Andres Kuperjanov

Department of Folkloristics, Estonian Literary Museum
Tartu, Estonia

The Relationship Between the Folk Calendar and Folk Astronomy Heritage

Abstract. Time can be determined by observation of astronomical objects. For determination of time, various phenological signs as well as the position of the heavenly bodies were used.
To tell the time of the day (or night), the most useful constellations were the Great and Little Wain (Big and Little Dipper), Orion and the Sieve. The North Star (*Põhjanael*—the Northern Nail) was the centre of the clock and due to its immobility, an important landmark. The best known time teller was the Wain, also used for fortune telling and meteorological forecasts. Orion and the Sieve were the wintertime time-telling constellations, providers of omens and marked the start of various types of work on the agricultural calendar.
To this end, the Sieve's position was observed on a number of days dedicated to different saints.
This article is based on materials from the manuscripts of the Estonian archives, digitised and analysed by the Department of Folkloristics of the Estonian Literary Museum.

Keywords: celestial clock, folk-astronomy, time.

Introduction

For timekeeping purposes, a variety of phenological events (patterns and sounds occurring in nature throughout its yearly and daily cycle) as well as other phenomena associated with the movement of celestial bodies, for example, changes in the direction and length of shadows, have been relied on. The most important ones among periodic events determined by celestial bodies were the movement of the sun and the moon, and the latter's phases. In addition, archive records make references to determining times and seasons on the basis of astronomical objects in the night sky. What follows is an interesting description from the late 19th century from Tõstamaa Parish on traditional timekeeping methods.

How people once used to tell time

"In olden times, there were no clocks or watches to tell what time of the day it was. Instead, people back then relied on other methods and measures for their timekeeping needs. In the morning when the master wanted to wake up his workfolk, he first stepped outside to make sure of the exact position of the Wolf's Wain, the Sieve and the Rods. He took a look at each of the most important stars whose location had been carefully taken note of, where the stars were and where they were not. When stars were in their known position, he knew what time of the day it was. He knew whether he had to wake up the servants or whether he could let them sleep a little more because he knew the stars and could tell the time as if he were looking at a clock.

But when the sky was cloudy and stars could not be seen, people paid attention to roosters crowing. They carefully listened to this sound over and over again and then they could tell what time it was. In the late morning, people observed the position, height and path of the sun.. Or some stood up and measured the length of their shadow in steps. When a shadow measured eight feet, or three steps in length, it was late morning, the time to take a break! The same was done around noon to see how far the day had progressed. This shadow was also measured in steps, but now their number was smaller! When a shadow measured two steps, it was noon, time to go and have lunch! In the evening, there was still work to be done. Later, people stepped outside to observe stars, to take note of their position and whether it was time to go to bed.

Sometimes the sky was thickly overcast with clouds and it was impossible to tell whether it was already late evening or whether the sun had set. At once, a fire was made to see whether its flames were white or red. Red flames meant that the sun had not set yet, while white ones showed that the sun had set and it was late in the evening" (E 20980/1 (3)).

This record describes precisely the use of astronomical observations for the purposes of timekeeping (a person went outside to see what the position of certain stars was in relation to well-known objects and determined the approximate time of the day on the basis of his

observations). Another characteristic feature was measuring the colour temperature of light using a flame. True, in blueish daylight flames appear red, while in reddish light around the time of the sunset their colour temperature is closer to that of natural light and they appear white.

Yelena Popova has conducted in-depth research about various timekeeping practices among the Bessermans and Udmurts, and because many of those methods were used in Estonia, too (Popova 2006), they will not be touched upon in this paper in greater detail for the purposes of saving space.

For us humans, time is a smoothly flowing variable. To be able to measure it in one way or another, we can rely exclusively on periodic changes occurring at fixed intervals. The apparent movement of the sun divides the 24-hour day into day and night, while the cyclical phases of the moon have given rise to the unit of 'month', which is approximately 29.5 twenty-four hour days in length. The period it takes the earth to complete its orbit once around the sun is one year, and the tilt of the earth's axis causes the seasons to change. It is likely that in earlier times the practice of keeping a calendar was not simply a rigorous practice of counting individual days, but rather a more prolonged, fluid process. Jakob Hurt, the initiator of the grand campaign for collecting Estonian folklore and author of the first monograph on Estonian folk astronomy, explains in his "Eesti astronomia" that the word *year* is a shortened form of *ajastaig* (from time to time), which basically means 'periodic time' (Hurt 1899).

