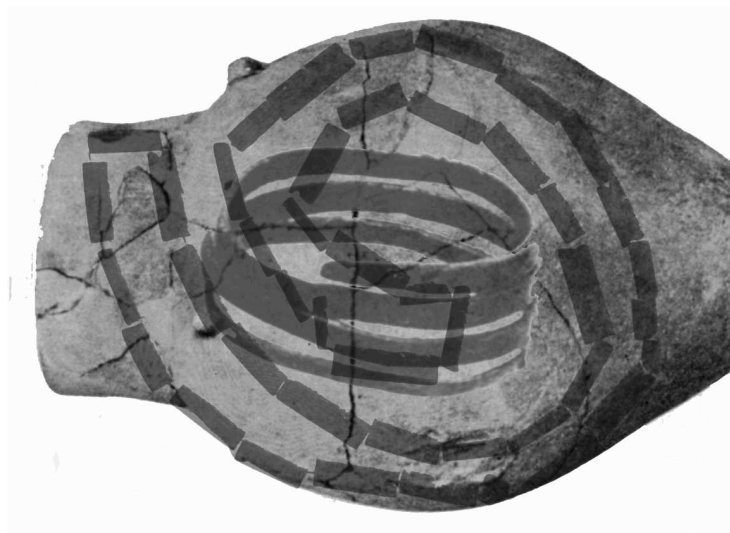


Konkoly Observatory of the Hungarian
Academy of Sciences

Monographs
No. 4



“Unwritten Messages” from the
Carpathian Basin

Edited by
Katalin Barlai and Ida Bognár-Kutzián

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Advisor: Esther Bánffy

Cover: Balázs Tatai

Computer graphics composed from findings in Basatanya cemetery

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FOREWORD

The Carpathian Basin, besides being a beautiful and interesting part of the European continent, is also a region of great actual and potential interest for archaeoastronomers.

As the area is situated in the temperate zone, more or less equidistant from the Equator and the Arctic Circle, there are many celestial events which can not be observed here. For example, the Sun never reaches its zenith, as it does in the tropics. The rise and setting of heavenly bodies does not have the 'drama' of the lands nearer the Equator, where, the path of the rising stars crosses the horizon at an ever steepening angle (approaching vertical) as the Equator is approached. This phenomenon was the basis of the navigation system of the ancient Polynesians.

The movement of the Moon is also less dramatic than in the lands nearer the Arctic Circle. The northern and southern extreme positions of the Moon (defined by the 18.6-year period of its movement) are not as spectacular as for example at Callanish (Scotland) or Stonehenge. In the northern countries the extreme position of the full Moon moves near the horizon. This gave rise to some remarkable cults, for example in Scandinavia.

What is left then to the inhabitants of the temperate zones? What can serve as a basis for their everyday rituals, belief systems, ideologies and burial customs? The answer: the four special events of the solar year, the two solstices and the two equinoxes.

Awareness of these days and events can be traced in the life of our remote, ancient and medieval, ancestors through their incorporating their knowledge in their communal architecture by aligning their shrines, graves churches and cemeteries. The examination of our ancestors' architecture from this point of view yields abundant proof of the intimate connection that existed between our ancestors' consciousness and the firmament.

This small collection of papers represents our first attempt of trying to use archaeoastronomy to gain some fresh insight into the practical and spiritual life of our remote ancestors in this region.

Budapest, December 2000

The Editors

Acknowledgements

It is my agreeable duty to express the editors' gratitude to the many people without whose unstinting and unselfish help, freely and generously given, the production of this volume would have been impossible due to the very limited financial resources available to us. The only shadow cast over my pleasure is the fact, that I am the only one of the editors left to do it.

I owe a debt of gratitude to Anthony F. Aveni and Wolfhard Schlosser for their official letters of support, which helped to obtain the financing of the project.

