structures and uses of 9 types of calendars. For example, in the southern regions of Kazakhstan (or Eurasia) it is convenient to use calendars whose “months” or “seasons” contain 30 or 40 days, since in these places the climate changes very quickly. In the northern regions of Kazakhstan (or Eurasia) it is convenient to use calendars, in whose months or seasons there are 90 or 120 days, since in these places the climate changes very slowly. These definitions ultimately make it easier for the reader to understand and define the goals and objectives of these nomad calendars.

1) The first type of calendar: "Urker esebi" – consisted of 10 months. Days and months were calculated in accordance with the movement of the Pleiades (heliacal sunrises and sunsets).

The names "Үркер есебі" (Russian "Үркер есеби", English "Urker esebi") in the Kazakh language literally means "Urker" (Pleiades – a scattered star cluster in the constellation of Taurus) and "esep" – account, calculation, calendar). Thus the term "Urker esebi" means "Urkerdin on ailyk esebi" (Ten-month calendar of the Pleiades).

The history of world calendars, in addition to Urker Esebi, also knows the Etruscan calendar [21] and the ancient Roman 10-month (304 days) calendar. [22] According to the author's guess, all these three calendars are united by one circumstance. They were based on the Pleiades' heliacal sunrises and sunsets, which could be observed with the naked eye for 11 sidereal months. The Etruscans and the ancient Romans for the remaining 2 or 3 months, when the Pleiades were not visible, did not take into account the time, that is, it was simply missed. The nomads, on the contrary, continued to count the 10-month calendar further, until after 4 years the counting of the time again did not coincide with the heliacal sunrises of the Pleiades.

1. Intercalation days of nomads in the “Urker Esebi” months:
a) 27 + 27 + 28 + 27 + 27 + 27 + 28 + 27 + 27 + 28 = 273 days
b) 27 × 7 + 28 × 3 = 189 + 84 = 273 days
c) 27.3 days × 10 togys aiy (sidereal month) = 273 days.

2. Intercalation days in 9 months of “Azamattyk esep”:
a) 30 + 30 + 31 + 30 + 30 + 31 + 30 + 30 + 31 = 273 days
b) 30 × 6 + 31 × 3 = 180 + 93 = 273 days
c) 30.33 days × 9 azamattyk ai (civil month) = 273 days

3. Compatibility of the "Urker esebi" calendar with "Zhuldyz esebi":
a) 6 + 7 = 13 days × 21 amal = 273 days ÷ 7 days = 39 week
b) 6 + 7 = 13 days × 28 amal = 364 days ÷ 7 days = 52 week
c) 273 days × 4 years = 1092 days ÷ 3 years = 364 days
d) 27.3 days × 40 month = 1092 days ÷ 39 month = 28 days

2) The second type of calendar: "Zhuldyz Esebi", which consisted of 13 months. Days and months were calculated according to the movement of the Pleiades, the Moon and the Sun, and also like “28 lunar mansions”.

The names “Zhuldyz esebi” (English “Star calendar”) literally in Kazakh language mean “Zhuldyz” (“Star”) and “esep” – accounting, calculation, calendar.

The meaning of the word "Zhuldyz-Star" included individual bright stars, such as Sumbile (Sirius), Usharkar-Tarazy (Orion), Sulusary (Aldebaran), Kambardin oti "Bile of Kambar" (Regulus), constellation such as Kambar zhuldyzy (Leo), Bosaga zhuldyzy (Gemini α, β and Auriga α, β), etc., as well as the visible 5 planets of the solar system: Olpan (Mercury), Sholpan (Venus), Kyzyl zhuldyz (Mars), Sary zhuldyz (Jupiter) and Konyrkay zhuldyz (Saturn).

The term “Zhuldyz esebi” is also close to the concept of 28 lunar mansions (in classical Hinduism “Nakshatra”, Chinese astronomy “Èrshí-Bā Xiù”, Arabian Manzils “Manazil al-Qamar”, Egyptian astronomy “Decans”).

At the end of the year, additional days in “Zhuldyz esebi” (simple years: +1 days and leap years: 2 days) were not added, as some have done in the past [23] and now [24] [25], because “Zhuldiz eseby” had close ties with “Urker esebi” and partially with “Togys esebi”. Therefore, in many popular scientific books and articles in the Kazakh language, the authors often confuse “Urker esebi”, “Zhuldiz eseby”, and “Togys esebi” with each other:

a) 28 days × 13 month = 364 days (Zhuldyz esebi).
b) 273 days × 4 years = 1092 days ÷ 3 years = 364 days (Urker Esebi).
c) 364 - 9 = 355 days × 3 years = 1065 + 27 = 1092 days (Togys esbi).

Some official documents of Kazakhstan are written in the following way: “Since 2011, from the 12th star of April, the country celebrates the Day of Science." As you can see in this sentence, the word "day" replaces the word "star" (zhuldyz). In ancient times, the Kazakhs considered the days thus, using the word "star" (zhuldyz). Now our state is trying to revive this ancient tradition. [26]

On the basis of that sentence we can indicate the dates in this form. For example, for Togys esebi: “Year – the Cow, the 8th star of the 11th togys aiy of 1985 (this means: “Year – of the Cow, the Moon and the constellation Leonis. 31.XI.1985, UT 22:30, Tue, 2446430.5 JDN 18-The day of the moon phase is on Regulus, Alpha Leonis (α Leonis – Kambardin Oti).

Kazakh title 28 stars as in "Nakshatra"
1st star; Moon and Pleiades (Urker). 24.XII.1985, UT 16:35 W, 2446423.5 JD
The 11th day of the phase of the moon (11th Togys aiy) is in the Pleiades.
2nd star; Moon and Taurus (Torpak). 25.HII.1985, UT 17:25, Wed, 2446424.5 JD
The 12th day of the phase of the moon is on Aldebaran (Sulusary).
3rd star; Moon and Orion (Usharkar-Tarazy). 26.XII.1985, UT 18:15, Thurs, 2446425.5 JD
The 13th day of the phase of the moon is on Betelgeuse (Kok shakpaktyn ogy).
4th star; Moon and Gemini-Auriga (Bosaga). 27.XII.1985, UT 19:05, Fri, 2446426.5 JD
The 14th day of the phase of the moon is on Gemini (Bosaganyn aldy).
5th star; Moon and Gemini (Bosaga). 28.XII.1985, UT 20:00, Sat, 2446427.5 JD
The 15th day of the phase of the moon is on α and β Gemini (Bosaganyn tomengi eki zhuldyzy).
6th star; Moon and Cancer. 29.XII.1985, UT 20:50, Sun, 2446428.5 JD
The 16th day of the Moon phase is on Cancer "Mosy kazan" (Tripod and cauldron).
7th star; Moon and Leo. 30.XII.1985, UT 21:40, Mon, 2446429.5 JD
The 17th day of the moon phase is on – μ (mu), ε (epsilon), κ (kappa) and λ (lambda) Leo: Cambardyn murty – Mustache Kambar).

8th star; Moon and Leo. 31.XII.1985, UT 22:30, Tues, 2446430.5 JD
The 18th day of the moon phase is on Regulus (α Leo – Kambardin Oti) and others etc. [1], Part III, Togys esebi, pp. 479-506]
[* 4 stars "Bosaga" (asterism): Gemini: β Gem: Pollux – 1.16m and α Gem: Castor – 1.59m and Auriga: α Aur: Capella – 0.08m and β Aur: Mencalinan – 1.90m.]

3) The third type of calendar: The mysterious "Togys esebi"

The names “Тоғыс есебі” (Russian "Тогыс есеби", English "Togys esebi") in Kazakh literally means "togys" (covering, occultation) and "esep" (account, calculation, calendar). Thus the term "Togys esebi" means "Ai (Moon) men Urkerdin (Pleiades) togysu esebi" – covering (or occultation) of the Pleiades star cluster by the Moon.

This calendar was a purely agricultural calendar, with whose help the nomadic and sedentary peoples of Kazakhstan and Central Asia tried to anticipate weather changes in the harsh continental climate of Central Asia.

There is no direct or indirect, oral or written evidence of the fact that according to the calendar "Togys esebi" in ancient times, pagan rites and rituals were performed. Thus it is safe to say that "Togys esebi" was never "the ancient pagan calendar of Tengri" ("The Eternal Blue Sky" of Genghis Khan), which was considered the supreme God before the advent of Islam in the 9th century. [27]

Togys esebi appeared in the life of nomads as an astronomical, mathematical and logical conclusion of the two previous calendars (“Urker esebi” and “Zhuldyz esebi”). Since the 3rd part of this article is entirely devoted to the topic of Togys Esebi, we will skip important details of this unique calendar for now and proceed to:

4) The fourth type of calendar: “Togiz tarmak” (Nine offshoot) or “Togiz schilde” (Nine schilde*). Days and months were calculated in accordance with 9 months (tarmak, shilde), consisting of 40 days.
[* Shilde – Chilla (translated from Farsi "forty days") – in the culture of the peoples of the countries of Central Asia and the Middle East this is a period of exhausting 40-day windless summer heat.]

In Kazakhstan, “Zhaz schilde” (40 days × 5 month = 200 days) means hot summer days, and “Kys schilde” (40 days × 4 month = 160 days) means winter cold days.

a) 40 days × 9 month = 360 days (“Togiz tarmak” or “Togiz schilde”).
b) At the end of the year, 4, 5 and 6 days were added. The Kazakhs call these days “Konak kunder” (Guest days).

Note: A wonderfully preserved structure of this calendar in the form of "Kise", you can see in the Kyzylorda region, the Aral district, in the village of Tokabay, among the descendants of Esepshi Yernazarov Sagyndyk (see Figure 2 above). [12]

5) The fifth type of calendar: "Tort toksan* esebi" (calendar consisting of four seasons). Days and months were calculated in accordance with the four seasons of the year, consisting of 90 and 91 days.
[* The word “Toksan” from Kazakh is translated as “ninety, a quarter of a year, season”.]

a) 90 days × 4 "toksan" = 360 + 5 (6) “konak” (guest) days = 365 (366) days.
b) 91 days × 4 “toksan” = 364 + 1-2 “konak” (guest) days = 365-366 days.

Remarkably, in “Tort toksan esebi”, the seasons of the year were not divided into small months of 30 or 31 days. The calculation of days and months was considered entirely from 90-91 days. The name "Four toksan" from 90-91 days:

The first toksan: “Zhas toksan” (“young toksan” – spring quarter)
The second toksan: “Zhaz toksan” (literally “summer toksan” – summer quarter)
The third toksane: “Terme toksan” (“harvest toksane” – autumn quarter)
The fourth toksan: “Kys toksan” (literally “winter toksan” – winter quarter)

Unfortunately, the principles of work and the structure of this calendar are forgotten (there are no reliable originals in the form of "Kise" of the notorious Esepshi). [28]

6) The sixth type of calendar: “Ush bunak* esebi” (Three Segment Calendar). Days and months were calculated in accordance with the 3 segments of the year, being exactly 120 days each.
* The word "Bunak" from the Kazakh language is translated as "segment, section, joint."
120 days × 3 “bunak” = 360 + 5 (6) “konak” (guest) days = 365 (366) days.

In "Ush Bunak Esebi", just like "Tort toksan esebi", the seasons of the year were not divided into small months of 30 or 40 days. The calculation of days and months was considered completely from 120 days. The name “Three bunacs” (Three segments) for 120 days each:

The first bunak (the warm and hot period) lasts approximately from February 9 to June 9: “Kara katkak, ash ozek” or “Tuyiak turlep, koi kurler shak” (“domestic animals (sheep, cow, horse, camel) give birth, and people drink milk as much as they want ” – spring-summer months).

The second bunak (a hot and cool period) lasts approximately from June 9 to October 9: “Shop kuaty basyna shygar uakyt” (“the grass becomes juicy” – summer-autumn months).

The third bunak (cool and cold) lasts approximately from October 9 to February 4: “Tokty toimas, shomish keppes” (“domestic animals (sheep, cow, horse, camel) is satisfied with dried grass” – autumn-winter months).

Unfortunately, the use and the structure of this calendar are forgotten (there are no authentic originals in the form of the “Kise” of the notorious Esepshi). [12]

7) The seventh type of calendar: 11-year lunar-sidereal calendar

According to my father, in ancient times, nomads used an 11-year lunar-sidereal calendar. It was, as it were, a continuation of the 10-month “Urker Esebi” and a prerequisite for a 12-year animal cycle. Proof of this is the "Kise" of the notorious Esepshi. It turns out that 4, 5 and 6 days (Konak Kunder – Guest Days), inserted as necessary at the end of each year, had an interesting goal. For example:

1) When 5 days are excluded from 360 days, it becomes a “simple” year of the lunar-sidereal calendar: 360 – 5 = 355 days.

2) When 4 days are excluded from 360 days, it becomes a “leap” year of the lunar-sidereal calendar: 360 – 4 = 356 days. Further, it is not difficult to calculate the mathematical equality:

a) 355 days × 9 years + 356 days × 2 years = 3195 + 712 = 3907 days.
b) 3907 days ÷ 11 years = 355.18182 days ÷ 13 sidereal months = 27.321678 days.

During this 11-year lunar-sidereal calendar the Moon phases covering the Pleiades have a difference of a decrease of 9-10 days per year compared with the seasons of the solar year. Therefore, it was not used as an agricultural calendar. [10, 1, Part III, Togys esebi, pp. 340-348]

8) The eighth type of calendar: 11-year lunar-synodic calendar

Even before the arrival of Islam in the Kazakh lands, the nomads used the 11-year lunar-synodic calendar. It was specially created to work with the previous lunar-sidereal calendar. The proof of this is again the “Kise” of the notorious Esepshi. For example:

1) When Esepshi excludes 6 days from 360 days, it becomes a simple year of the lunar-synodic calendar: 360 – 6 = 354 days.
2) When 5 days is excluded from 360 days, it becomes like a leap year of the lunar-synodic calendar: 360 – 5 = 355 days.

Further, it is not difficult to calculate the mathematical equality:

a) 354 days × 7 years + 355 days × 4 years = 2478 + 1420 = 3898 days
b) 3898 days ÷ 11 years = 354.36363 days ÷ 12 synodic months = 29.530303 days

During this 11-year lunar-synodic calendar, the Moon phases showing the “neomenia” (ancient Greek new moon) have a difference in a decrease of 10-11, even 12 days a year compared with the seasons of the solar year. For this reason, this lunar calendar was also not used as an agricultural calendar. [10, 1, Part III, Togys esebi, pp. 340-348]

Depending on which calendar (No. 4, No. 5 and No. 6) he used, as necessary, Esepshi added 5 and 6 days to his 360-day year, divided by 30, 40, 90 and 120 days:

a) 360 days + 5 “konak” (guest) = 365 days (simple year)
b) 360 days + 6 “konak” (guest) = 366 days (leap year)

Under the assumption of my father and the author of this article, No.7 (lunar-sidereal calendar) and No.8 (lunar-synodic calendar) calendars had only ritual and astrological character. These calendars, as it were, were identified with the unstable life paths of people and slowly changing phenomena of the Universe.

Although the principles of operation and the relationship of these calendars among themselves remain a mystery, their mathematical theory can be represented as follows:

a) 355.18182 days × 33 years = 11721 + 355 = 12076 ÷ 34 years = 355.17647 days ÷ 13 sidereal month = 27.321267 days
b) 365.94 days × 33 years = 12076 days (No.4, No.5 and No.6)
c) 354.36363 days × 33 years = 11694 + 354 = 12048 ÷ 34 years = 354.35294 days ÷ 12 synodic month = 29.529412 days
d) 365.1 days × 33 years = 12048 days (No.4, No.5 and No.6).
e) 365.24242 days × 33 years = 12053 days (Omar Khayyam cycle) [10, 1, Part III, Togys esebi, pp. 340-348]

My second teacher after my father, Professor Akzhan Zhaksybekuly al-Mashani (1906-1997), the reviewer of my first book, was an expert on the history of the Kazakh calendar. In 1988 he stated his positive opinion about the likely existence of an 11-year lunar calendar (with sidereal and synodic months) and a 33-year solar calendar among the nomads of the Kazakhs. [11]

9) The ninth type of calendar: "Azamattyk esep" (Civil calendar). Days and months were calculated in accordance with 12 months of the year, being exactly 30 days each.

If we take into account the age, this calendar is the “youngest”. Apparently, it was compiled by the very first Kazakh intelligentsia (who received a European education) in the nineteenth century, like the Julian calendar.