People used to divide time into shorter periods—weeks—on the basis of lunar phases. Currently, we use a solar calendar in which a month has four weeks and a week has seven days, associated with the seven planets known in antiquity. The system includes the four major phases of the moon. However, several written sources seem to indicate that a calendar month consisting of 30 days and divided into six weeks of five days was once used. It is possible that Winter Peak Day, when the Milky Way is in its highest position in the sky, was used to link the lunar calendar to the solar calendar (Eelsalu 1981, 1979), and that early chronological systems included a 13th month, characteristic of the lunisolar calendar, to be able to combine

a calendar which was based on the cycles of the moon with one that relies on the earth's revolving around the sun.

Shield clocks were used in Estonia as early as in the 19th century and calendars were put into circulation in the first quarter of the 18th century. Although these developments had rendered traditional timekeeping methods obsolete and marginal by the time enthusiasts started to form folklore collections, hand-written archive materials still contain bits and pieces of relevant information. These describe a few major constellations as well as how stars were observed and used to predict weather, yield, and the future. There is a description of the personal experience of Daniel Pruhl (1840—1912) from Northern Estonia, who had established a library association in his home village of Metsiku.

> *"It is said that ancient Estonians knew a lot about stars, and I believe that because traces of it have survived to this day, although lately this knowledge is fading into oblivion.*
>
> *When I was a boy, my father used to take me outside on clear nights to watch the stars. He told me much about the stars and showed me different ones. The North Star was the one he used to keep track of the movement of stars. These were the Rods, the Wain and then the Sieves. He used them to measure time. He always knew, looking at the stars, what time of the day it was (for about fifty years, he had worked as a beer brewer at Palmse Manor and it was there that he learned to determine time. Nobody kept track of the times of the day in the parish). When he was far from home and the night was clear, he knew exactly what time it was and in which direction our home was. He used to predict the weather by the stars. He said that when stars were running, there would be a strong wind. A white circle around a big star meant clouds and snowfall"* (E 25036/7).

One of the most common methods used to keep track of time was to watch how shadows changed. One had to pay attention to the shadow's length as well as the direction in which it was cast. Archive sources indicate that simple sundials were built. Those tending to livestock in pastures had to be able to determine when midday and the time to bring the animals home were. Herding livestock was

typically the responsibility of older children. These children had no clocks or watches. They measured time using the shadow cast by the sun as described in the following excerpt.

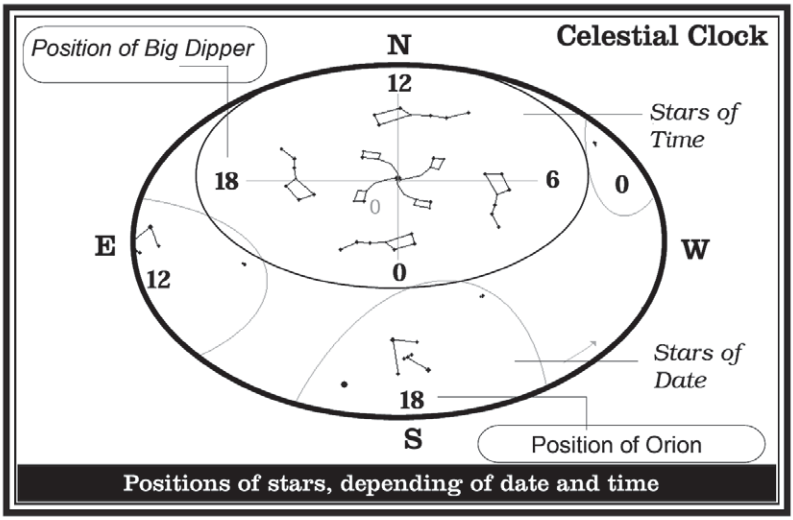
> *"Children herding livestock measured the shadow cast by the sun to determine what time of the day it was. On sunny days, they marked out their own shadow and measured it in feet. Around 12 o'clock the shadow was four feet long, while at 11 o'clock it was five feet long. The length of the shadow was measured constantly to determine when the midday break time was for livestock.*
>
> *As early as in the last century, all children herding livestock in Iisaku Parish knew how to keep track of time by measuring the length of their shadow"* (RKM II 415, 135/6 (8)).