During the data collecting stage I had to pay frequent visits to the library of the National Museum of Hungary (Magyar Nemzeti Múzeum), where the staff, including the director, Endre Tóth, were extremely helpful. The same goes for the library and staff of the Institute of Archaeology of the Hungarian Academy of Science (Magyar Tudományos Akadémia) and its director, Csanád Bálint.

I have received incalculable help from my colleagues and friends, first of all Ildikó Ecsedy, further Lajos Bartha, Tamás Dolinszky, Károly Falvay, Aurél Pónori Thewrewk and Iván Tóth in form of advice and guidance. The papers were translated into English by Karl C. Barlay, József Csaba and Miss Dragana Mladenović as 'labour of love'.

Sincere thanks to my sons, Miklós and Mihály, for patiently alleviating my ignorance concerning the solution of some computational problems. Pál Decsy and Csaba P. Kiss have never hesitated to give a helping hand whenever his help was requested. The help of Andras Holl is acknowledged.

Finally, last but not least I want to thank the financial backing of our project provided by the T 25343 OTKA grant and the Ministry of National Cultural Heritage.

Katalin Barlai

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We have retained the habit, come down to us from the days when human palaeontology did not exist, of isolating that particular slice of six thousand years or so for which we possess written or dated documents. This for us is History, as opposed to pre-History. In reality, however, there is no breach of continuity between the two. The better we get the past into perspective, the more clearly we see that the periods called 'historic' (right down to and *including* the beginning of 'modern' times) are nothing else but direct prolongations of the Neolithic age. Of course, as we shall point out, there was increasing complexity and differentiation, but essentially following the same lines and on the *same plane*.

(Teilhard de Chardin: The Phenomenon of Man)

THE NEOLITHIC SHRINE AT PARTA

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Abstract

The Neolithic shrine at Parta belongs to the Banat culture from the period of middle-late Neolithic age. Its size was 11.6×6 m. The shrine was divided in two rooms by a wall. On the dividing wall there was a round window-like opening about 35 cm in diameter. The shrine had a circular opening — about of 30 cm — on the western wall too. This room was the place where the people brought their offerings. The eastern room was the most sacred place, a sanctuary where only the priest was allowed. There stood twin Bull-idols forming a divine couple of the Bull God and the Great Mother Goddess facing east. From the astronomical point of view we prove that at winter solstice sunset the sunlight illuminated a hand-loom in the NW corner of the shrine. In spring and autumn the sunlight entered the hole in the dividing wall and fell on the socle of the Bull-idols. During summer solstice sunset the Sun illuminated the place on the altar table where the grain offerings were brought. The vernal point was in the constellation Taurus in that time.

1 Description of the Shrine

The small settlement of Parta (Parác) is located 15 km SW of Timişoara (Temesvár), which is — according to specialists — one of the first historic locations to have been explored in the Banat district (see the map at the end of the volume).

The first excavations were rather haphazard. The first findings came to light unexpectedly during the construction of the dikes on the river Timiş. Systematic excavations were started in 1931 by Joachim Miloja. The discovery of extensive complexes made it necessary to enlarge the area under exploration, so that the multilayer dwellings, sheds, and a number of man-made holes could be properly examined. The examination of the central building and the shrine was completed in the summer of 1985. A replica (on a smaller scale) of the shrine and of the other edifices, uncovered during the excavation, was built and is now exhibited in the Banat Museum (Lazarovici, 1985).

The Parta shrine belongs to the ‘Banat’ culture of the middle-late Neolithic (4600–4200 BC). It is contemporaneous with the sites of the Vinca B1-B2 and Szakálhát cultures

in the Mid-Balkans and in the Great Hungarian Plain, respectively. The Parța shrine was erected at the midpoint of the NS axis of the ancient settlement. The first stage of the shrine was built as an oblong edifice of 12.5 m long and 7 m wide, oriented in the WE direction.