By the way, the Kazakhs still call the Julian calendar “Eskishe esep”, this word literally means “Old calendar” or “Eski sanat” (Old style), because on February 14, 1918 Soviet Russia and Kazakhstan switched to a new chronology style – the Gregorian calendar (“Zhanasha esep”, meaning “New Calendar”, or “Zhana Sanat – New Style”).

However, it should be noted that the Kazakh intelligentsia among the people did not blindly copy the Julian or the Gregorian calendar. They came up with a harmonious and flexible calendar, as befits nomads who clearly felt the rhythm of nature and the universe for thousands of years.

30 days × 12 month = 360 + 5 (6) konak (guest) days = 365 (366) days. [29]

PART 2: THE TWELVE-ANIMAL CYCLE OF THE PEOPLES OF CENTRAL ASIA

The chronological system of a 12-year cycle of animals is called in Kazakh “On eky zhyldyk khayuanattar musheli”, or in short “Mushel”. Mushel takes into account not only the movement of the Sun, the Moon and the Pleiades but also the movement of Jupiter, a giant planet that every 12 years (more precisely, every 11.862 years) makes one revolution around the Sun. This system came into use from time immemorial and has survived into the 21st century.

The 12-year animal cycle is a chronological system common among the peoples of Central and East Asia. The years are not denoted by numerals but rather by the names of 12 animals arranged in a certain order. Within 12 years the whole range of these names passes, and from the 13th year a new cycle begins, proceeding in the same manner. For 2000 years most countries of the world with other chronological systems tried to remove the 12-year cycle of animals from its literature, official correspondence and the official calendar. Nevertheless, the 12-year animal cycle remained the basis of the Kazakh national calendar. The spread of the twelve year animal cycle is very wide. It is known to all the peoples of Central Asia and East Turkestan, from Japan to the Volga region, and from the Caucasus to Indochina. [30]

The names of animals used in this system are basically the same for all nations. Variations of names in most cases are minor. The main variation of the names of these animals are: 1. Tyshkan-Mouse (rat); 2. Siyr-Cow (bull, buffalo); 3. Barys-Leopard (tiger); 4. Koyan-Hare; 5. Ulu-Snail (dragon, fish, crocodile); 6. Zhylan-Snake; 7. Zhylky-Horse; 8. Koi-Sheep; 9. Meshin-Monkey; 10. Tauyk-Hen (rooster, pheasant); 11. It-Dog; 12. Donyz-Pig (wild boar). [31] [32]

Is it Possible to Switch from a 12-Year to a 13-Year Cycle of Animals in Kazakhstan?

There is an oral tradition of Kazakhs living in some regions of Kazakhstan that 13 names of months, with the exception of one month (“1 togys aiy”), were indirectly called the names of the 12-year animal cycle in turn. According to my father, "1 togys aiy" was called by the name of the sacred animal of nomads – a camel (Latin *Camelus*, "ship of the desert"), which was not included in the 12-year animal cycle. [31] For example, the Tobol-Irtysh Tatars also included a camel in the list of the 12-year animal cycle. [33] Thus, the list of the 12-year animal cycle increases to 13 animals (28 days × 13 month = 364 days). What is remarkable is that such a change in the name of the months on the basis of "Mushel" fully corresponds to the name of the thirteen zodiacal (from the Greek Ζωδιααςςός, "animal") constellation in the ecliptic. Modern astronomers hold that the 13th constellation is Ophiuchus ”(Latin *Ophiuchus*) [34], which is located between the constellations of Scorpio (Latin *Scorpius*) and Sagittarius. (Table 2)

Table 2 13 togys ayy and 13 zodiac constellation

No.	Kazakh name	English translation	Latin name	28 days in months	Togys months
1	Tuie	Camel	Aries	12.04.– 09.05.	1 togys aiy
2	Tyshkan	Mouse	Taurus	10.05. – 06.06.	25 togys aiy
3	Siyr	Cow	Gemini	07.06. – 04.07.	23 togys aiy
4	Barys	Leopard	Cancer	05.07. – 01.08.	21 togys aiy
5	Koyan	Hare	Leo	02.08. – 29.08.	19 togys aiy
6	Kok bori (ulu)	Wolf (howl)	Virgo	30.08. – 26.09.	17 togys aiy
7	Zhylan	Snake	Libra	27.09. – 24.10.	15 togys aiy
8	Zhylki	Horse	Scorpio	25.10. – 21.11.	13 togys aiy
9	Koi	Sheep	Ophiuchus	22.11. – 19.12.	11 togys aiy
10	Meshin (Urker)	Pleiades	Sagittarius	20.12. – 16.01.	9 togys aiy
11	Tauyk	Hen	Capricorn	17.01. – 13.02.	7 togys aiy
12	It	Dog	Aquarius	14.02. – 13.03.	5 togys aiy
13	Donyz	Boar	Pisces	14.03. – 10.04.	3 togys aiy

1. As can be seen from Table 2, in the 12-year animal cycle, the name of the 5th, 9th year in “Mushele” and, respectively, in the 13-month name of animals in the calendar "Zhuldyz esebi", the name of the 6th and 10th months is also changing.

In principle, nothing will change apart from the fact that in the future we will change the name of the “12 year cycle” to “13 year cycle”.

Firstly, we officially introduce into circulation the favorite animal of nomads and Kazakhs – the camel (totemic name (Pir) – “Oysylkara”) in the series of cycles of the year “Mushel”. (Figure 3)

Figure 3 The 12-year animal cycle. Nomads have always considered the camel the most important member.

Secondly, the disputes, which lasted two hundred years, will be removed: Who invented the 12-year cycle of animals: nomadic Kazakhs or Chinese? There will be no need to continue this meaningless discussion, [30] as the Kazakhs have switched to the thirteen-year cycle of animals.

Nomads of Central Asia and Kazakhstan 200 years ago, even now, do not claim that thousands of years ago they invented the “12-year animal cycle” or “Mushel”. All the current controversy around the 12-year cycle of animals rises mainly from scholars of the West. Indifferent to useless disputes, nomads at this time continue to use a 12-year cycle of animals. Even the fact that the whole world believes that the "motherland" of the 12-year animal cycle – China – frankly does not bother nomads.

Although many facts about the emergence of a 12-year cycle of animals indicates that it was invented by nomads, this is not said by nomads themselves but rather by independent scientists. [35] What to do, the nomad mentality is like that. We will wait until time puts everything in its place.

However, there are actually some problems regarding the name of the 12-year animal cycle. Here, the current descendants of nomads cannot look calm and indifferent. This is mainly due to the fact that for many centuries the names were misinterpreted.

The first controversial name in the 12-year cycle of animals is the 5th year in the cycle, the word "Ulu" (in Kazakh language) or "Snail" (literal translation).

Snails – the common name of gastropods with an outer shell (Latin *Gastropoda*). Gastropods with a rudimentary shell or completely lost by them are called “slugs”.

A reasonable question arises: how could nomads include a snail in the ranks of animals? There is a clear discrepancy here.

At the end of the 19th Century N.I. Merder, a writer from Tsarist Russia (pseudonym: N. Severin, 1839-1906 [36]), because of ignorance of the subject, translated the word “Ulu” as “Snail”. Since then, confusion has reigned in the "Mushele". [29, p. 266]

On what basis did we change the name "Ulu" to the word "Wolf"?

1) The predatory beast "Wolf" in the Kazakh language is called "Kaskyr", "Bori" (among the Mongols –“ Shino”). Ancient Turkic peoples called the Wolf “Kok Kurt”. "Kok" means blue, the color of the sky. The Turkic word "Kurt" is the root of the Kazakh word "Kurtu" (destroy, eliminate). That is, the blue wolf is a sacred animal for the Turkic-speaking peoples, the messenger of the God of heaven himself, Kok Tengri, who saved their tribes from destruction. [32]

As is known from history, the tribe of Genghis Khan (Temirshyn-Temudzhin, 1162-1227) was called "Boritegi" (Bordzhigin). The words "Boritegi" literally means "born from a wolf."

All Turkic peoples were afraid to call the totemic name "wolf" in the literal sense and imposed a taboo on this word. Kazakh pastoralists still do not use the name of this predatory animal, they simply say "it-kus", "ulyma", etc. The word "Ulyma", "Ulu" literally means "howling wolf." (Table 2, above)

Argument (Latin *Argumentum* – argument, proof, conclusion) we will call a fragment of a statement containing a justification of a thought, the acceptability of which seems reasonable. For this reason, the year of Ulu (Snail) in the 12-year cycle of animals can be changed to the correct word "Wolf." Other authors write about it. [37]

The word "Meshin" by ordinal count is the 9th year in the 12-year cycle of animals. The name "Meshin" until recently was called the corresponding Chinese name "Monkey". However, there was never a monkey in the territories of Central Asia and Kazakhstan.

2) In the early 2000s, it turned out that the word “Mechin” was not an animal at all, but the name of a star cluster adored by all Kazakhs. "Having traced the evolution of this term, D.D.Dondokova comes to the conclusion that the original meaning of the word ‘Mushen’ was ‘the Pleiades constellation’ (kaz. Meshin, Urker, Pleiades).” [38] [39]

It turns out that in the 12-year cycle of animals eleven of the names are of animals, and one name belongs to the star cluster “Urker”. In my opinion, this name means something sacred to nomads, therefore this name (Meshin) should be left unchanged, and the name “Monkey” should not be used.

According to the "Togys eseby" calendar, approximately every 9 years the Moon disk completely covers the Pleiades. And during the next 9 years the Moon passes by (above or below) the Pleiades.

2. The 12-year animal cycle is a chronological system of nomads. The basis of this chronological system is a 3-year cycle (Tables 3, 4 and 5).

Table 3 For example: The first year of Togys esebi

1	2	3		4	5	6	7	8	9
No month	Moon phases	Name of months		Togys esebi			Zhuldyz esebi		
1st month	29.53058885	29.53	1 togys ai	27	27	27	28	28	28
2nd month	27.32166155	27.32	25 togys ai	28	55	55	28	56	56
3rd month	25.11273424	25.11	23 togys ai	27	82	82	28	84	84
4th month	22.9038069	22.9	21 togys ai	27	109	109	28	112	112

5th month	20.69487963	20.69	19 togys ai	28	137	137	28	140	140
6th month	18.48595232	18.48	17 togys ai	27	164	164	28	168	168
7th month	16.27702502	16.27	15 togys ai	27	191	191	28	196	196
8th month	14.06809771	14.06	13 togys ai	27	218	218	28	224	224
9th month	11.85917041	11.85	11 togys ai	28	246	246	28	252	252
10th month	9.650243099	9.64	9 togys ai	27	273	273	28	280	280
11th month	7.441315793	7.43	7 togys ai	27	300	300	28	308	308
12th month	5.232388487	5.22	5 togys ai	28	328	328	28	336	336
13th month	3.023461181	3.01	3 togys ai	27	355	355	28	364	364

Table 4 For example: The second year of Togys esebi

1	2	3		4	5	6	7	8	9
No. month	Moon phases	Name of months		Togys esebi			Zhuldyz esebi		
1st month	0.814533875	0.8	1 togys ai	27	27	382	28	28	392
2nd month	28.13619542	28.12	25 togys ai	28	55	410	28	56	420
3rd month	25.92726812	25.91	23 togys ai	27	82	437	28	84	448
4th month	23.71834081	23.7	21 togys ai	27	109	464	28	112	476
5th month	21.5094135	21.49	19 togys ai	27	136	491	28	140	504
6th month	19.3004862	19.28	17 togys ai	28	164	519	28	168	532
7th month	17.09155889	17.07	15 togys ai	27	191	546	28	196	560
8th month	14.88263159	14.86	13 togys ai	27	218	573	28	224	588
9th month	12.67370428	12.65	11 togys ai	28	246	601	28	252	616
10th month	10.46477697	10.44	9 togys ai	27	273	628	28	280	644
11th month	8.255849668	8.23	7 togys ai	27	300	655	28	308	672
12th month	6.046922362	6.02	5 togys ai	28	328	683	28	336	700
13th month	3.837995056	3.81	3 togys ai	27	355	710	28	364	728

Table 5 For example: The third year of Togys esebi

1	2	3		4	5	6	7	8	9
No month	Moon phases	Name of months		Togys esebi			Zhuldyz esebi		
1st month	1.62906775	1.6	1 togys ai	27	27	737	28	28	756
2nd month	28.9507293	28.92	27 togys ai	27	54	764	28	56	784
3rd month	26.74180199	26.71	25 togys ai	28	82	792	28	84	812
4th month	24.53287469	24.5	23 togys ai	27	109	819	28	112	840
5th month	22.32394738	22.29	21 togys ai	27	136	846	28	140	868
6th month	20.11502007	20.08	19 togys ai	28	164	874	28	168	896
7th month	17.90609277	17.87	17 togys ai	27	191	901	28	196	924
8th month	15.69716546	15.66	15 togys ai	27	218	928	28	224	952
9th month	13.48823816	13.45	13 togys ai	28	246	956	28	252	980
10th month	11.27931085	11.24	11 togys ai	27	273	983	28	280	1008
11th month	9.070383543	9.03	9 togys ai	27	300	1010	28	308	1036
12th month	6.861456237	6.82	7 togys ai	27	327	1037	28	336	1064
13th month	4.652528931	4.61	5 togys ai	28	355	1065	28	364	1092
14th month	2.443601625	2.4	3 togys ai	27	382	1092			

Then the number "3" begins to form a simple and complex chronology:

1) 3 years × 3 cycle = 9 years × 4 cycle = 36 years × 100 cycle = 3,600 years
2) 3 years × 4 cycle = 12 years × 25 cycle = 300 years × 12 cycle = 3,600 years
3) 3 years × 10 cycle = 30 years × 10 cycle = 300 years × 12 cycle = 3,600 years, etc.

However, with regard to the chronological system of nomads of Central Asia, there is still no consensus. Different dates are given for the beginning of the epoch (chronology) of nomads, including to the point of absurdity ... to begin the era of nomads from ten thousand years before our era (Gobekli Tepe [in Turkish "Potbelly Hill"] 37°13'23 "N 38°55'21 "E). [40] But we hold a different opinion.

We know that on October 4, 1583 BCE (which is the year -1582 according to astronomical year numbering) about the 17th day of the lunar cycle, the Moon exactly covered the Pleiades. This covering of the Pleiades occurred again on October 4, 1582 AD, that is, one day before the Gregorian Calendar was introduced (by Pope Gregory XIII). Now we are making formal calculations for the epoch of the nomads of Central Asia:

1) 1582 AD - 1583 BCE = 1582 - (-1582) years = 1582 + 1582 years = 3,164 years + 436 years = 3,600 years;
2) 2018 AD - 1583 BCE = 2018 - (-1582) years = 2018 + 1582 years = 3,600 years.

From this equality it is seen that from the total amount of 3,600 years exactly 3164 years pass according to the Julian calendar, and 436 years pass according to the Gregorian calendar.

The numbers 12 and 24 were of particular importance in the tribal system of both the Huns and the Turkic-speaking peoples – the traditional division into 24 genera, divided into two phratries. The Huns noted the presence of 24 elders, the Oguz-Kagan tribe was divided into 24 genera, 12 in each phratry, etc. The connection between the division into 12 (24) totemic clans and the cycle of 12 years bearing the names of animals, most of which are known as totems of the tribes belonging to the Hunnic union, is quite likely.

The 12-year animal cycle originated from the first centuries BC to the first centuries AD on the territory of Central Asia among the tribes and ethnic groups that were in the stage of decomposition of primitive communal relations and the emergence of feudal class relations. Its origin is connected with the presence of the 12 (24) membered tribal system among the Turks, and totemistic views concerning most of the animals in the cycle. How did this cycle get to China? Perhaps through the population of the western provinces that came from the "northern barbarians" who settled there. From China and Kazakhstan, the 12-year animal cycle system has spread to the rest of the world. [30, pp. 64-65]

PART 3: TOGYS ESEBI - A UNIQUE CALENDAR OF NOMADS

Background

The "Togys esebi" calendar does not look like the usual lunar or lunisolar calendar. In this calendar the main object of the night sky (other than the Moon) is the Pleiades star cluster (in the Kazakh language, *Urker*). This calendar diverges from the classic lunar, solar and lunisolar calendars. But thousands of years ago the nomads of Central Asia did not know about them and did not even guess at them. From their point of view, they used the most appropriate calendar for their nomadic lifestyle.

These “Riders of the Steppes”, who love freedom, did not obey anyone except their Kok Taniri. [41] As they say, "if you want freedom, prepare for war." Therefore, they always took with them a complete set of military weapons (“Er karuy bes karu”: saber, ax, spear, mace, bow). However, without knowing it themselves, they were simultaneously engaged in astronomical science.