Telling time by the stars

The stars typically used for telling time were the so-called clock stars—the Great Wain (Big Dipper) and the North Star. In a 24-hour period, all the stars in the sky complete approximately a full circle around the North Star. In the equatorial coordinate system used in astronomy, one of the coordinates is determined by a star's distance from the Vernal Equinox. Similarly, it is possible to tell time by the position of the Great Wain in the sky, keeping in mind that this "clock" becomes fast by four minutes every day, which means that more precise timekeeping using this method is a rather experimental procedure. It is vital to use a fixed observation point as well as specific landmarks (a roof's edge, a large tree growing at a distance, etc.) to be able to correctly measure the movement of stars and determine their position in relation to these objects.

In addition to the clock stars, which could be used for the purpose of timekeeping all year round (the Great Wain and North Star), there were also the so-called calendar stars (used to tell time as well as determine a longer period of time), or winter-time clock stars. Among the most important ones were Orion and the Sieve (the Pleiades stars). Next follows an image of the dial of a star clock.

The North Star is the brightest star in the Lesser Wain. It is in the centre of the dial and a vital landmark because of its fixed position.



0 -	22.03. 0h	**12** -	22.03. 12h
	22.06. 18h		22.06. 6h
	22. 09. 12h		22. 09. 0h
	22. 12. 6h		22. 12. 18h
6 -	22.03. 6h	**18** -	22.03. 18h
	22.06. 0h		22.06. 12h
	22. 09. 18h		22. 09. 6h
	22. 12. 12h		22. 12. 0h

The traditional method for finding the somewhat brighter North Star in the sky is to draw a line between the pointer stars of the Great Wain and extend it about five times. Another passage describing how stars were taught about was recorded by Martin Luu from Central Estonia, a local parish secretary, who described how the Great Wain was used to tell time.

> *"Next time, when Kaarel was once again watching stars and I was with him, I had him explain to me about the North Star and the North Sieve. Because I had memorized his instructions, he said: "He positively knows!" He showed me the position of the Great Wain in the sky. While the pole of the Great Wain revolves, changing its position after a certain time, the Lesser Wain revolves differently, ending up in another position"* (RKM II 223, 25/31 (1)).

A similar timekeeping method was recorded in Kodavere (a parish by Lake Peipus, Eastern Estonia).

> *"In olden times, people had no clocks, so they determined whether it was morning or not by listening to the rooster's crowing and observing the stars in the sky. Each star was named differently. The Wain* [*was watched*]*, whether its one end pointed to the north and the other to the south. Like that, one could tell time right away. I remember that when my father was alive, there was no clock in the house, but they knew how to keep track of time. My father was also working on the lake. This means that they went out to the lake around three o'clock in the morning"* (RKM II 211, 258/9 (6)).

In winter, the Sieve, Orion and Sirius were also used to keep track of time and organise various types of work that needed to be done on a farm.

> *"Back in the old days when people had no clocks, time was told by winter stars: when the Sieve was low in the sky, people used to say that soon it would be light outside, but when the Sieve was high in the sky, people used to say that there was still much time until it gets light outside. Similarly, they observed the Rods (Orion) which were said to look like flails used for rye threshing"* (H II 16, 591/2 (2)).

> *"When the Sieve and the Flail were at a certain height in the sky, it was time to start with threshing"* (E X 34 (156)).

The Great and Little Cross (Cygnus and Delphinus) were described for the first time in the 6th century by St. Gregorius from Tours.

His *De cursu stellarum* from the year 573 gave instruction for monks how to observe the sky and determine the correct prayer times. These constellation names are widely spread throughout European folk astronomy, but I couldn't find this particular use for them in the Estonian case.