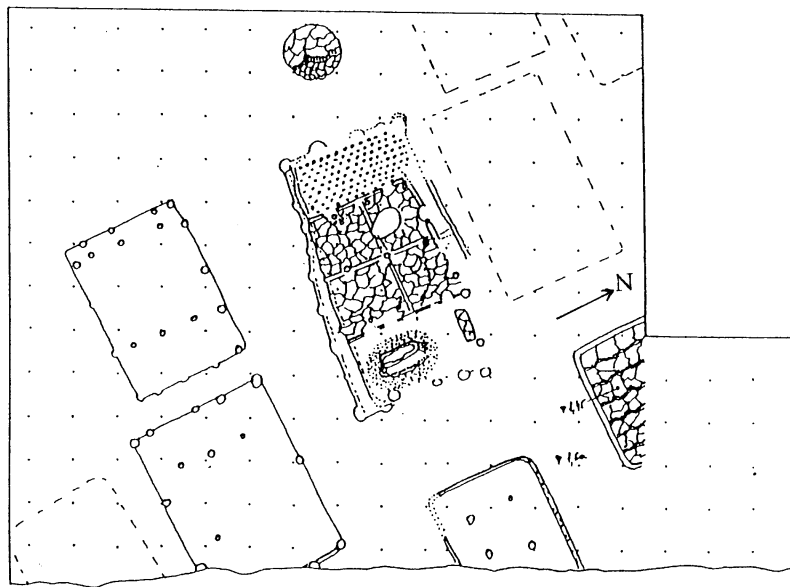


Figure 1: Central part of the settlement at Parța (after Lazarovici, 1989, p. 157)

A sacred area was cordoned off by a 50–60 cm high wall, made from a mixture of clay, straw and sand, reinforced with sticks and saplings. The altar table was placed in this area. The sacred area can be further subdivided:

1. An entrance of 60 cm.
2. A portable fireplace next to the entrance, standing on three or four wooden legs.
3. A 50 cm by 60 cm pedestal for the bust of the idol.
4. Space for storing the ashes of the ‘burnt offering’.
5. A 40 cm wide and 60–80 cm long box (on the left side of the entrance).

Analysis of our findings led us to the formulation of the following hypothesis:

The person (priest?), carrying the sacrificial offerings, entered the sacred area through the entrance (1) and went to the sacrificial table. The offerings were burned on the portable fireplace (2). The remaining ashes of the burnt offering were placed either behind the fireplace (4), or behind the idol (3), on the right side of the entrance. Those offerings that were not burned were placed in the long box (5), to the left of the entrance and the portable fireplace. The walls of the edifice were reinforced by wooden poles, placed about 1.4–1.6 m from each other.

During the second stage, after removing the remains of the ‘first stage shrine’, a new shrine of somewhat smaller dimensions was erected (Shrine 2). The reason for the

rebuilding of the shrine is not known, but it is probable that it had to do with damages due to a fire (Lazarovici, Maxim, 1992).

Before building the second shrine, a substantial statue (or idol) was erected on a clay pedestal, made from sandy soil, coated by a layer of wet yellow clay. The ‘twin statues’, constructed of a mixture of clay and chaff (straw) were placed on top of the pedestal, while at its sides some trays were installed (Figure 2), presumably to hold the incoming gifts and offerings. After drying out, the double idol and its pedestal were hardened by fire. After this the wooden parts of the shrine, the altar-table, the partitions, and the roof of the shrine were installed.