Apparently “Urker” and the calendar “Togys esebi” liked the nomads very much. In the oral folklore of the Kazakh people you can find many legends or parables relating to Urker. For all Kazakhs, without exception, “Urker is the elder of all the stars” (Urker zhuldyz agasy).

As a child, my father often told me one interesting legend about Urker. Now I will relate this story to you (this is an excerpt from my book *Kazakh National Calendar* [1], pp. 344-348).

The Legend of the Moon (Ai) and Urker
or How the Fourteen Robbers Destroyed World Peace

According to the stories of our ancestors who lived in the sands of Kyzyl-Kum (translated from Kazakh this means “Red Sands”), Urker was once the holy flock of sheep of Qudai Tagala [42] himself (the King of Heaven, Taniri or Tengri). Usually in a flock of sheep (in the Kazakh language, *otar koi*), there are about 700-900 head. In fact, in the star cluster Urker there are approximately 3,000 stars.

In antiquity with this flock of sheep there was a tragedy on the scale of the universe. As a result, these sheep began to be frightened by all living things in this world. Since then we have the word "Urker" from the Kazakh language, literally translated as "skittish." Approximately in this way, my father began to tell the legend, which has an important cosmological and cosmogonic significance, not only for the Kazakh people.

This story took place in very, very ancient times, when Qudai Tagala lived in Sumbile (Sirius), and the evil Kafirit [43] lived in a dark cave behind the Sun. Friendly people lived happily on Zheruyk (the Promised Land, Edem, Paradise).

At that time, Kudai Tagala ruled over the sky. He rightly ruled his between-heaven-and-earth faithful fourteen warriors (in the Kazakh language, *on tort sarbaz*). All the "zhyn" (arabic: الـ جن, al-jinn, jinn, djinn) [44], created from the fire without the smoke of the blue sky and the ever-green earth, obeyed them without question.

But only Kafirit did not obey and resisted them constantly. Moreover, he dreamed of taking the place of Kudai Tagal.

The proud and envious Kafirit constantly harmed ordinary people in the Promised Land. In the end, the patience of Qudai Tagaly was finished. He ordered his fourteen warriors to seize Kafirit and bring him to him. The fourteen warriors (*sarbaz*) also had their grievances against Kafirit. Under the leadership of Bas Sardar (head of the group), who rode a blue horse, and Ak Sarbaz (deputy head of the group), who rode a white horse, the remaining twelve warriors went in

search of Kafirit. They carefully searched all the black caves that were behind the sun. In one of the black caves they found and grabbed Kafirit, and tightly tied him up with a chain.

Ak Sarbaz was especially angry with Kafirit, so he thought that the moment of truth had come. Pulling the saber from its scabbard, he says:

“What do you think, is it worth spending our precious time (especially Qudai Tagala) on this scoundrel. I’d do better to cut off his head right now, ”he says to Bas Sardar, demanding permission. Looking into the eyes of the fourteen warriors, Kafirit was very frightened and fell on his knees in front of them. If I reveal to you a great secret that no other living soul knows about, will you give your word that you will leave me alive and take me to Qudai Tagala.

And suddenly, like a spark, curiosity arose. What secret does Kafirit want to reveal? Why do we, the most devoted servants of Qudai Tagala, not know about it? For a moment, the fourteen warriors were confused. Overcome by curiosity, each of the fourteen warriors thought to himself: "Although he is now the condemned Kafirit, he was once a respected angel, perhaps he does not lie. Let's hear from him what secret he can tell us.” “Moreover”, said Bas Sardar for all, “Qudai Tagala ordered us to bring him in alive.” And then everyone looked straight into the eyes of Kafirit and said: “We give the honest word of a warrior (*sarbaz*). But if what we hear does not make sense, consider yourself a headless creature.”

This is exactly what the insidious Kafirit expected. Wriggling like a snake he whispers, arousing in them more interest: “In the center of the plain, in the largest pasture, Zher uiyk, graze a flock of sheep. You can't go wrong — these sheep don't have black wool, every one of them has only white wool. Among them there is one white sheep with golden wool. Firstly, if you kill her and eat her “magic” meat, you will live forever on a green Earth. Secondly, you will become the fourteen vizier of All Heaven. Thirdly, after that, Qudai Tagala will make any decisions only after consulting with you.” The warriors of Qudai Tagala were amazed. They looked at each other, and turned to Bas Sardar. From their eyes one could understand that they were ready to go against the will of Qudai Tagala. Bas Sardar and Ak Sarbaz looked at the eyes of their twelve warriors. Seeing their agreement with their decision, they turned to Kafirit and said: “We decided to go to Zher uiyk to check the accuracy of your words. While we are checking the accuracy of your words, you will be waiting for us here. If everything is as you have told us, your fate will be decided by Kudai Tagala, we will forgive you all your sins.”

Pretending to be humble, Kafirit bowed his head: "I obey. Have a happy journey, I will wait with impatience." As soon as the fourteen warriors were out of sight, Kafirit with his long nails opened the chain lock and freed himself from the chains. Satisfied with the fact that he “killed two birds with one stone”, grinning wickedly, Kafirit ran to Kara Uiyk (Black sky whirlpool). This damned place was on the outskirts of Sholpan (planet Venus), few people knew its whereabouts.

The flock of sheep, told by the liar Kafirit, was in fact the “white box” (Pandora's box [45]) of Qudai Tagal, which kept all the secrets of fair control over the sky. A live sheep and golden fleece was the only key to this white box. Kafirit had long been planning to destroy a peaceful and happy life in Zher uiyk. This sacred place was the center of the equality of good and evil. Kafirit was constantly thinking, “While Zher uiyk exists, I will never overcome Qudai Tagala.”

The most faithful servant of Qudai Tagala, St. Kyzyr Ata, guarded the sacred place Zher uyik and the flock of sheep. Qudai Tagala gave him the ability to smell, see the silhouettes of evil spirits and monsters, even those less dangerous than Kafirit, for a distance equal to one year.

The fourteen warriors did not know this, since they did not need to know. Trusting them completely, Qudai Tagala and Kyzyr-ata had no idea which catastrophe awaited everyone ahead.

The fourteen *sarbazov* (warriors) went straight to Zher uiyk, named for its beauty among the people “Mangilik Zhasyl Zher” (Eternally Green Earth). When they approached within one-day distance of Zher uiyk, Kyzyr-Ata received an order from Qudai Tagala to arrive in Sumbile (Sirius).

Kyzyr Ata again looked at the flock of sheep, turned his nose to the wind, and, subtly distinguishing all odors, looked at the horizon. He did not smell the smell of evil spirits, did not see the silhouettes of enemies. All sarbaz had the ability to hide their silhouettes from all creatures. Therefore, for Kyzyr Ata, the silhouettes of the sarbazov seemed to be ordinary dry shrubs. After that, Kyzyr Ata, with a calm soul flew away to Sumbule on a winged horse (Kanatty Pyrak).

The next day, the fourteen warriors finally reached Zher uiyk. This time, it seems, Kafirit did not deceive them. Sheep in white wool, similar to each other, grazed on a green pasture. Suddenly, like a fire, one sheep was seen with a golden fleece. She looked at them from afar, frightened.

Overwhelmed by the thought of what awaited them, when they will be equal in status to Qudai Tagala, Bas Sardar and Ak Sarbaz announced: “Let's arrange a ‘kokpar tartu’ (horse game of nomads). Thus we will determine which of us is the most dexterous and luckiest sarbaz.” All fourteen warriors rushed forward to grab a sheep with a golden fleece. The excited horsemen each wanted to get the one with the golden fleece. At first the herd did not suspect anything bad, they grazed on peacefully. When the sarbazi, like hungry wolves, surrounded them from all sides, the frightened sheep grouped togeher. In the middle was the sheep with the golden fleece.

It was impossible to hide the glitter of gold in the sunlight. The most experienced elderly Sarbaz waited for the right moment, then attacked and deftly raised the golden sheep, and then passed it to Ak Sarbaz. Ak Sarbaz, without waiting for the rest of the warriors, hit the sheep in the heart with his knife (*kezdik*).

For several thousand years, there was not a single black cloud in the sky of Zher uiyk. It was at that moment in the sky that everything changed dramatically. Gray clouds appeared on all sides of the horizon, approaching the zenith, they all condensed, and in the end all the sky was covered with black leaden clouds. The joyful sarbazis decided to eat the meat of the sheep, before the weather finally deteriorated. The youngest sarbaz began to display the golden skin of the sheep, hanging the body on a tree. Others lit the fire to cook the meat. When the meat was cut into pieces, a lamb with golden wool was found in the womb of a dead sheep. Seeing this, Ak Sarbaz’s eyes filled with blood. He displayed the little lamb by hanging it on a tree. Then they buried the lifeless body of the lamb.

All fourteen warriors ate a full cauldron of boiled meat and drank *sorpa* (broth) with relish. The meat was unusually tasty. The satisfied warriors decided to take a nap under a huge tree. Just when they were beginning to fall asleep, suddenly lightning flashed in the sky, and there was a loud roar, like the desperate cry of an old woman. This scared all warriors half to death. Only then did doubt begin to prevail in their hearts. What if they had been mistaken, believing the words of Kafirit. They were afraid to think what would happen to them all if this were true.

After this roar, a heavy downpour began, which had never been seen before. The fourteen warriors of Qudai Tagala did not understand that these were tears of the curse of Heaven. As promised, the elderly Sarbaz received the fresh golden fleece. The cold heavy rain did not stop, only intensified. Especially the elderly Sarbaz felt that he was wet to the bone. Out of desperation, he threw the golden fleece on his back. Despite the fact that they were tormented by inner fear, the horsemen wanted to show each other their high spirits.

The idea that from now on Qudai Tagala will consult with them in everything inspired their imagination. The more they were inspired by the greed for power, the more the carefree life on Zher uiyk disappeared. At each moment, the jinns and evil spirits that were between Heaven and Earth began to penetrate the bodies and souls of people.

Returning along the same road as before, the fourteen warriors of Qudai Tagala could no longer recognize the former country Zher uiyk. Just one day ago, the people who met them with open arms now became sullen. People and countries that were just yesterday friends, now cursed each other because of little things. Endless clashes and bloodshed came to this promised land. Civil strife easily turned into a war.

Going down to the ground from Sumbile, which was located at the far end of the Sky, Kyzyr Ata saw with horror what the fourteen warriors of Qudai Tagala had done. He immediately flew back to Sumbile. Hearing from him about the affairs of his fourteen warriors, Qudai Tagala became angry so much that Kizir Ata himself trembled because of fright. Qudai Tagala looked at the Earth blackened by sin. Far away on the horizon, invisible to the human eye, his weary fourteen warriors were walking slowly. They were divided into two groups of seven. Qudai Tagala, dividing them thus, turned them into visible stars in the sky.

But Qudai Tagala in anger did not stop only with this action. He turned part of the world into a cold region with severe frosts. Just where his fourteen warriors became visible as stars. Thus, at last, the fourteen warriors achieved their eternal life in Heaven. They will spend the rest of their lives in the cold, black, still night sky.

Qudai Tagala ordered Kyzyr Ata to find and bring Kafirit to him no matter what. Kyzyr Ata followed the unique smell of Kafirit. He walked around the fiery Sun and saw Kafirit, sleeping peacefully in Kara Uyyk on the outskirts of Sholpan (planet Venus). Kyzyr Ata attacked him, put shackles on him and led him to Qudai Tagala. Although Qudai Tagala was angry, he could not give the order to cut off the head of Kafirit, because Kafirit could deceive not only ordinary sinful people, but also his most faithful fourteen warriors. Now, before the restoration of a peaceful life at Zher uiyk, Qudai Tagala could not issue such an order. There was nothing left to do but to tie up Kafirit in the most visible place so that he was constantly in sight.

At that moment, Qudai Tagala remembered his fourteen warriors, which he had turned into stars. He ordered Kyzyr Ate to tie Kafirit firmly to the center of the sky (*Temir Kazyk* – the Iron Stake). Kudai Tagala did everything so that not one eye in the Universe ever saw this center of the sky. Then, on this invisible iron stake, Kyzyr Ata tied the leash of the blue horse Bas Sardar. From that moment on, the fourteen warriors began circling around Temir Kazyk, guarding Kafirit. This time Kudai Tagala did not trust even Kyzyr-Ata to keep the magic key from Temir Kazyk. He hung the key in his throne.

The fourteen warriors cursed by Blue Sky and Black Earth, from that moment on, angry people began to call Ulken zheti karakshi (Big Seven Robbers) and Kishi zheti karakshi (Little Seven Robbers). Later, they were joined by other sinners who were guilty in front of Qudai Tagala. Thus, their number reached Kyryk karakshy (Forty robbers).

No matter how people look at the sky, it is impossible to see either “Forty robbers” or Kafirit in the sky. Because the level of Forty Robbers is below fourteen robbers. Kafirit is not a star, it is a smokeless flame (the Aurora Borealis). Up to now this fire paints the sky with multicolored paint, enchants people with extraordinary beauty.

So that no one else could attack the holy flock of sheep that provides life on the Black Earth, Qudai Tagala turned Kyzyr Ata and the holy flock of sheep into stars. And in order to separate the holy flock of sheep from fourteen robbers in the sky, Qudai Tagala created the four stars of "Bosaga" (Gemini: β Gem – Pollux and α Gem – Castor; Auriga: α Aur – Capella and β Aur – Mencalinan) as the border between them. To weigh the fate and actions of people, he created eight stars Usharkar-Tarazy (Orion). In order to protect people from the misfortune of “Kara uiyk”, where Kafirit lived, he created Olpan (Mercury) and Sholpan (Venus), as well as Kyzyl zhuldyz (Mars). Over time, people began to call the nine stars that form the basis of the sacred flock of sheep – “Urker” (Pleiades), and another bright star that moves behind them – “Kyzyr Ata” (Aldebaran).

After all this tragic history, the formerly unchanging climate of Earth has changed. Now on the Earth, 6 months of winter and 6 months of summer alternate.

Moving along the intended line (the ecliptic) Qudai Tagala – the shining Urker, moves from east to west, like the Sun (in fact, Urker is a fixed star cluster). Towards Urker, a golden fleece appears, thrown over the shoulder of an elderly robber (Alcor and Mizar). Behind him shines a golden lamb skin attached to the saddle of Ak Sarbaz.

At the sight of them, Urker (a flock of sheep) unwittingly recalls Zher uiyk, and all at once begin to bleat loudly. This is very annoying and infuriates the fourteen robbers. Forgetting their sins, they blame the flock of sheep ("Because of you, we suffer forever"). They begin to shoot arrows from their bow in the direction of Urker. Many times their arrows fly over Urker and destroy the scales of Usharkar-Tarazy. To protect Urker, Bosagi, Usharkar-Tarazy – Qudai Tagala turned the former habitat of Kafirit (Kara uiyk) into a huge shield (the Moon). Over time, the arrows of fourteen robbers left many holes on the surface of Kara uiyk. People hated Kafirit, so they often said: "Ai, ai, atana lagnet-ai (eternal damnation to you)." Later, this expression was shortened and the habitat of Kafirit (Kara uiyk) was simply called "Ai" (Moon).

The notorious fourteen robbers meet with Urker steadily every 27 or 28 days. Qudai Tagala made it so that during this meeting Ai (Moon) covered Urker with his body. Therefore, Urker always looks beautiful. The Moon looks variegated. Arrows from the bows of fourteen robbers made him ugly.

After many centuries, our ancestor nomads, from this phenomenon of the night sky, created a unique calendar. Initially, this calendar was called *Togysu*. This word from the Kazakh language is literally translated as "covering" or "occultation." Then our ancestors added the word "esep" (calculation, calendar). The result was a unique calendar of nomads, *Togys esebi*.

In this lunar-stellar calendar the Moon covers Urker for 13 or 14 months. Each month consists of 27 or 28 days. Unlike a purely lunar calendar, in this calendar each month begins with a different phase of the Moon. If the days and months in the Togys eseby calendar are calculated correctly, then everyone will notice that it always accurately reflects the rhythm of the nature of the Earth and the Universe.

Kafirit never sleeps. He makes extensive use of all his spellcasting talents. For many thousands of years, Kafirit inflames colored lights in that part of the sky where he is chained to Temir Kazyk. All twelve months of the year, he pretends to be warmed by the heat of this flame. Thus, wriggling like a snake, he cunningly attracts fourteen robbers to his fire.