Calendar stars

In addition to keeping track of time, such winter-time constellations as the Sieve and Orion were used to keep the agricultural calendar. Vestring's dictionary from the early 18th century includes the following

saying: *When the Sieve rises at dawn, oxen are sent out to plough*. According to Heino Eelsalu's interpretation, this saying dates back more than a couple of thousand years (Eelsalu 1985), provided that it is an accurate definition typical of early astronomy, because currently this event occurs in the middle of the summer period. However, there are other similar statements that can be traced back to significantly more recent periods, and the saying has been used as a proverb in media oriented at farmers even in the late 20th century. Elsewhere the saying appears in a slightly different form and has been modified, for example, to *When the Sieve sets at dawn on St. Andrew's Day* (30 November), *oxen are sent out to plough on St. George's Day* (23 April) EKS 4° 5, 824 (8) or *When the Sieve sets at dawn on St. Martin's Day and the weather is mild, the new year brings cold and snow, and oxen are sent out to plough on the Ploughing Day* (ERA II 178, 484/5 (52)).

Also, the Sieve was relied on for meteorological forecasts.

> *"The Sieve appears in October, rarely in the last days of September.* [The Sieve rises from the east and moves to the west.] *When the Sieve disappears into red afterglow by 25 March according to the old* [*calendar*]*, spring will be warm. When the Sieve goes by red afterglow, taking a higher northern route, spring will be cold"* (RKM II 254, 426/9 (5)).

The movement of the Sieve stars as well as their rising and setting was carefully observed because this information was relied on to determine the start of the period for agricultural activities and to predict yield.

> *"When the Sieve disappears at dawn on St. Catherine's Day, it will appear at dusk on St. Mary's Day, and this means a fat year"* (E 34812 (1)).

"When the Sieve appears at dusk on St. Mary's Day, this means a year with a good crop. In the evening, around dusk, when stars start to appear in the sky, right away the Sieve cluster and how far it has come on its long winter journey can be seen. In late autumn-early winter, the Sieve cluster appears in the early morning sky, to 11 o'clock. It is used to tell time and the height at which the sun is around 11 o'clock in the summer.

> *"It is not every year that the Sieve cluster appears at dusk in spring, that is, by St. Mary's Day. An afterglow can be seen two hours after the sun has set. The height of the afterglow measures in the direction of the sunset some ten fathoms from the horizon. When the afterglow is light, the light is violet. When the weather is clear, the light appears yellowish"* (RKM II 133, 517/8 (a)).

The previous description is similar to the following one.

> *"In olden times people said about the Sieve in the sky that when the Sieve appears at dawn by St. Mary's Day, spring will be early. But it seems that every year it tends to coincide with dawn and spring is still the same"* (KKI 39, 312/3 (33)).

Another important event for hunters and fishers was the appearance of the moon and the Sieve side by side. In highly favourable years the moon may even overlap with the Sieve. This marked the high period for preparing traps and guns for the hunting season.

> *"Fishing nets are prepared when the moon and Sieve are side by side"* (E, StK 30, 125 (5)).

This favourable period is mentioned even in the 19th century. This is the period for making decoy birds as well as fixing hunting and fishing gear. These activities probably featured elements originating from earlier practices of ritual magic.

> *"When the moon and the Sieve stars happen to appear side by side, clean and fix your gun and hunting gear, grouse decoys and fishing hooks, tip-up strings and laces. And adjust and repair your basket traps, fishing nets and other things because this will help you catch many fish and wild birds"* (H II 40, 320 (1376)).

The Milky Way

The Milky Way and the winter peak: In the old timekeeping system, the Milky Way was primarily a sign of the end and beginning of the year. In the Estonian folk calendar Winter Peak Day (Feb. 12) should fall on the date when winter has reached its peak and is retreating—the weather starts to become warmer and the arrival of spring approaches.

Today the real peak of winter has shifted, due to the precession of the spring point to the end of January or beginning of February (dated as January 14 on the calendar, while August Wilhelm Hupel and Ferdinand Johann Wiedemann, for example, have erroneously dated it to March 12). The winter peak used to be an important marker in the old calendar system, a sign by which the lunar calendar could be synchronised with the real year.

It is not unnecessary to reiterate that the motif of cutting down the world tree has often been connected with the winter peak (Kuperjanov 2002).

Other stars used for timekeeping

Several stars and constellations mentioned by name in sources from various Estonian archives were used for the purposes of timekeeping. Following is a short list of them.

Agu, Aotäht, Ehatäht, Koidutäht—Venus appears as a bright star in the morning or evening sky, and fits the description of the Rooster's Star. The light at dawn or dusk was not considered to be good for health and was feared to a certain extent.