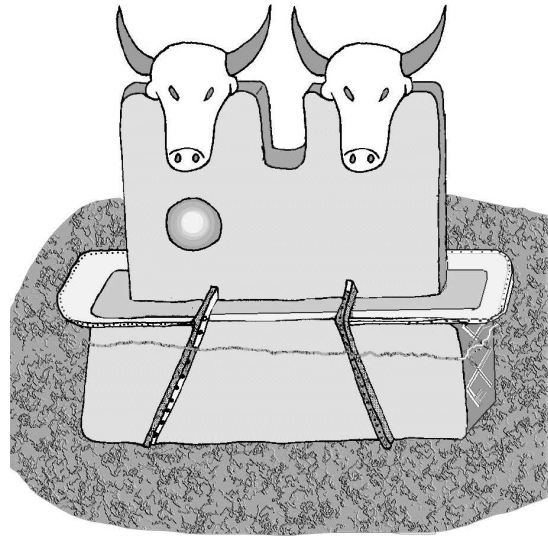


Figure 2: **The double idol. Representation of the Great Mother Goddess and the Bull God. It is 175 cm high (reconstructed)**

The new shrine is 11.6 m long and 6 m wide. The longer axis is aligned with the WE direction. The partition screen separating Sectors **a** and **b** (Figure 3), constructed by weaving saplings between vertical poles, was placed on the altar’s fireplace. Some of the poles were stuck in the ground, some were fixed to the roof structure. This screen had a hole of 30 cm, which was plastered with clay. It is assumed that when the shrine was set on fire, the heat of combustion ‘fired’ this material, so all that was left behind was a fire-hardened clay disk.

Towards the end of its use, the hole in the partition screen was filled in.

The altar table was situated in the middle of the room. It was about 20–30 cm high (measured from the floor). It was evenly bisected by the partition screen, so about 2.5 m of it was found in each area.

When the shrine suffered damage, the wall was also pushed in and its broken pieces have fallen on top of the ruins of the statue. On the east-wall, north of the axis, in front of the statue, there was a large window and an entrance. The inside of this window was guarded by two columns, which had, at the height of the statues, representations of bull-heads placed upon them (Figure 4). There were some interesting lines drawn in the clay. The area between these lines was painted red. There was also a ‘bulge’ between the