The fourteen robbers, unable to withstand the severe frost, secretly descend from the sky to the fire of Kafirit to warm themselves. Thus, Kafirit deceived thirteen of the robbers, starting with Bas Sardar.

Thus, the insidious and purposeful Kafirit convinced thirteen robbers to take his side and approached the very top of the sky – Temir Kazyk. At this place of legend, my father always sighed sadly, and said: "Someday Kafirit will be able to deceive this last, fourteenth, young robber. Kafirit will break out of the chain and will be free. Then the end of the world will come. But until then our sinful world will hang on one hair of this young robber."

On the Day of Judgment, people will first of all be justly punished for the fact that they themselves, not knowing, took the side of Kafirit. For committing other unforgivable sins (the shedding of blood of people on Earth, for a crime against weak people and orphans, for the thirst for wealth, for greed, etc.).

After the "end of the world" the heavenly world will change, new stars will appear, a new generation of people will appear on earth. To test them, Qudai Tagala will install Zher uiyk in the center of the Earth again. Then he will resurrect the lamb with a golden hide from under the tree of life. From this lamb will grow exactly the same sheep with a golden fleece. And then Urker finally disperses and herds of white identical sheep will return to her.

When we were boys our elders often told us this parable. Usually, the legend of my father ended with these words: "Remember this legend all your life, then Kudai Tagala will have mercy on you on Judgment Day."

“Togys Esebi” Rediscovered

In this article the calendar of ancient nomads in Central Asia, later extended to the entire Eurasian continent, is presented fully for the first time. However, due to the complexity of its use in everyday life, this unique calendar had been forgotten, seemingly forever. But the nomads not only preserved it, they managed to adapt it to the harsh nomadic life.

Fragmentary explanation and interpretation of this calendar first appeared in 1959-1966 in the books [46] [16] of the Kazakh scientist Khasen Abishev, written in Kazakh. This book is notable for the fact that in it there are no references to prior literature. At the end of the book are given the names, as well as the regions, of 82 rural residents, who provided extensive information about the astronomical knowledge of the Kazakh people. Since this book has never been translated into other languages, this unique calendar was not known to the world until recently. For the first time, “Togys esebi” became known to Western readers from a brief description in my article on the Mayan calendar. [47]

Until today, various authors [48] in different sources on the topic "Togis esebi" wrote very briefly and unclearly, which led to the emergence of more questions than answers. A good example of this is a brief note by an unknown author [49] taken from the Internet:

> The star calendar, based on the sidereal cycle of the Moon, in practice is used very seldom. It is also the most ancient calendar. Such a calendar under the name togys (from Kazakh *togysu* meaning "to intersect" [occultation]) was used by Kazakhs. The beginning of months coincides with the moment when the Moon passes the Pleiades and the names of months correlate with lunar phases. As the difference between the synodic and sidereal cycles of the Moon is about 2 days, each subsequent meeting of the Pleiades and the Moon occurs on a lunar phase that is 2 days earlier than the previous lunar phase. There is a certain relation between the names of togyses months and seasons. So, for example, in the spring such "meetings" occur on the 5th, 3rd, 1st days of a lunar month, in the winter – on the 11th, 9th and 7th days. The beginning of a year in this calendar coincides with the month when the waxing (young) Moon meets the Pleiades. This usually occurs in a period between the end of April and the beginning of May. In an ancient Kazakh star calendar there are 13 such "meetings" [occultation] in a year from which only 11 are visible. If every month contains 28 days then the duration of the year is 364 days.

So that I do not waste the reader’s time, I will not discuss the errors in this passage, but rather I will provide some quotes from Section 3 of the manuscript of my book *The Kazakh National Calendar* [1], which explains the essence and principles of the "Togys esebi" calendar.

First of all, the reader should be aware that Togys esebi did not appear suddenly and instantly. It was developed gradually, based on achievements and at the same time on the shortcomings of “Urker esebi” and “Zhuldyz esebi”. According to the opinion of the author, the time of its occurrence is directly related to the time when the vernal equinox point (0° Aries) was exactly on the Pleiades star cluster, namely -2329-07-15 (July 15, 2330 BCE). [49a]

From those days (about 4,350 years ago) until the time of the recent Kazakhs nomads, various peoples (Sakas, Sarmatians, Huns, numerous Turkic tribes and present Turkic peoples and ethnic groups) counted each new year from the day when the thin band of the moon disk (Neomenia – Greek Νεομηνία, "new moon") [50] slowly covered the Pleiades.

Further, we ask you not to confuse this term with the modern astronomical term “new moon” – more properly called “dark moon”. In astronomy, the dark moon occurs when the Moon and the Sun have the same ecliptic longitude. At this time the lunar disk is not visible to the unaided eye, except when silhouetted during a solar eclipse. [51]

This noble and joyful day was called by all the nomads "Ulistyn Uly kuni". This word literally translates as "Great Day of the Nomad Empire." The first day of the first month (1 togys aiy – *neomenia*) "Togys esebi" in those days corresponded to the month of March. This day (March 20-21) today is known to the whole world as the great holiday of the east "Naw-Ruz" (translated from Persian – New Day). [52]

After 4350 years, the first day of the first month (1 togys aiy) "Togys esebi" moved to the month – April. Currently, you may notice that a thin strip of the disk of the Moon (*neomenia*) slowly covers the Pleiades from mid-April to early May. Probably, as a sign of nostalgia for the past, the Kazakh “Esepshi” call 3 togys aiy (March) – “Zhana togys” (New covering).

Since the basis of "Togys esebi" is the sidereal month, and the basis of the lunisolar calendar is the synodic month, these calendars should not be confused with each other.

In other words, "Togys esebi" takes as a basis the movement of the Moon, which covers the Pleiades every 27-28 days. Therefore, its scientific name should be “lunar-stellar calendar”. But the nomads called this calendar very simply “Covering calendar” or “Occultation calendar” (both names literally translate as “Togys esebi”).

You, probably, will still ask: “What is the difference between lunar-solar and lunar-stellar calendars?” Since this is a very important question that requires a comprehensive explanation of the principle of work of Togys esebi, we will completely answer this question.

The Moon revolves around Earth in an elliptical orbit with a mean eccentricity of 0.0549. Thus, the Moon's center-to-center distance from Earth varies with mean values of 363,396 km at perigee to 405,504 km at apogee. The lunar orbital period with respect to the stars (sidereal month, literally “togys aiy”) is 27.32166 days (27d 07h 43m 12s). [53] [54]

The most familiar lunar cycle is the synodic month (synodic month, literally "tuar ai") because it governs the well-known cycle of the Moon's phases. The Moon has no light of its own but shines by reflected sunlight. As a consequence, the geometry of its orbital position relative to the Sun and Earth determines the Moon's apparent phase. [53]

The mean length of the synodic month is 29.53059 days (29d 12h 44m 03s). *This is nearly 2.21 days longer than the sidereal month.* (29.53 days – 27.32 days = 2.21 days) As the Moon revolves around Earth, both objects also progress in orbit around the Sun. After completing one revolution with respect to the stars, the Moon must continue a little farther along its orbit to catch up to the same position it started from relative to the Sun and Earth. This explains why the mean synodic month is longer than the sidereal month. [53] [54]

In other words, the principle of operation of the Togys esebi calendar is based precisely on the difference of days of 2.21 days between the synodic and sidereal months.

The calculation of the nomads was very simple:

1. 27.32 days ÷ 2.21 days = 12.362 tuar ai × 3 years = 37.09 tuar ai
2. 29.53 days ÷ 2.21 days = 13.362 togys ai × 3 years = 40.09 togys ai
3. 27.3 days × 40 togys ai = 1092 days ÷ 37 tuar ai = 29.5 days

During the study "Togys esbi" the author of this article calculated very accurate 423 (365.2576832 days) = 435 = 436 summer cycles:

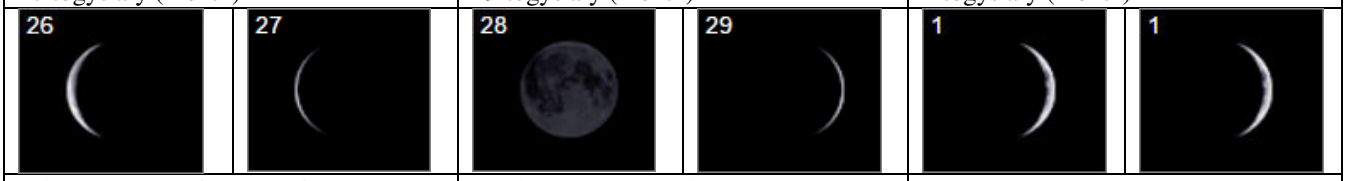
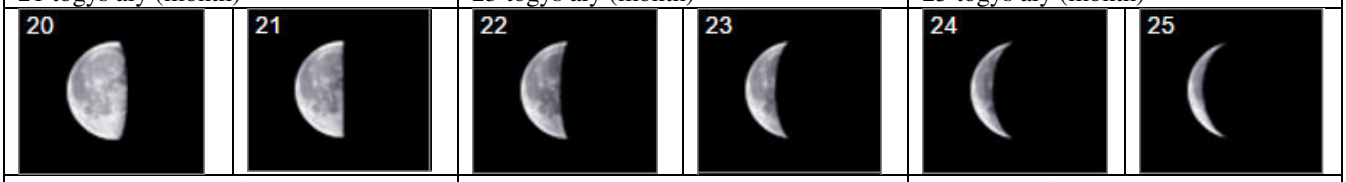
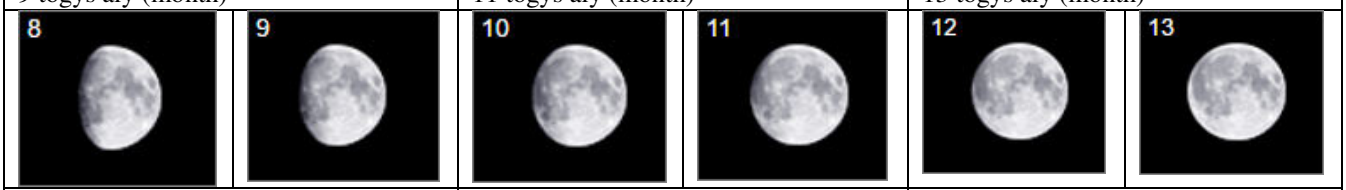
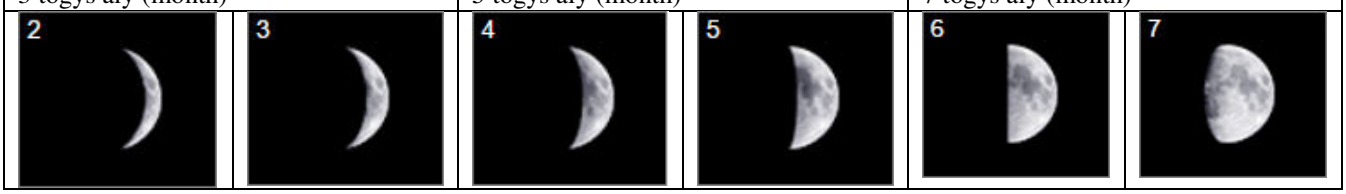
1. 27.321662 ÷ 2.209 = 12.3688 × 423 years = 5232 tuar ai = 436 years
2. 29 530581 ÷ 2,209 = 13.3688 × 423 years = 5655 togys ai = 435 years
3. 27.32 days × 5655 togys ai = 154504 days ÷ 5232 tuar ai = 29.53 days

Not yet known to science this universal cycle can be called “the lunar precession”, since there is exactly 1 year difference between the lunar calendar and the stellar calendar!

In turn, this principle of work of Togys esebi gives rise to two phenomena that are not found in lunar, solar and lunar-solar calendars:

The first phenomenon: In accordance with the chosen principle of work in the Togys esebi calendar, each new “togys aiy” (literally “covering the month”) begins with a reduced new phase of the Moon, which differs from the previous phase of the moon “togys aiy” by 2 to 3 days. These diminishing phases of the moon are clearly visible in Figure 4.

Figure 4 Approximate Moon phases that cover the Pleiades throughout the year

27 togys month	These 4 types of phase of the Moon were considered as – 1 togys month	
10 May 14:00 – 6 June 12:00	from April 12 (Almaty time is 15:30) – until May 9 (Almaty time is 13:30)	
27 togys aiy (month)	29 togys aiy (month)	1 togys aiy (month)
		
July 31 8:00 – 26 August 6:30	4 July 10:00 – 30 July 8:30	7 June 12:00 – 3 July 10:00
21 togys aiy (month)	23 togys aiy (month)	25 togys aiy (month)
		
20 October 3:00 – 16 November 1:00	23 September 4:30 – 20 October 3:00	27 August 6:30 – 22 September 4:30
15 togys aiy (month)	17 togys aiy (month)	19 togys aiy (month)
		
11 January 21:30 – 6 February 19:30	14 December 23:30 – 10 January 21:30	17 November 1:00 – 14 December 23:30
9 togys aiy (month)	11 togys aiy (month)	13 togys aiy (month)
		
2 April 16:00 – 11 April 15:30	6 March 18:00 – 2 April 16:30	7 February 19:30 – 6 March 18:00
3 togys aiy (month)	5 togys aiy (month)	7 togys aiy (month)
		

The second phenomenon: In the Togys esebi calendar, the corresponding “togys aylari” does not have any name in words, as in lunar, solar and lunar-solar calendars, they are numbered according to the corresponding decreasing phases of the Moon.

Not to mention the ancient times, even now (21st century), suddenly, because of stupidity, we manage to replace the names 13 and 14 togys aylary (for example, with the names of animals), then such confusion will begin that even the devil himself could not unravel. Nomads knew about it well and did not even try to do it. To theoretically understand the structure of the months of “togys ailars” in Togys esebi, it is enough to look at Tables 3, 4 and 5 above, then much can be understood about the structure and principles of work of Togys esebi.

Firstly, these 3 tables are specially developed only for 3 years. These 3 years or about 1092 or 1093 days form the basis of Togys esebi.

1) 27.325 days × 40 togys ai = 1093 days
2) 28 days × 39 zhuldyz ai = 1092 days ÷ 3 years = 364 days
3) 29.54 days × 37 tuar ai = 1093 days

Secondly, in these three tables you will notice that every year for 3 years approximately begins with 1 togys ai (on the first day of the phase of the moon) and ends at 3 togys ai (the third day of the phase of the moon). This is the rhythmically repeated astronomical and mathematical constancy of Togys esebi.

In the middle of any of the 3 years, the phases of the moon fluctuate within 2-3 days. This is due to the fact that after each 5 togys ai, a fractional number – 0.21 days is an extra 1 day (0.21 days × 5 togys ai = 1.05 day). Nomads call this rule “Takka togaytu aiy” (accounting with odd numbers). In accordance with this rule, in Togys esebi there is never a “togys aiy with an even number”.

These two phenomena and two rules are the simplest and most explainable part in the structure and principles of work of Togys esebi. However, this is only the beginning. Therefore, many Kazakh-speaking authors and researchers who write about Togys esebi limit their description with these phenomena and rules. We go further and continue to where the human mind has not gone before.

The first key to the correct understanding of Togys esebi:

Any person or reader who has at least some astronomical knowledge understands well that all fixed stars like Urker (Pleiades) are not always visible to the observer from the Earth. This is due to the apparent movement of the sun along the ecliptic.

As the Earth orbits around the Sun over the course of the year, we observe the Sun to track out a circle around the celestial sphere (which is the sky seen as a sphere which revolves around an axis defined by the North and South Poles). This track of the Sun on the celestial sphere is called “the ecliptic”. Relative to the "fixed" stars we observe the Sun to move eastwards on the celestial sphere completing one full circuit of 360° over the year (about 365.25 days), i.e., an eastward motion of about 1° per day. The zodiac is the set of constellations on the ecliptic (i.e., those that the Sun travels through in the course of the year). The traditional twelve zodiac constellations are Aries (Kos zhuldyz), Taurus (Sulusary), Pleiades (Urker), Gemini (Bosaga), Cancer (Mosy), Leo (Kambar), Virgo (Sattary segiz), Libra (Tarazy), Scorpio (Buyi), Sagittarius (Mergen), Capricornus (Taueshki), Aquarius (Sukuigysh) and Pisces (Balyktar). [55]

In the course of the year, the Sun spends six months above the celestial equator (about 21st March to about 20th September) and six months below (about 20th September to the about 21st March). It is this 23.5° tilt of the Earth's spin axis with respect to the ecliptic plane which causes the seasons.