Jõulutähed—the Christmas Stars, Stars of the Auriga constellation (Hurt), sometimes Cassiopeia.

Jõulutäht—the Christmas Star, Capella

Jõulusõel—the Christmas Sieve (Livlдnder), probably St. Catherine's Sieve—χ/h Persei

Kadrisõel—St. Catherine's Sieve, χ/h Persei

These constellations associated with Christmas are positioned high up in the sky during the holiday period.

Koot and Reha, Vardad, Koodid—the Flail and the Rake, the Rod Stars, Orion. The name refers to rye threshing in late autumn. Due to relatively cool, short summers, there was not enough time for rye crops to become fully dry and ripe. As such, harvested crops were dried in a threshing barn, and grains were separated from their husks only

later. The Orion constellation marks the suitable period for this farm work, and its traditional name refers to agricultural tools used for this task.

Kuketäht, Kikkatäht—the Rooster's Star, the brightest star visible in the morning sky after the rooster's crowing at midnight. Likely any star that appears brightest in the morning sky.

Koivalge täht—a star visible at dawn or dusk, probably Mercury.

Kuusulane—a bright star or rather a planet close to the moon, used for making predictions and forecasts.

Küünlakuu täht—the Candlemonth Star, Deneb, α Cygni (Wiedemann). During this period, is positioned in the far north.

Küünlapäevatähed—the Candlemass Stars—Stars of the constellation Perseus.

Nääritähed—the New Year's Star, Cassiopeia (Wiedemann), consists of three Christmas Stars and one New Year's Star. During these celebrations, the Candlemas Stars and the New Year's Star are high up in the sky.

Orjatäht—the Slave's Star, or Sirius, but it could be any other bright star upon the appearance of which slaves undertaking corvée labour were allowed to return to their homes.

Paastumaarja täht—Albireo β Cygni, an ancient celebration dedicated to women, and in more modern rituals associated with the 25th of March.

Paastutähed—the Fast Stars—Cygnus constellation (Wiedemann, Hurt). In March, the Cygnus constellation rises straight from the north.

Puhtetäht—a star with a reddish hue, rising some three hours before it gets light outside. Possibly Mars or Jupiter appearing in the morning sky.

Vastlatähed—Cassiopeia, marks the day prior to the great fast, a pagan festival celebrating fertility.

Conclusions

Religious movements drawing on motions of the moon and sun and their effect started to emerge in the early 20th century. Many groups in the present New Age movement rely on the phases of the moon or worship the sun. Also, planting calendars, highly popular among people, are based on lunar phases. It was believed that the moon and sun play a major role in healing rituals and prophylactic magic, both still practised. Constellations and stars were used for timekeeping as well as for making predictions and forecasts.

Regular observations of the Sieve, especially during certain days in the autumn and winter period, dedicated to different saints, was one of the most widely accepted methods for making weather forecasts and predictions about the ploughing period.

The naming of several constellations after various calendar celebrations was inspired by their position in the sky during these events. For example, the Fast Stars, or the Cygnos constellation, rise straight from the north in March; the Candlemas Stars and the New Year's Star are high up in the sky during celebrations of the same name; Orion is associated with rye threshing in late autumn, being named, in Estonian, after tools used for this work. Written records from the 19th and 20th century indicate that people relied heavily on constellations in planning the fishing and hunting season or various agricultural work in making various forecasts and predictions as well as in determining the correct time for various celebration and festivities.

Acknowledgements

This research has been supported by the Centre of Excellence in Estonian Studies (CEES, European Regional Development Fund) and is related to research projects IRG 22-5 (Estonian Research Council).

References

E 20980/1 (3)—M.J. Eisen's manuscript collection in the Estonian Folklore Archives, 1880—1934. Tõstamaa parish, Pootsi municipality. Otto Schantz (1895).

E 25036/7—M.J. Eisen's manuscript collection in the Estonian Folklore Archives,

1880—1934. Haljala parish, Metsiku village. Danel Pruhl (1896).

E 34812 (1)—M.J. Eisen's manuscript collection in the Estonian Folklore Archives, 1880—1934. Jüri parish, Kurna municipality. Jaan Saalverk (1897).