For northern hemisphere observers the Sun stops moving up the celestial sphere reaching its highest point on about 21st June, i.e. at the summer (June) solstice. The word solstice means "Sun standing still". At this time the Sun is at Right Ascension 6h, Declination +23.5°. At this time northern hemisphere observers receive the maximum amount of sunlight because the Sun is highest in the sky at noon and is above the horizon for the longest period.

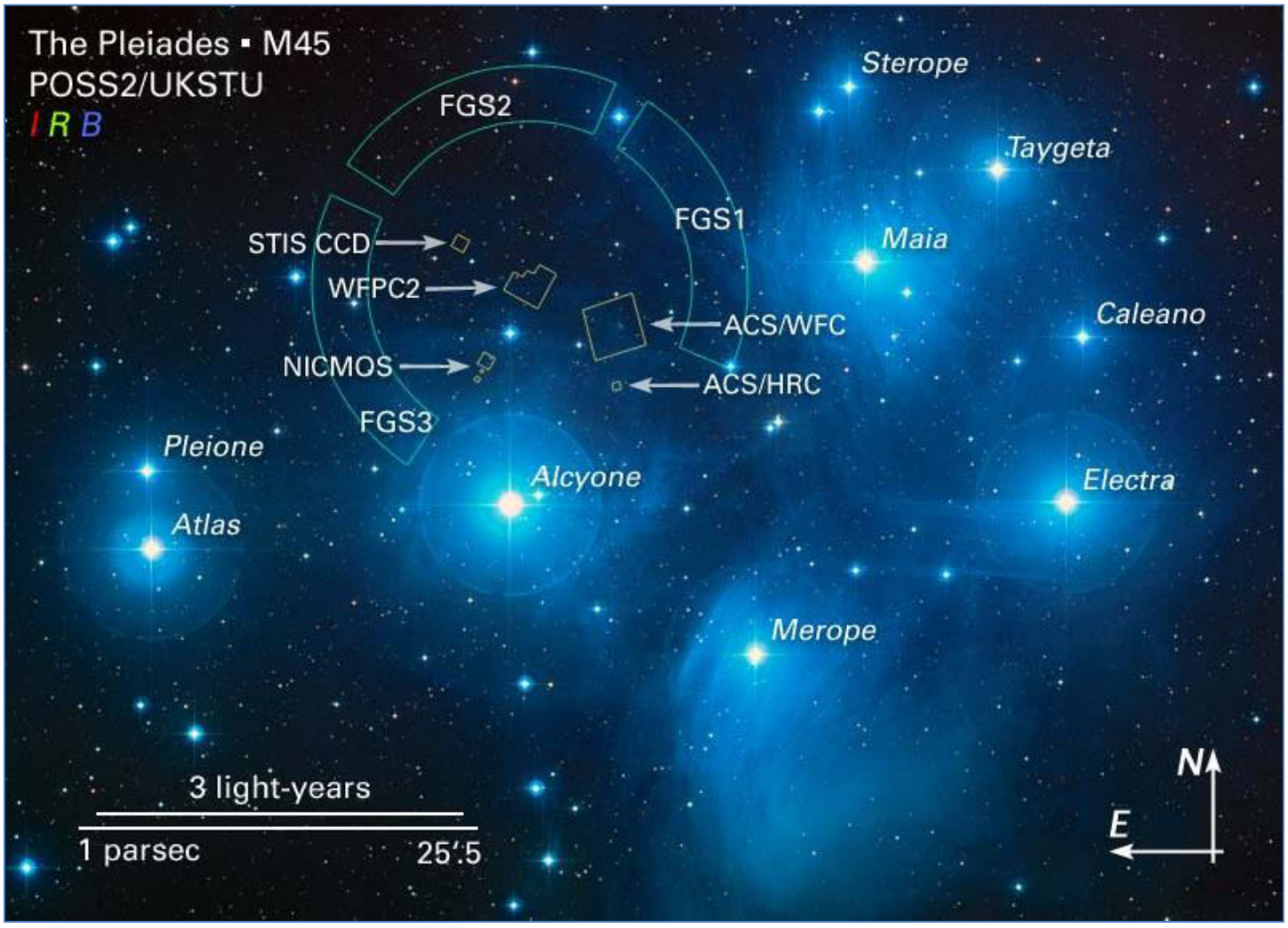
On about 20th September, the Sun crosses the celestial equator moving southwards. This is the autumnal (September) equinox. At this time the Sun is at RA 12h, Decl. 0.0°. The Sun reaches its lowest point at the winter (December) solstice on about 21st December. At this time the Sun is at RA 18h, Decl. −23.5°. Northern hemisphere observers receive the minimum amount of sunlight at this time as the Sun is lowest in the sky at noon and is above the horizon for the shortest time. [55]

The second key to the correct understanding of Togys esebi:

To understand how Urker is connected with the apparent movement of the Sun along the ecliptic, I will give a very brief modern scientific definition of the Pleiades:

The Pleiades is an open cluster consisting of approximately 3,000 stars at a distance of 400 light years (120 parsecs) from Earth in the constellation Taurus. It is also known as "The Seven Sisters", or the astronomical designations NGC 1432/35 and M (Messier) 45. It is among the nearest star clusters to Earth and is the cluster most obvious to the naked eye in the night sky. A color-composite image of the Pleiades from the Digitized Sky Survey is given in Figure 5.

Figure 5 Nine bright stars of the Pleiades



The nine brightest stars of the Pleiades are named for the Seven Sisters of Greek mythology: Sterope, Merope, Electra, Maia, Taygeta, Celaeno, and Alcyone, along with their parents Atlas and Pleione).

The name of the Urker stars in the version of my father Aliceit Kambaruly (these names of stars are associated with sheep of different ages):

No.	Greek mythology	The name of the stars Urker in the Kazakh language
1	Alcyone	Altyn zhundi ak saulyk
2	Atlas	Ai muyizdi ak serke
3	Electra	Bualdyr ishinde buaz koi
4	Maia	Kuiekti sezgen kok koshkar
5	Merope	Kulagy tilik kunan koi
6	Taygeta	Don muryndi donen koi
7	Pleione	Ak serkenin ak muyizi
8	Celaeno	Toiyp algan toktyshak
9	Sterope	Kozy ertken konyr koi

Coordinates:
Right ascension: 03h 47m 24s
Declination: +24° 07′ 00″ [56]
Distance: 444 ly on average (136.2±1.2 pc [57] [58] [59] [60])
Apparent magnitude: (V) 1.6
Apparent dimensions: (V) 110' (arcmin) [61]

The third (and main) key to the correct understanding of Togys esebi:

Now we should try to understand how the visible movement of the Sun along the ecliptic and Urker is associated with the covering or occultation of the Moon (*Ai*):

The mean inclination of the lunar orbit to the ecliptic plane is 5.145°. And any star with an ecliptic latitude of less than about 6.5 degrees may be occulted by it. There are three first magnitude stars that are sufficiently close to the ecliptic that they may be occulted by the Moon and by planets – Regulus, Spica and Antares. [62] Occultations of Aldebaran are presently only possible by the Moon, because the planets pass Aldebaran to the north. Neither planetary nor lunar occultations of Pollux are currently possible. However, in the far future, occultations of Pollux will be possible, as they were in the far past. Some deep-sky objects, such as the Pleiades, can also be occulted by the Moon. [63] [64]

Modern astronomy, as well as all scientific literature [for example, 64, p. 433, Alcyone] considers only those bright stars that the Moon exactly covering (occultation) at a given time. Pleiades is not included in the list of these stars; only Alcyone is included.

Since the nomads in ancient times did not have high-precision astronomical instruments (astrolabe, quadrant, armillary sphere, clock, binoculars, telescope, calculator, computer, etc.) [65], they observed the Sun in the daytime and at night the Moon and the Pleiades. However, the author suspects that the nomads possessed primitive astronomical instruments in the form of earth or stone embankments.

The notorious "Esepshi" left behind a lot of intangible oral heritage and a significant amount of material evidence. The territory of present-day Kazakhstan is covered with mysterious ancient kurgans (megaliths, dolmens, menhirs, cromlechs, cairns, seids, etc.). Among them, the so-called “whiskered mounds” or “lunar-solar mounds” are very often found. Many of them are still considered "sacred" (holy) places for the Kazakhs.

Today in Kazakhstan there are about 35,000 architectural, archaeological and historical monuments. [66] Among them, hundreds of archaeoastronomical objects are valuable not only for domestic, but also for world science. In my book, I dedicated the first part to this topic [1, p. 78-79, 85-86], and also from the point of view of science indicated the exact coordinates of very important hundreds of objects. Any reader can view these mysterious objects from space, reducing the height to a minimum ("Google Maps" and "Google Earth" [67]).

The Nine Principles of the Lunar-Stellar Calendar Togys Esebi

For a complete understanding of the lunar-stellar calendar of nomads nine principles of its work must be learned. However, in some places where I describe these nine principles, if I write “Urker lies under the Earth for 40 days” or “Urker moves along the ecliptic from the east, and the Moon moves towards from the west,” etc., this does not mean that I do not know that Urker (the Pleiades) is a fixed star cluster and that it never descends into the Earth, etc. In the course of describing these principles in some places I will have to think and speak like the ancient nomads, who did not know that the Earth is round like a ball and, moreover, that it moves around the Sun. Modern and complex astronomical scientific language cannot explain the ancient Togys esebi because they speak different languages. My goal is to present nine principles in language that is understood by both scientists and nomads (though that it is very difficult).

The first principle of the lunar-stellar calendar Togys esebi:

During a period from 8-9 to 9-10 years (9 years on average), the Moon either completely or partially covers the Pleiades as it passes it. (Table 6)

Table 6 Approximate periods (1892-2050) of "Tolyk togysu" and "Alystap togysu" in the interval 8.83 – 10 years

Periods	Day	Month	Year	Week	UT	J. Day	P. D.	S.M.	S.M. amount	S.Y.	S.Y. amount
Tolyk	10	January	1892	Sun.	15:35	2412107	3443	126	27,32539683	9,43	365,1113468
Alystap	15	June	1901	Sat.	5:10	2415550	3442	126	27,31746032	9,42	365,3927813
Tolyk	17	November	1910	Thurs.	19:00	2418992	3498	128	27,328125	9,58	365,1356994
Alystap	15	June	1920	Tues.	5:30	2422490	3442	126	27,31746032	9,42	365,3927813
Tolyk	17	November	1929	Sun.	19:10	2425932	3224	118	27,3220339	8,83	365,1189128
Alystap	15	September	1938	Thurs.	23:25	2429156	3306	121	27,32231405	9,05	365,3038674
Tolyk	4	October	1947	Sat.	22:15	2432462	3525	129	27,3255814	9,65	365,2849741
Alystap	29	May	1957	Wed.	6:30	2435987	3224	118	27,3220339	8,83	365,1189128
Tolyk	27	March	1966	Sun.	10:35	2439211	3661	134	27,32089552	10	365,3692615
Alystap	4	April	1976	Sun.	10:00	2442872	3224	118	27,3220339	8,83	365,1189128
Tolyk	31	January	1985	Thurs.	14:00	2446096	3333	122	27,31967213	9,13	365,060241
Alystap	18	March	1994	Fri.	11:00	2449429	3524	129	27,31782946	9,65	365,1813472
Tolyk	10	November	2003	Mon.	19:30	2452953	3388	124	27,32258065	9,28	365,0862069
Alystap	18	February	2013	Mon.	13:00	2456341	3251	119	27,31932773	8,9	365,2808989
Tolyk	13	January	2022	Thurs.	15:30	2459592	3388	124	27,32258065	9,28	365,0862069
Alystap	24	April	2031	Thurs.	9:00	2462980	3442	126	27,31746032	9,42	365,3927813
Tolyk	25	September	2040	Tues.	22:30	2466422	3525	129	27,3255814	9,65	365,2849741
Alystap	21	May	2050	Sat.	6:50	2469947	0	0	0	0	0

1) Full covering of Pleiades by the Moon called in Kazakh is “Zharasyp togysu” (peaceful coverage) or “Koiyndasyp togysu” (embracing covering). In modern astronomy, this type of coverage is recognized. See Figure 6 and the animation “Covering the Pleiades by the Moon on August 23/24, 2008 in Moscow” [68].

Figure 6 Full covering of Pleiades by the Moon

2) Partial covering of Pleiades by the Moon in Kazakh is called “Kyrbailanyp togysu” (stretched coverage) or “Topyrak shashyp togysu” (spiteful covering). Modern astronomy does not recognize this type of coverage. See Figure 7.

Figure 7 Partial covering of the Pleiades by the Moon

From the first principle it becomes clear that the nomads never interrupted the systematic chain of the endless covering of the Pleiades by the Moon. During an approximately 9-year period of full covering of Pleiades by the Moon, you can more or less establish the beginning of each sidereal month (togys aiy).

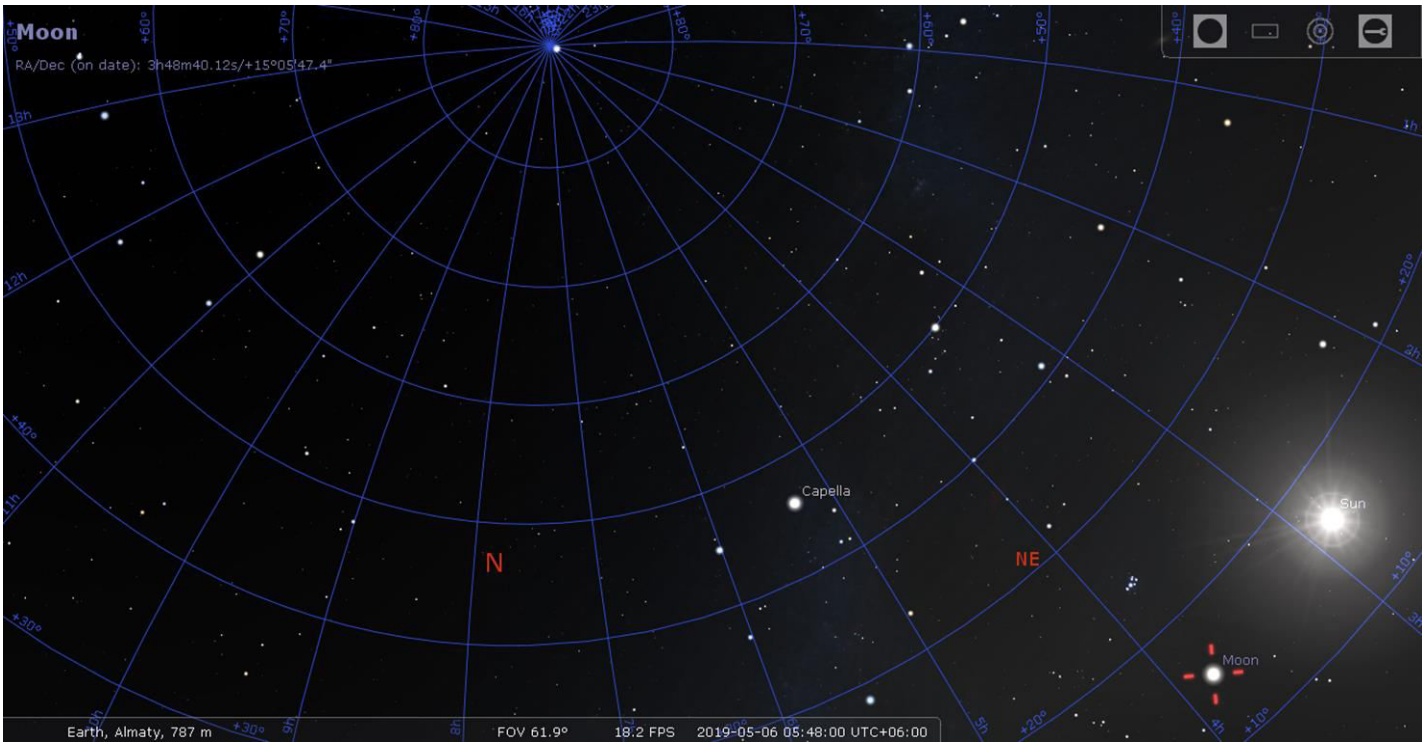
And what about in the approximately 9-year period of partial covering of Pleiades by the Moon? How did the nomads define the beginning of the sidereal months (togys aylary) when the Moon does not cover the Pleiades exactly? From this arises the second principle of Togys esebi.

The second principle of the lunar-stellar calendar Togys esebi:

To solve this problem the nomads used (as earthly observers) the only "fixed" star - "Temirkazyk" (Polaris, a.k.a. the Polar Star). Polaris (α Ursa Minor, abbreviated α UMi) is the brightest star in the constellation of Ursa Minor (Right ascension 02h 31m 49.09s, Declination + 89° 15’ 50.8”).