E, StK 30, 125 (5) < Emmaste parish, Hadma settlement - Selma Perv < J. Sooster (1925).

E X 34 (156)—M.J. Eisen's manuscript collection in the Estonian Folklore Archives, 1880—1934. Tartu town. Matthias Johann Eisen. Nõu (80).

H II 16, 591/2 (2)—J. Hurt's manuscript collection in the Estonian Folklore Archives, 1860—1906. Tallinn. Adolf Ferdinand Bernstein (1890).

H II 40, 320 (1376)—J. Hurt's manuscript collection in the Estonian Folklore Archives, 1860—1906. Koeru parish. Hans Anton Schults (1892).

KKI 39, 312/3 (33)—Manuscripts of the Institute of Estonian Language and Literature 1947—2000. Ambla parish, Ambla municipality, Jõgisoo village. Vaina Mälk. Vilhelmine Kull (83) (1966).

RKM II 133, 517/8 (a)—Manuscripts of the State Literary Museum 1945—1996. Kadrina parish, Kõrveküla village. J. Vahur (quoted from memory) (1962).

RKM II 211, 258/9 (6)—Manuscripts of the State Literary Museum 1945—1996. Kodavere parish, Pala municipality, Ranna village. Mall Proodel. Aleks Vainu (66) (1966).

RKM II 223, 25/31 (1) —Manuscripts of the State Literary Museum 1945—1996. Põltsamaa parish. Martin Luu, from the collector, Martin Luu (1967).

RKM II 415, 135/6 (8)—Manuscripts of the State Literary Museum 1945—1996. Iisaku parish, Vaikla village. Alli Vetekaja. Maria Rebina (1873—1959).

RKM II 254, 426/9 (5)—Manuscripts of the State Literary Museum 1945—1996. Haljala parish, Pedassaare village, Pärtli farm. Aime Lindre. Vilhelmine Kaukküla (78) (1969).

Hupel, August Wilhelm. 1780. *Ehstnische Sprachlehre für Beide Hauptdialekte, den revalschen und dörptschen, nebst einem vollständigen Wörterbuch*. Riga & Leipzig: Hartknoch.

Hurt, Jakob (1989) = Hurt, Jakob (1899). Eesti astronomia. Kõne Eesti Jaani koguduse Noortemeeste Seltsis 10. Jaanuaril 1899. In: Hurt, Jakob. *Mida rahvamälestustest pidada: Artiklite kogumik* [How to Regard Folklore: A Collection of Articles (in Estonian).] Tallinn: Eesti Raamat. Pp. 91—130.

Eelsalu, Heino. 1979. Talihari ja Linnutee. [The Middlewinter and the Milky Way (in Estonian).] In: *Keel ja Kirjandus, 4*. Tallinn: Eesti NSV Teaduste Akadeemia; Eesti NSV Kirjanike Liit. Pp. 226—228.

Eelsalu, Heino. 1985. *Ajastult ajastule.* [From Era to Era (in Estonian).] Tallinn: Valgus.

Kuperjanov, Andres. 2002. Names in Estonian Folk Astronomy—from 'Bird's Way' to 'Milky Way'. *Folklore. Electronic Journal of Folklore*, 22. Pp. 49—61. DOI:10.7592/FEJF2002.22.milkyway.

Livländer, Robert Johannes. 1923. Vanade saarlaste täheteadus praegusel ajal: Mõned märkused ja lisandused Dr. J. Hurti "Eesti astronoomiale". [A Look on the Folk Astronomy Today: Some Additions to the Estonian Astronomy by Dr. J. Hurt (in Estonian).] *Loodus,* 8. Pp. 484—494.

Popova, Yelena. 2006. Time as a Category of Traditional Besermian Worldview. *Folklore. Electronic Journal of Folklore,* 32. Pp. 63—98. DOI:10.7592/FEJF2006.32.popova.

Westring, Salomo Heinrich. 2000. *Lexicon Esthonico Germanicum.* Available at http://www.folklore.ee/~kriku/VESTRING/index.htm (last accessed on December 21, 2016).

Wiedemann, Friedrich Johann. 1876. *Aus dem inneren und äusseren Leben der Ehsten: Der Akademie vorgelegt am 30. Sept. 1875*. Sankt-Peterburg: Kaiserliche Akademie der Wissenschaften.