During the full and partial covering of Pleiades by the Moon, nomads determined the beginning of each new sidereal month (togys aiy), when the Moon, the Pleiades and Temirkazyk were in one line. At the present time (approximately from 2012 to 2021) we can observe the partial coverage of the Pleiades by the Moon. (Figure 8)

Figure 8 Moon, Pleiades and Temirkazyk are in one line.



No.	Date	Sidereal month	Covering periods	Week	JDN
1	02.02.2012	07 togys aiy	Full covering	Thu	2455959.5
2	29.02.2012	05 togys aiy	Partial covering	Wed	2455986.5
3	17.12.2021	11 togys aiy	Partial covering	Fri	2459565.5
4	13.01.2022	09 togys aiy	Full covering	Thu	2459592.5

What to do when the Pleiades and the Moon are not visible in the sky at night?

This was an expected and very difficult question. It is from this place that the third principle arises by itself. The explanation of this principle will be somewhat lengthy due to the complexity of the question .

The third principle of the lunar-stellar calendar Togys esebi:

In the south-east of Kazakhstan (Almaty, 43°15'20"N 76°55'3"E), Urker (Pleiades) is not visible in the sky at night from May 10 to June 20 (about 40 days). Just on the eve of the summer solstices, the "invisible period of the Pleiades," among the nomads, was called "Urker 40 kun Zherdin astynda zhatady." This phrase literally means "Pleiades lie underground for 40 days." Even some modern Kazakh researchers wrote that at this time of the year "the Pleiades go into the southern hemisphere, so the Pleiades are not visible in the northern hemisphere." In fact, the Pleiades is a fixed star cluster, it does not go anywhere, it stands still. Then why is the Pleiades not visible at night?

The answer is very simple. Please see "The first key to the correct understanding of Togys esebi" above. The zodiac is the set of constellations on the ecliptic (i.e., those that the Sun travels through in the course of the year).[55] For about 37-40 days, the Sun obscures with a powerful light not only the Pleiades but also all the stars of the Taurus constellation from earthly observer.

It is during this 40-day period that we miss two invisible coverings of the Pleiades by the Moon:

The first covering of the Pleiades by the Moon occurs during a new moon (a.k.a. “dark moon”) when the Moon is not visible. It is this covering of the Pleiades by the Moon that is often accompanied by a solar eclipse.

The second covering of the Pleiades by the Moon occurs during the 29th, 28th or 27th phases of the Moon.

These two coverings of the Pleiades by the Moon occur on the eastern horizon before the Sun rises. In modern astronomical language, this phenomenon is called *heliacal rising*: "Heliacal risings occur after a star has been behind the Sun for a season and it is just returning to visibility. There is one morning, just before dawn, when the star suddenly reappears after its absence. On that day it "blinks" on for a moment just before the sunrise and just before it is then obliterated by the Sun's presence. That one special morning is called the star's heliacal rising." [69] [16] [46]

I assume that the 765-day “Togiz tasil” (Nine rules) helped the nomad priest of “Esepshi” (timekeeper) to determine the first day of a continuous sidereal month (togys aiy):

27 × 28 togys ai = 756 + 9 = 765 days ÷ 28 togys ai = 27.321428571 days

Apparently, in addition to the continuous physical observation of the Pleiades and the Moon, Esepshi (timekeeper) indirectly counted a continuous number of days, months and a year with the help of Togiz Tasil:

1) 355 days + 355 days + 27 + 28 = 765 days
2) 355 days + 382 days + 28 = 765 days
3) 27 days × 19 + 28 days × 9 tasil (rules) = 513 + 252 = 765 days, etc.

Despite this comprehensive answer, one question remains. How did Esepshi determine the exact time of the day or night when the Moon covered the Pleiades?

An interesting and at the same time intriguing question that requires a comprehensive answer concerns the fourth principle of the Togys esebi.

The fourth principle of the lunar-stellar calendar Togys esebi:

Closer to spring, especially in summer or at any time of the year due to the complex movement of the Moon, covering of Pleiades by the Moon, defining the 1st day of the sidereal month (togys aiy), can occur in the morning, afternoon or evening. How and in what way did the nomads determine these coverings in the daytime?

Since ancient times, mankind has known the four main phases of the moon, namely, the new moon (a.k.a. dark moon), the first quarter, the full moon and the third quarter (a.k.a. the last quarter). In order to maintain a correct count of days, months and years, the nomads divided the visible phases of the moon in simple years into 13, and leap years into 14 phases (See Figure 4 and Table 3, 4 and 5 above). Up to today the name of the phases of the moon, which takes into account all 29 or 30 days in the Kazakh language, has changed little. The following is the name of the Moon phases in the Kazakh language:

Tugan Ai (literally “neomenia”) – from 1 to 3 days:
1. Tugan Aydin 1 zhanasy (neomenia – new moon)
2. Tugan Aydin 2 zhanasy (neomenia – new moon)
3. Tugan Aydin 3 zhanasy (neomenia – new moon)
Zhana Ai (literally “new moon”) – from 4 to 7 days:
4. Zhana Aydin 4 zhanasy ”(new moon)
5. Zhana Aydin 5 zhanasy ”(new moon)
6. Zhana Aydin 6 zhanasy ”(new moon)

7. Zhetilik Ai – Seven-day Moon (first quarter of the moon).
Osushi Ai (literally "growing moon") – from the 8th to 13 days:
8. Osushi Aydin 8 zhanasy (growing Moon)
9. Osushi Aydin 9 zhanasy (growing Moon) ... 10, 11 zhanasy
12. Osushi Aydin 12 zhanasy (growing Moon)
13. On ushtik Ai – the thirteen day moon.
Tolgan Ai (literally "full moon") – from the 14th to the 21st day:
14. On tortine tolgan Ai – fourteen day Moon.
15. Tolgan Aydin 13 eskisi "(full moon)
16. Tolgan Aydin 12 eskisi ”(Full Moon) ... 11, 10, 9, 8 eskisi
21. Tolgan Aydin 7 eskisi ”(Full Moon).
Kemushi Ai (literally “last quarter Moon”) – from the 22nd to the 28th day:
22. Kemushi Aydin 7 eskisi (last quarter Moon)
23. Kemushi Aydin 6 eskisi (last quarter Moon) ... 5, 4, 3 eskisi
27. Kemushi Aydin 2 eskisi (last quarter Moon)
28. Kemushi Aydin 1 eskisi (last quarter Moon).
Oliara * (literally "dead cut") – 29th and 30 days:
29. Aydin 1 oliarasy (astronomical new moon)
30. Aydin 2 oliarasy (astronomical new moon).
* Oliara – when the Moon is not visible (the end of the old and the beginning of the new).

What is the connection between the covering of Pleiades by the Moon in the morning, afternoon and evening with these incomprehensible phases of the moon? However, these same readers have repeatedly seen the “white silhouette” of the Moon in the sky during the day. [70, Principal and intermediate phases of the Moon] Nomads also saw this barely visible or clearly visible white silhouette of the Moon and used it to achieve their goal.

From Table 3, 4 and 5, you can see the preliminary phase of the Moon and the corresponding days and months of the year when the Moon covers the Pleiades. Looking carefully at the visible phase of the moon in the morning, afternoon or evening you can easily guess when the Moon covers the Pleiades.

The meaning of the Kazakh word “mezgil” or “shak” is synonymous with the Greek word “nychthemeron” (Greek νυχθήμερον consisting of two words: “Nycht” [Night] and “Hemera” [day, daytime]). [71] Unlike other ancient peoples of the world, the nomads of Central Asia divided the days (24 hours) into 18 time intervals: 24 hours ÷ 18 mezgils, shak = 1 hour and 20 minutes.

The name of the time intervals of day and night ("mezgil" or "shak") in the Kazakh language:
1. A glimpse of the morning dawn
2. The advance of the morning dawn
3. The dawn or the coming of the morning
4. The sunrise
5. The sun at the height of the rope
6. Morning hours (8-9 hours of the day)
7. Midday clock (10-11 hours of the day)
8. Noon when the sun is overhead (12 o'clock in the afternoon)
9. Time after noon (13-14 hours of the day)
10. The sun is inclined to the west (15-16 hours of the day)
11. The sun approaches the western horizon (17-18 hours of the day)

12. Sunset
13. The coming of the evening
14. The arrival of evening darkness
15. Nightfall, the approach of the night
16. Midnight
17. After midnight
18. A short dark time before dawn.

At the end of this description of the fourth principle, we can draw such an unexpected conclusion. As can be seen from this description, in comparison with the classical (lunar, solar and lunisolar) calendars, covering of Pleiades by the Moon can occur at any time of the day. (Table 7)

Table 7 Date, hours and minutes between 1975 and 2055, defined in the 80-year cycle

Periods	Day	Month	Year	Week	UT	J. Day	P. D.	S.M.	S.M. amount	S.Y.	S.Y. amount
Tolyk	10	January	1892	Sun.	15:35	2412107	3443	126	27,32539683	9,43	365,1113468
Alystap	15	June	1901	Sat.	5:10	2415550	3442	126	27,31746032	9,42	365,3927813
Tolyk	17	November	1910	Thurs.	19:00	2418992	3498	128	27,328125	9,58	365,1356994
Alystap	15	June	1920	Tues.	5:30	2422490	3442	126	27,31746032	9,42	365,3927813
Tolyk	17	November	1929	Sun.	19:10	2425932	3224	118	27,3220339	8,83	365,1189128
Alystap	15	September	1938	Thurs.	23:25	2429156	3306	121	27,32231405	9,05	365,3038674
Tolyk	4	October	1947	Sat.	22:15	2432462	3525	129	27,3255814	9,65	365,2849741
Alystap	29	May	1957	Wed.	6:30	2435987	3224	118	27,3220339	8,83	365,1189128
Tolyk	27	March	1966	Sun.	10:35	2439211	3661	134	27,32089552	10	365,3692615
Alystap	4	April	1976	Sun.	10:00	2442872	3224	118	27,3220339	8,83	365,1189128
Tolyk	31	January	1985	Thurs.	14:00	2446096	3333	122	27,31967213	9,13	365,060241
Alystap	18	March	1994	Fri.	11:00	2449429	3524	129	27,31782946	9,65	365,1813472
Tolyk	10	November	2003	Mon.	19:30	2452953	3388	124	27,32258065	9,28	365,0862069
Alystap	18	February	2013	Mon.	13:00	2456341	3251	119	27,31932773	8,9	365,2808989
Tolyk	13	January	2022	Thurs.	15:30	2459592	3388	124	27,32258065	9,28	365,0862069
Alystap	24	April	2031	Thurs.	9:00	2462980	3442	126	27,31746032	9,42	365,3927813
Tolyk	25	September	2040	Tues.	22:30	2466422	3525	129	27,3255814	9,65	365,2849741
Alystap	21	May	2050	Sat.	6:50	2469947	0	0	0	0	0

Therefore, the nomads did not have a specific beginning of the time of day. However, despite this unusual division into 18 hours instead of 24 hours, nomads firmly decided that the beginning of the year in Togys esebi will always begin not from an astronomical new moon (oliara – May month), but from a narrow crescent of the Moon (neomenia – April month). What for? It is from this place that the explanation of the fifth principle of Togys esebi begins.

Fifth principle of the lunar-stellar calendar Togys esebi:

For the role of the 1st day (Ulystyn uly kuni – 1 togys aiy) of the current year, the nomads chose the very moment when Urker still did not disappear from view for 37-40 days. These days (approximately from mid-April to 10 May), on the western horizon, under the narrow crescent of the moon, one can see a “weak” silhouette of the barely visible Pleiades. After this, Urker disappears completely and appears only after 37-40 days on the eastern horizon before the rising Sun, just on the eve of the date of the summer solstice.

I deeply suspect that the great Stonehenge these days does not indicate the summer solstice, as many think. Stonehenge indicates the place of appearance (heliacal sunrise) of the Pleiades. In the future, many tourists and supporters of ancient science, who gather on the eve of June 20-22 for this event in Stonehenge, can see for themselves.

When did this rule or tradition arise among the nomads?

I am not completely sure, but I suppose that the nomads when they began the countdown of their era in "Urker esebi" (later "Zhuldyz esebi") in 2283 BCE – covering of Pleiades by the Moon occurred in a narrow crescent of the Moon (neomenia – March month). So, as the nomads always focused strictly on the Pleiades, they preserved this old tradition and continue each beginning of the year according to Togys Esebi (the legitimate continuation of "Urker esebi", later "Zhuldyz eseby") from the narrow crescent of the Moon (neomynia – is now April month). It is here that such an interesting astronomical paradox arises.

In modern astronomy there are three interconnected concepts: precession, nutation and equinox. According to the laws of these concepts, at this point in time, the vernal equinox point passed from the constellations of Aries to the constellation Pisces. During the Gregorian calendar reform in the 16th century, the date of the spring equinox was set at 21 March. However, for some "unknown reason" at this time, this date has shifted and was set around March 20. [72] [73] [74] In brief, Pope Gregory XIII did not keep his word (an error of 1 day should have been accumulated only after 3300 years). [75] But the most important thing in this story is not this.

In the northern hemisphere on March 20-21, it is definitely not yet spring. It feels as if it is still the continuation of winter. Even the Christian Easter, which was to take place around March 21, is often celebrated in April. [76]

Recently, Akims (governors) of the northern regions of Kazakhstan often require that the Nauryz holiday (at the vernal equinox) be celebrated not on March 22, as it is now, but in April. [77]

As we can see from the structure and principle of work, in Togys Esebi the first day of the year always occurs in late April or early May. Maybe the nomads were right?

Not everyone can agree with this obvious conclusion of the author. I respect the opinions of all people in our planet. However, I think that those who disagree with my opinion, as the main argument says "where is all this written?" The answer to this prudent question lies in the sixth principle.

The sixth principle of the lunar-stellar calendar Togys esebi:

Nomads cannot be considered completely illiterate and without writing. This is evidenced by the inscription on a silver cup, found not far from Almaty, along with the Scythian "Golden Man" (6th century BC, the city of Issyk-Esik, literally "Door"). [78] Another inscription (Orkhon inscriptions) in the ancient Turkic language was deciphered only in the 20th century. [79]

In addition, Kudai Tagala gave the nomads excellent memory, eloquence and improvisation. In the history of Central Asia there were many nomads who memorized a huge text that is not shorter than the text of a book (epic poem, genealogy, etc.). Draw your own conclusion: When there were so many walking “living books”, why and who needed to develop writing based on signs. However, after many tens of centuries, it is necessary to recognize that this was the main mistake of the nomads.

Thus, the nomads kept all their history, culture and writing in their heads, including many numbers and tables. Thanks to this gift of the Almighty Kudai Tagal, you have the opportunity to get acquainted with the unique calendar "Togys esebi".

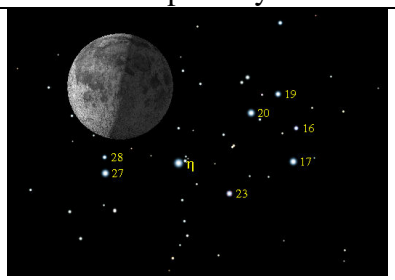
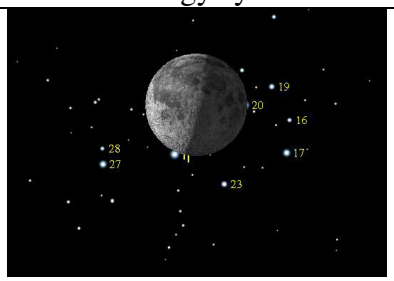
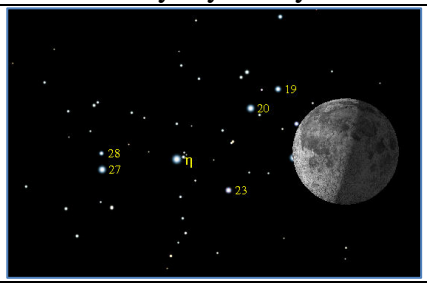
I am saying all this so that you can understand the meaning of three important sentences which has become like a winged word or aphorism in the Kazakh language, which, as an important detail, complements the puzzle called “Togys esebi”.

When we consider that the nomads did not have high-precision devices , then the observations of the night sky by the nomads can be regarded as "coarse" observations. Due to these "rough" observations, the accuracy of the "Togys esebi"

calendar fluctuated within 3 days at the beginning of each month (togys ay). In part, this was facilitated by the complex and unpredictable movement of the Moon. It is believed that three epithetic names were invented by Esepshi himself:

1) The first day was called "Auyl uy kondy" (literally "settled next to each other" or the Moon approached the Pleiades from the east), the astronomical name "Arrival".
2) The second day was called "Togysty", "togamdasty" (covering of the Pleiades by the Moon), the astronomical name of "Coverings".
3) The third day was called "Orip shikty" (literally "a flock of sheep leaves the corral" or the Moon moves away from the Pleiades from the eastern side), the astronomical name "Opening". (Figure 9)

Figure 9 Three epithetic names for covering of Pleiades by the Moon

The third day was called "Orip shikty"	The second day was called "Togysty"	The first day was called "Auyl uy kondy"
		
The Moon moves away from the Pleiades from the east side	Covering of Pleiades star cluster by the Moon	The Moon approaches the Pleiades from the east side

Thus, focusing on these three descriptions, the nomads more accurately determined the first day of the beginning of each sidereal month (*togys aiy*) in Togys esebi.

Under the inside of different words and phrases, proverbs and sayings, as well as among various aphorisms of nomads, you can find real digital arithmetic.

For example, the Kazakhs have a saying: “Kyrkyna shydap – kyryk birine shydamapty”. An approximate translation says: "Tolerant to forty, but not tolerable forty-first:"

1. 27.3 days × 40 togys aiy = 1092 days ÷ 3 years = 364 days
2. 27.3 days × 41 togys aiy = 1119 days ÷ 3 years = 373 days.

This saying warns you that 40 togys aiy consist of the correct 3 sunny years (364 days), but 41 togys aiy consists of the wrong 3 sunny years (373 days). Thus, the most important principle appears – the rules of intercalation in “Togys esebi”. We will tell about this and another in the seventh principle.

This cycle (3 years) of the appearance of the Pleiades repeats itself every year without change. This constant rule was well known to the Greeks (Hesiod: "Works and Days") [80], the Germans (the Nebra sky disk on which are 40 holes around the perimeter) [81] (Figure 10) and especially the Romans. The Romans called the Pleiades in Latin "Vergiliarum". [82]

Figure 10 The Nebra sky disk (there are 40 holes around the perimeter)

Seventh principle of the lunar-stellar calendar Togys esebi:

Before proceeding to the description of the seventh principle concerning intercalation, it is necessary to clarify one important detail. This is due to the definition of the year value which corresponds to the calendar Togys esebi. Sidereal, tropical and anomalous years – can be called an astronomical year. [83]

The mean tropical year is defined as the average period of time for the ecliptic longitude of the Sun to increase by 360 degrees. [84] Since the Sun's ecliptic longitude is measured with respect to the vernal equinox, [85] the tropical year comprises a complete cycle of the seasons and therefore the the tropical year is the basis of most calendars. Due to the axial precession of the Earth, the tropical year is about 20 minutes shorter than the sidereal year. The average tropical year is approximately 365 days, 5 hours, 48 minutes, 45 seconds, using the modern definition [86] (= 365.242 19 days from 86400 SI seconds) or, more precisely, 365.242 190 402 (365 d 5 h. 48 m. 45.25 s). [87]

A tropical year, like an anomalous year, can in no way form the basis of the Togys esebi calendar. because, the Pleiades star cluster is essentially a fixed star. [See references 56 to 61]

I do not yet know the general opinion of interested scientists, but, in my opinion, Togys Esebi is based on sidereal (stellar) year, which is the time taken for the Earth to complete one revolution of its orbit, as measured against a fixed frame of reference (such as the fixed stars, Latin *sidera*, singular *sidus*). Its average duration is 365.256363004 days (365 d 6 h 9 min 9.76 s) (at the epoch J2000.0 = January 1, 2000, 12:00:00 TT). [87, ibid.]

To this bold hypothesis I was led by these equalities:
1. 314 × 365 + 119 × 366 = 114610 + 43554 = 154504 ÷ 423 = 365.2576832 days
2. 356 × 355 + 79 × 356 = 126380 + 28124 = 154504 ÷ 435 = 355.18160919 days
3. 3836 × 27 + 1819 × 28 = 103572 + 50932 = 154504 ÷ 5655 = 27.3216622 days
4. 276 × 365 + 160 × 355 = 97704 + 56800 = 154504 ÷ 436 = 354.36697248 days
5. 2456 × 29 + 2776 × 30 = 71224 + 83280 = 154504 ÷ 5232 = 29.53058104 days

The difference between the sidereal year and 423 years (365.25768321513 days or 365 days 6 hours 11 minutes 3.83 seconds) is only +0.0013202 days or 1 minute, 54.066 seconds.

Intercalation or embolism in chronometry [88] is the introduction of a leap day, week, or month into some lunar-stellar calendar years of “Togys esebi”. Only in this case the calendar “Togys esebi” corresponds to the seasons of the year or to covering of Pleiades by the Moon.

The astronomical significance of the sidereal month, equal to 27.322 days, greatly simplifies the rules of intercalation in the lunar-stellar calendar Togys esebi:

27.322 days + 27.322 days + 27.322 days = 81.966 or 82 days.

The most primitive rules of intercalation (timekeeping) for the correct alternation of months in the Togys eseby calendar can be found in the structure of the nomadic mankalny game – Togyz kumalak (Kazakhs – nine pebbles) and Toguz korgool (Kyrgyz – nine dung balls):

The first option: 27 days + 1 day + 27 days + 27 days = 82 days
The second option: 27 days + 27 days + 1 day + 27 days = 82 days
The third option: 27 days + 27 days + 27 days + 1 day = 82 days. [19]

In 2015, in East Kazakhstan, were found stone boards "Togyz kumalak" made possiby in the Stone Age. (Figure 11)

Figure 11 Togyz kumalak stone boards made in the Stone Age

The rules of intercalation (timekeeping) of the embolismic year in the lunar-stellar calendar of Togys esebi differ from the classical (lunar, solar and lunisolar) calendars. The closest "relative" and similar in structure to Togys esebi, this is the lunisolar calendar. [89]

Since the sidereal year (365.25636 days) does not have a whole series of lunar sidereal months (27.32166 days), the lunar-stellar calendar of Togys eseby should have a variable number of months in a year (about 13.3687 togys aiy). Regular years in Togys eseby have 13 months (355-356 day) , but the embolismic years (from Greek "embolismos" – inset) insert the 14th “intercalary” or “leap” or “embolismic” month (382-383 day) every second or third year. (Table 8) Inserting the intercalary month in a particular year can be defined using regular cycles, such as 3-year, 8-year, 19-year, 30-year, or 423-year cycles.

Table 8 The ordinal number of months and the approximate number of days in months

No	Togis esebi	Simple years		№	Togis esebi	Embolismic years	
The ordinal number				The ordinal number			
1 month	1 togys aiy	27	28	1 month	1 togys aiy	27	28
2 month	25 togys aiy	28	27	2 month	27 togys aiy	27	27
3 month	23 togys aiy	27	28	3 month	25 togys aiy	28	27
4 month	21 togys aiy	27	27	4 month	23 togys aiy	27	28
5 month	19 togys aiy	28	27	5 month	21 togys aiy	28	27
6 month	17 togys aiy	27	27	6 month	19 togys aiy	27	27
7 month	15 togys aiy	27	28	7 month	17 togys aiy	27	27
8 month	13 togys aiy	28	27	8 month	15 togys aiy	27	28
9 month	11 togys aiy	27	28	9 month	13 togys aiy	28	27
10 month	09 togys aiy	28	27	10 month	11 togys aiy	27	28
11 month	07 togys aiy	27	27	11 month	09 togys aiy	28	27
12 month	05 togys aiy	27	28	12 month	07 togys aiy	27	27
13 month	03 togys aiy	27	27	13 month	05 togys aiy	27	27
		355*	356*	14 month	03 togys aiy	27	28
						382*	383*

*383 – 2015-2016, *355 – 2016-2017, *356 – 2017-2018, *382 – 2018-2019.

In the lunisolar calendar, the embolismic month is usually inserted at the end of the year. This simplifies the intercalation rule. But in Togys esebi, the embolismic month is introduced at the beginning of the year, immediately after 1 togys aiy. The question arises: How did the nomads determine that the current year would be a regular (13 month) or an intercalary (14 month) year?

The nomads solved this problem using three methods:

1. If the last month (3 togys aiy) of a regular year (13th month) began 5-6 days after the vernal equinox (from March 26 to April 2), then the next year will again be a regular year of 355 or 356 days.

2. If the last month (3 togys aiy) of a regular year (13th month) began 5-6 days before or after the vernal equinox (from March 16 to March 26), then the next year will be an embolismic year from 382 or 383 days. Since this second method was an important feature of Togys eseby, the notorious Esepshi called such months “Zhana togys” (literally “New covering”). The term “Zhana togys” unambiguously means “leap year” or “embolismic year”.

3. If the last month (3 togys aiy) of the embolismic year (the 14th month) begins 10-11 days after the vernal equinox (from April 2 to April 12) in the interval of 20-21 days, then it is considered that the rules of intercalation in Togys esebi works correctly.

As a result of the correct use of these three methods of intercalation, the 1st month (1 togys aiy) of the lunar-stellar calendar Togys esebi should fluctuate in the interval from April 12 to May 9. If these three dates do not coincide with the three dates described in the three methods, then somewhere in the structure of Togys esebi an error has crept in.

According to the stories of Esepshi, which have survived to this day, until May 10 of any year on the western horizon at dawn or in the evening twilight you will see the weak silhouette of the Urker (Pleiades). If the observer is lucky, you can see covering of Pleiades by the Moon the last time until Urker-Pleiades disappears from the field of view for 37-40 days. These days, looking attentively at the Urker-Pleiades visual silhouette, Esepshi made different predictions for the current year. Some of these predictions remained in the memory of the Kazakh people:

1. “Urker taska tusti” (literally “Urker fell on a stone,” that is, the western horizon is as smooth as a stone) – this year there may be a drought. It will be a dangerous year for animals and people. In such years there will be no succulent grass and harvest.

2. “Urker suga tusti” (literally “Urker fell on the water”), that is, a mirage appeared on the western horizon) – this year there will be a lot of moisture. In such years there will be a lot of rain and as a result a lot of juicy grass and harvest. This forecast especially pleases people.

3. “Urker kanga tusti” (literally “Urker fell on blood”), i.e., the whole western horizon looks like red blood) - this means that a bloody war could begin this year. Naturally, such predictions are alarming and frighten people. However, in 1723, when numerous troops of the Dzungar Khanate [90] suddenly attacked the peaceful Kazakhs (the name of this tragedy was “Aktaban Shubyryndy – Alkakol Sulama”), historians write that Zhana togys (3 togys aiy) looked exactly like that. Despite this tragedy, the Kazakhs are still alive, but the Dzungar Khanate forever disappeared into the depths of history.

Despite wars, life goes on. In our case, after 37-40 days, the Urker-Pleiades reappears on the eastern horizon at dawn or dusk. I sincerely hope that the life of mankind will never end. The continuation of this topic is set forth in the next eighth principle of Togys esebi.

The eighth principle of the lunar-stellar calendar Togys esebi:

According to the modest calculation given in this article, the lunar-stellar calendar Togys esebi has existed for about 4,300 years. What has changed during this time?

Due to the axial precession of the Earth, the tropical year is about 20 minutes shorter than the sidereal year. [86] If we translate this definition into an arithmetic language, we will see the following digital value:

1. 365.256363004 – 365.242190402 = 0.014172602 (20 min. 24.513 sec.)
2. 365.256363004 ÷ 0.014172602 = 25772 years
3. 365.242190402 ÷ 0.014172602 = 25771 years.

As we can see, the difference between sidereal and tropical years is one year in 25,772 years . I am surprised by one thing. Why modern astronomy complicates this simple formula: "In astronomy, axial precession is a gravity-induced, slow, and continuous change in the orientation of an astronomical body's rotational axis. In particular, it can refer to the gradual shift in the orientation of Earth's axis of rotation in a cycle of approximately 25,772 years." [91] [92]

The precessional eras of each constellation, often known as Great Months, are approximately: [93]

No.	Constellation	Year entering	Year exiting	Time in days
1	Taurus	4500 BC	2000 BC	2500 years / 35 days
2	Aries	2000 BC	100 BC	1900 years / 27 days
3	Pisces	100 BC	AD 2700	2600 years / 37 days

The history of the nomads of Central Asia is closely related to these dates.

In our case (relative to Togys esebi), in approximately 4,300 years (the chronology of Togys esebi) the difference between the sidereal and tropical years is about 61 days. However, in Togys Esebi, the seasons of the year did not shift by as much as 2 months. To be honest, for me it is a big mystery.

Although I researched the whole complex of nomad calendars for more than 30 years, for me there are still some mysteries concerning Togys esebi. I gathered such mysterious and incomprehensible facts in the ninth principle of Togys esbi. I present these facts and state my thoughts. But my statement is not absolute truth. If I or someone else solves these riddles correctly, then the number of principles in Togys esebi may increase to 13, to 21 or to 27, etc.

The ninth principle of the lunar-stellar calendar Togys esebi:

In the ninth principle there are five basic riddles and their constituent sections. With the successful solution of these riddles in the future they can become one of the principles of Togys esebi.

In time, probably all, these secrets will be revealed. For a start, I explain the essence of these riddles. Then I suggest an answer.

I deeply suspect, and am 70% sure, that all ancient civilizations used “amal” in their calculations. Then they were forgotten or renamed as "week”. If we still have common sense and reason, we must realize this and accept it. If there is at least some tiny rational grain in this article of mine, then you can be sure that I achieved this when I myself accepted with doubt what I now ask you to accept (at least, for the sake of argument).

Why did we forget our past?

According to my view, all-powerful priests are guilty of this. They protected and hid their knowledge from ordinary people. When one of them suddenly died, all this knowledge went away with him. From there, as we all know, there is no way back.

The only people who knew about this knowledge are the nomads and their notorious “Esepshi”, who did not hide their knowledge from the people. But today the people will not recover this knowledge until they read what the author of this article, a true representative of the ancient nomads, has written. In particular, if in the future the scientific world accepts the word “amal”, I beg you not to replace this word with a Latin or Greek word. I also earnestly ask that all Kazakh terms used in this article be retained in Kazakh. The nomads deserve it.

The first riddle: The key of all calendar mysteries is “amal”

Thus, from year to year I began to understand the “forgotten language” not only of Togys esebi, but also other ancient calendars, such as the calendar of ancient Rome, up to the Gregorian Calendar. [94] To be honest, among all the ancient calendars I was strongly attracted by the mysterious Mayan and Aztec calendars. Although at the very beginning there was no evidence, but deep in my thoughts I felt some kind of parallel connection between the nomad calendars and the Mayan-Aztec calendars. Approximately 5 years ago, inspiration started in my thoughts and I began to clearly feel these invisible connections.

When I say and write that the ancient Romans used in their calculations 7.4 days (7 days 9 hours 36 minutes), nomads 7 and 9.1 days (9 days 2 hours 24 minutes), and the Mayan-Aztecs used 7 days, 9.1 days and 18.2 days (18 days 4 hours 48 minutes), I feel a shudder of mind and amazement of readers and scholars. How is this possible!?

There is nothing supernatural or incomprehensible in my words. Everything is very simple. The ancient priests did not use these "amal with a fraction" as I set out. They used it in another simple way, i.e., rounding a fraction until it reaches an integer:

1. Ancient Romans: 7.4 days × 5 "amal" = 37 days
2. 7 days × 3 “amal” + 8 days × 2 “amal” = 21 + 16 = 37 days
3. Ancient nomads: 9.1 days × 10 "amal" = 91 days
4. 7 days × 13 "amal" = 91 days ÷ 10 amal = 9.1 days
5. 9 days × 9 “amal” + 10 days = 81 + 10 = 91 days
6. 9 days × 10 "amal" + 1 days = 90 + 1 = 91 days
7. Ancient Maya: 18.2 days × 5 "amal" = 91 days
8. 18 days × 4 “amal” + 19 days = 72 + 19 = 91 days
9. 18 days × 5 "amal" + 1 days = 90 + 1 = 91 days, etc.

1. Ancient Romans: 7,4 days ≈ 7 days 9 hours 36 minutes
7.4 days × 4 amal = 29.6 days × 12 months = 355.2 days
7.4 days × 48 amal = 355.2 days ÷ 13 months = 27.323 days
7.4 days × 51 amal = 377.4 days ÷ 14 months = 26.96 days

Note: In the Julian and Gregorian Calendars, 9 months (from January to September) in simple years is 273 days, and in leap years, 274 days:

31 + 28 (29) + 31 + 30 + 31 + 30 + 31 + 31 + 30 = 273 (274) days
27,3 (27,4) × 10 months = 273 (274) days ÷ 9 months = 30.33 (30,44) days, etc.

2. Ancient nomads and Kazakhs: 9.1 days ≈ 9 days 2 hours 24 minutes:

9.1 days × 3 amal = 27.3 days × 10 months = 273 days
9.1 days × 30 amal = 273 days ÷ 7 days = 39 weeks
9.1 days × 40 amal = 364 days ÷ 7 days = 40 weeks
9.1 days × 90 amal = 819 days ÷ 9 days = 91 weeks
27 × 28 = 756 + 9 = 765 days ÷ 28 months = 27.3214286 days (Togyz tasil), etc.

3. Ancient Maya and the Aztecs: 18.2 days ≈ 18 days 4 hours 48 minutes:

18.2 days × 20 amal = 364 days ÷ 7 days = 40 weeks
18.2 days × 45 amal = 819 days ÷ 3 years = 273 days
364 days × 5 years = 1820 days ÷ 7 years = 260 days
260 days × 4 years = 1,040 days ÷ 3 years = 346.667 days, etc. Table 9. [1]

Table 9 Example of short periods (amal) of ancient Rome, nomads (Kazakhs) and Mayans and Aztecs

	7.4 days	Ancient Rome		9.1 days	Nomads Kazakhs		18.2 days	Mayans Aztecs
4 amal	29.6	29.530589	3 amal	27.3	27.321662	5 amal	91	
8 amal	59.2	59.061178	6 amal	54.6	54.643323	10 amal	182	
12 amal	88.8	88.591767	9 amal	81.9	81.964985	15 amal	273	

16 amal	118.4	118.12236	12 amal	109.2	109.28665	20 amal	364	
20 amal	148	147.65294	15 amal	136.5	136.60831	25 amal	455	
24 amal	177.6	177.18353	18 amal	163.8	163.92997	30 amal	546	
28 amal	207.2	206.71412	21 amal	191.1	191.25163	35 amal	637	
32 amal	236.8	236.24471	24 amal	218.4	218.57329	40 amal	728	
36 amal	266.4	265.7753	27 amal	245.7	245.89495	45 amal	819	
40 amal	296	295.30589	30 amal	273	273.21662	50 amal	910	
44 amal	325.6	324.83648	33 amal	300.3	300.53828	55 amal	1001	
48 amal	355.2	354.36707	36 amal	327.6	327.85994	60 amal	1092	
48 amal	355	355.2	39 amal	354.9	355.1816	65 amal	1183	
99 amal	377	732.6	40 amal	364	364	70 amal	1274	
147 amal	355	1087.8	78 amal	709.8	355	75 amal	1365	
198 amal	378	1465.2	120 amal	1092	382	80 amal	1456	

The second riddle: Why are “Months of two brothers” needed?

What role does “Eki agaiyndy ailar” (“Months in pairs” or literally “Months of two brothers”) play in Togys esebi?

We briefly explain the essence of the issue. As we already know, the number of days in a months of Togys esebi is either 27 or 28. Contrasted with Togys esebi, in the lunar calendar the months consist of 29 and 30 days. In the Julian and Gregorian Calendars the months consist of 28, 29, 30 and 31 days. If we take the entire range of nomad calendars, then the months in the "Togyz tarmak" calendar consist of 40 days, the "Tort toksan" calendar consists of 90 days, the "Ush bunak" calendar contains 120 days, etc. [12] [95] [96] [97]

For this reason, some months of the lunar calendar (29-30 days) or the solar calendar (28-31 days) correspond to two months of Togys esebi. For example, 1) 1-28 – continuation 29- and onwards; 2) 1-29 – continuation 30- and onwards; 3) the beginning in the 1st month before 1 – continuation 2-29 – 30- and further; 4) the beginning in the 1st month before 1 – continuation 2-30 – 31- and further; 5) the beginning in the 1st month to 2 – continuation 3-30 – 31- and further; 4) the beginning in the 1st month to 2 – continuation 3-31, etc. Such months the nomads called "Eki agayindy ailar" ("Months in pairs" or literally "Months of two brothers").

As a clear example of what has been said, we can give a concrete example:

1. In 2019, 1 togys aiy begins on May 6 and ends on June 1
2. In 2019, 25 togys aiy begins June 2 and ends June 28
3. In 2019, 23 togys aiy begins on June 29 and ends on July 26

In the above example, "Eki agayindy ailar" is June 2 and 29.

But for some reason, our ancestors forgot (or we forgot) to tell us why we need these "months of two brothers".

Usually, in 80-90% of cases, on the eve or on the day when the covering of Pleiades by the Moon occurs, it is not only local weather that is getting worse. The same weather change occurs throughout Eurasia or partially in the northern hemisphere. I have often noticed this climate phenomenon on international TV channels. However, why this happens and what precedes it, not only I, but probably nobody, knows.

This is not mysticism or superstition. This change was felt by all living things (people, animals and plants) without exception.

We sincerely hope that scholars studying the subject of “covering, occultation” [98] will pay attention to these riddles. If the world's climatologists and meteorologists begin to compare covering of Pleiades by the Moon dates with archived meteorological service [99] forecasts, they will be surprised that I am not exaggerating.

But I noticed something strange several times. If the weather worsens in the 1st month of "Eki agaiyndy ailar", then in the 2nd month of "Eki agaiyndy ailar" this does not happen. Why, I again do not know!

The third riddle: Why is “precession” going faster?

The constellation "Leo" is called by Kazakhs "Kambar zhuldyzy”. After the end of the Pleiades covering, in 6-7 days the Moon covers the constellation “Leo”. The Kazakhs call this covering “Ai men Kambardin togysy” (literally “covering of Kambar by the Moon”).

The heaviest and worst of the worst covering of the current year is considered “Akpan men Kambardin togysy” (literally “covering Akpan and Kambar”). These are 9 togys aiy. This togys ayi corresponds to the end of January and the beginning of February. Usually, when the Moon approaches the star Regulus (α Leonis, Kambardin Oti [Bile Kambar]) the Kazakhs do not embark on a journey.

However, in all materials relating to Togys esebi, it is written that 9 togys aiy correspond to the end of January and the beginning of February. On the date indicated here at this time corresponds to 7 togys aiy. This togys aiy corresponds to dates from January 20 to February 16. The Kazakhs called this period of the year “Zhuannyn zhiniskerip, zhinishkenin uziletin kezi”. This literally means, “Thick fat becomes thin, and thin will break like a thread.” In the semantic meaning, it means, “The rich man becomes poor, and to the poor remains nothing.”

Naturally, the question arises: How in such a short time (about 300-400 years) did the season of the year shift by almost a whole month consisting of 28 days? According to the modern scientific definition, for such an offset of the month approximately 1976 years should have passed: 28 days ÷ 0.014172602 = 1975.64 years.

The fourth riddle: Is there a connection between the "barrow" and "calendars"?

In the endless Kazakh steppes, where there is no living soul, there are many strange barrows (*korgan, oba, tobe*) of various types and forms. Usually these barrows (*korgan*) are located on mountain ranges, elevated or hilly terrain. It seems to me that the so-called “moustached” or “lunisolar barrow” resemble the usual form of the celestial “analemma” [100], but painted on the ground.

For clarity, I will give the geographical coordinates of some of these barrow. You can view them online using “Google Maps” and “Google Earth”. [67] I immediately warn readers that these barrows are thousands of years old, so they are barely visible:

50°02'29.97” N, 66°20'47.22" E (near the village of Shieli)
50°20'04.38” N, 65°31'48.82" E (near the village of Amangeldi)
51°21'37.46” N, 64°01'16.93" E (near the village of N,auryzym)
50°22'09.71” N, 66°08'29.39" E (near the town of Arkalyk)
51°06'23.52” N, 65°24'19.29" E (near the village of Aksai)
50°05'37.74” N, 65°15'17.79" E (near the village of Tort Con)
50°05'27.51” N, 65°28'35.92" E (near the village of Agashkol)
51°33'53.10” N, 58°41'11.31" E (Russia, Novoaktyubinsk). However, this mound was built not by Russians, but by nomads, etc.

And also in the Kazakh steppes recently found futuristic forms of barrow (geoglyph), the purpose of which is still unknown. But since these barrows occupy vast areas, the nomads obviously did not build these barrows for entertainment.

1. Urpek swastika from three horns: GPS: 50°06'09.82"N 65°21'40.90"E (142 m. × 219 m. × 230 m.), Kostanay region, Amankeldy district, village Urpek.
2. Ushtogay square: GPS: 50 ° 49'58.48 "N 65 ° 19'34.70" E (290 m. × 294 m.), Kostanay region, Amankeldy district, village Ushtogai.
3. Kaiyndi square with five rings: GPS: 50 ° 01'39.28 "N 65 ° 59'57.34" E (219 m. × 224 m.), Kostanay region, Arkalyk district, village Kaiyndy. [102]

The mounds (geoglyph) “Ustyurt Arrows”, the length of each of which is about 900-1000 meters, look even stranger. The author of this article found, between coordinates 45 °33'19.69 N, 56 °46'18.71 E to 45°28'16.16 N, 58°9'8.50" E, about 40 such arrows and about 10 more strange forms of the mound (geoglyphs). ([1] pp. 78-79)

Of the hundreds of such barrows, I single out three, which are clearly associated with the “Urker esebi” and “Zhuldyz esebi” and “Togys esebi” calendars.

1. Double barrow concerning “Urker Esebi” and “Zhuldyz Esebi” (GPS: 50°05'03,52"N 65°13'13,44"E):

In the western side of the "lunar-solar korgan" there are 10 earthen barrows. These barrows stretching from the north-east to the south-west side, clearly indicate 10 sidereal months in Urker esebi:

27 × 7 + 28 × 3 = 189 + 84 = 273 ÷ 10 sidereal month = 27.3 days.

In the northern hemisphere, covering of Pleiades by the Moon usually occurs on the southwest side. Apparently the unknown “Esepshi” who built this ancient mound was considered holy. Because a whole graveyard appeared near his grave. To bury a deceased person near holy people is an ancient tradition of the Kazakhs. By the way, near the cemetery you can still see about 8 barrows. This indicates the total number of years in the “Urker esebi” and “Zhuldyz esebi” cycles:

273 days × 8 years = 2184 days ÷ 6 years “Zhuldyz esebi” = 364 days.

Probably from this place begins the long winding history of nomad calendars!

2. Barrow “Togys esebi” (GPS: 51°08'40,07"N 65°20'47,73"E):

Unlike the previous barrow “Urker esebi” and “Zhuldyz esebi”, in this unusual barrow earthen mounds begin right from the western reference point of the “lunar-solar barrow”. In this barrow, earthen mounds also extend from the north-east to the south-west side. Where covering of Pleiades by the Moon usually takes place. In this barrow, the earthen mound does not consist of 10 barrows, but as many as 15 barrows.

Usually in “Togys esebi” in regular years there are 13 months (togys aiy), and embolismic years there are 14 months (togys aiy). Where did 1 extra mound come from?

The unknown “Esepshi” who built this mound knew the structure and working principles of “Togys esebi” very well. In fact, in Togis esebi there are not only 13 or 14 phases of the moon, but there are 15 phases of the moon hidden from prying eyes.

For example, after 1 togys aiy (neomenia), the 29th phase of the moon can follow. However, in the rules of Togys esebi never indicates 29 togys aiy, because somewhere in the middle of this year, 1 or 2 phases of the moon disappear unnoticed. Therefore, after 1 togys aiy there should always be 27 togys aiy or 25 togys aiy so that there will always be 13 or 14 months in that year. If we include 29 togys aiy this year, then there will be 15 months in a year or 410 days. Then such a calendar destroys the entire calendar cycle. Thousands of years ago this unknown Esepshi knew about this rule well. Even this Esepshi knew well that approximately every 9 years the "full" and "partial" covering of the Pleiades by the Moon changes places in the sky. Proof of this can be seen in the form of 9 mounds forming a closed ring (see the eastern part of the barrow).

Barrow "37 warriors" (GPS: 48°25'48.20"N 74°27'30.84"E):

This barrow has another name “Corpetai korgany” (the name of the mountain where this mound is located). The most important thing is not the name, but the sum of 37 figures. An exquisite view of this ancient barrow can be seen from these photos. [101] As we know from this article, the ancient version of “Togys esebi” had a 3-year cycle:

27.3 days × 40 togys aiy = 1092 days ÷ 37 tuar ai* = 29.51 days
28 days × 39 zhuldyz aiy = 1092 days ÷ 7 days = 156 weeks
* 37 Tuar Ay is 37 synodic months.

During the year when the Pleiades were not visible in the night sky (37-40 days) or when covering the Pleiades on the Moon occurred below the horizon, the nomads determined the exact beginning of each month using the lunar synodic months.

Every menhir, every stone in this barrow had a special role of its own. If in the future in the barrow “37 warriors”, scientific research will be carried out from an archaeoastronomic point of view, perhaps we will understand the lunar theory of the nomads better. But, despite several archaeological excavations having been performed in this mound in different periods, many of the rules of conducting complex mathematics of the nomads have disappeared forever.

The fifth riddle: the intellect of a mature scientist, with the formation of elementary school

In ancient times, even the most advanced priests (Esepshi) could count only up to a hundred, maybe up to a thousand. They knew only the basic arithmetic operations: addition, subtraction, multiplication and division. I suspect that they are unlikely to have mastered the division of a column of fractional numbers written in binary, ternary, octal, hexadecimal and any other number system.

However, despite this truth, something strange is happening in the world. Scientists armed with powerful telescopes and computers, are trying to unravel the most primitive calendar of the Maya and Aztec. This is similar to attaching to a horse-drawn cart the engine of a "Ford" or a "Mercedes". Sometimes I am afraid to ask myself, do we understand what we are doing?

All the facts written in the surviving Maya codices show that the Maya people used three types of calendars in their daily lives:

1st type. 260 day calendar of eclipses of the Sun and the Moon:
260 days × 4 years = 1040 days ÷ 3 years = 346.66667 days.

2nd type. 819 day lunar sidereal calendar:
27.3 days × 30 sidereal month = 819 days.

3rd type. 364 day calendar (most likely a star calendar):
260 days × 7 years = 1820 days ÷ 5 years = 364 days
819 days × 4 years = 3276 days ÷ 9 years = 364 days

To understand all this, you do not need to come up with complex formulas. It is enough to know the basic arithmetic operations consisting of "+" "-" "×" "÷". And that's all, nothing more is required!

There are hundreds or thousands of materials on the Internet concerning the Mayan calendars. When you start reading these materials, your hair stands on end. These materials have such complex formulas that even the Maya priests did not dream of.

If any reader or scientist is going to explore the nomad calendars, I ask only one thing. Remember, you are not going to study the "theory of relativity" or the "nuclear physics" of the ancient nomads. You will study the primitive ancient calendars of nomads. You do not need to be a genius who can only create complex formulas. Have "the intellect of a mature scientist, with the instruction of elementary school." Only then will the riddles of nomad calendars be opened.

While I am alive, I will not allow anyone to spoil the history and culture of my holy ancestors!

CONCLUSION

In this article I could not include all the details and materials which reveal the whole essence of the calendars of the nomads and Togys esebi. But in my book [1] (unfortunately at present only in the Kazakh language) there is a more complete answer to all the questions that should arise after reading this article.

This simple and forgotten agricultural calendar of nomads “Togys esebi” may surprise the world in more than one way, because there is some natural purity in it that the modern world has lost for a long time. In ancient times, people had not only intelligence, but also the instinct for preserving themselves and the world around us.

Ancient nomads avoided greed and wisely used their natural resources. Because they were afraid of the wrath of Mother Nature, their minds always told them, if you take more than you need, it will be disastrous for you. To take something extra, they always asked Mother Nature to give permission. Therefore they often wandered through the expanses of the Eurasian continent, so that, on their return, the nature of these places would be fully restored.

Of course in those days there was the same greed for wealth, lust for power, hatred for others, etc., as now. But these negative vices of humanity had a limit beyond which it was impossible to transgress.

Unfortunately, all this is now in the past. The current generation of people and nomads often shows how they selfishly love wealth and power. For this, they are ready to sacrifice everything that Mother Earth has given them. I will not go into details, but the current generation of nomads, along with the rest of humanity, has reached bottom (or perhaps not yet). An intelligent look into the past will help us rise up again.

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