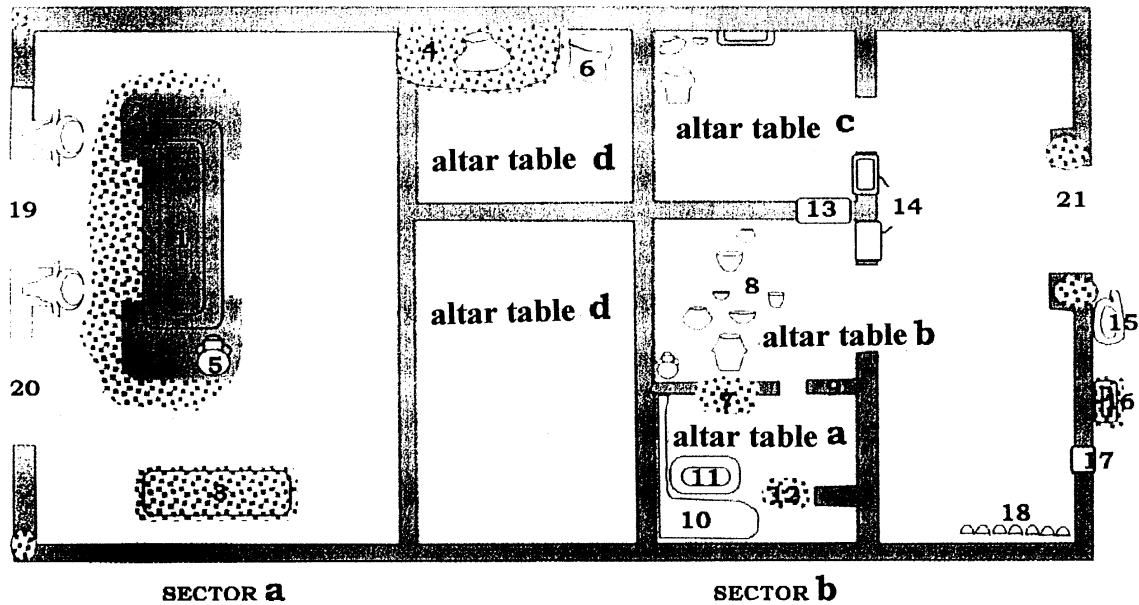


Figure 3: Plan of the second shrine. 1: the double idol; 2: pedestal; 3: adobe trough; 4: portable fireplace; 5: amphora; 6: great cup; 7: taurian skulls; 8: vessel; 9: mounting for the taurian skull; 10: cassette; 11: ‘man-faced vessel’; 12: mounting for the taurian skull; 13: taurian skulls; 14: mounting for the taurian skull; 15: hand-mill (mortar); 16: adobe cup; 17: Sun–Moon couple; 18: vertical loom; 19: window; 20: eastern entrance; 21: western entrance

bull’s horns (Figure 5), presumably a symbolic representation of the Sun and the Moon (Lazarovici, 1989).

The eastern room contained the coupled representations of — presumably — the Great Mother Goddess and the Bull God. This is the most important part of the shrine. It is 175 cm high. Its distance is 1 m, 1.3 m and 3.05 m from the east, south and north walls respectively. The uppermost part of this statue was formed by a double idol with two heads and their shoulders (see Fig. 2). Our assumption is that the shrine was raided by a hostile group. It is assumed that the shrine may have been occupied through violent action, during which its structure and furnishings were damaged, and the heads of the attached statues were taken as trophies. This could account for their missing. The altar table, upon which the intended gifts and offerings were deposited, was placed at the back of the central statue. The portable fireplace, on which the selected offerings were burned, was placed on the altar-table and fixed to the south wall. Near the northern wall, on the right side of the statue, there was an adobe trough for the other gifts and offerings.

The western entrance was shifted to the south of the WE axis. Sunlight was allowed to enter the shrine through a 35 cm circular opening on the western wall, between the entrance and the NW corner. Next to the circular hole an 8 cm thick clay relief — representing the Moon — was stuck on the wall, thus forming a representation of the Sun–Moon couple. This combined symbol is assumed to have been about 1.35 m above the floor level. Just below this symbol an adobe cup, and further down, towards the south, a rimmed hand-mill was also stuck on the wall. This triad — the Sun–Moon symbol, the cup and the hand-mill — formed a complex depicting a culture based on grinding (plant processing) and sacrificing to the Sun and the Moon, which were the symbols of the deities

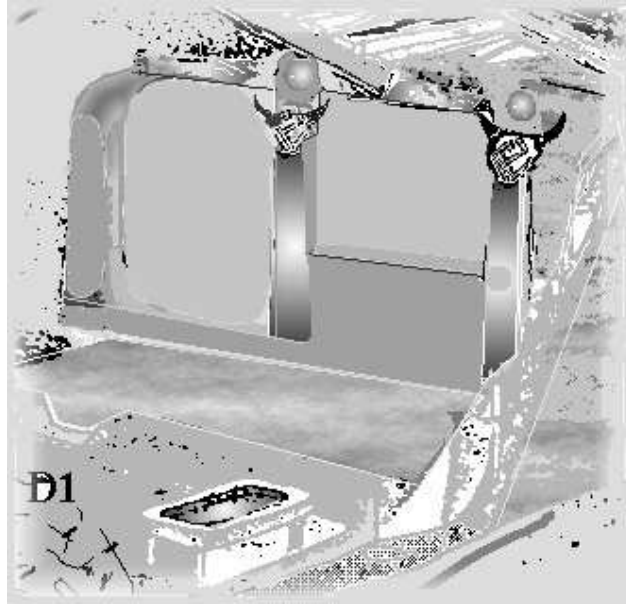


Figure 4: **The eastern entrance and the window with the bull-headed columns**

of fertility and procreation.

Near the northern wall, in the NW corner, two indentations were found in the floor of the sanctuary. Between these holes, there were 7 conical weights of clay (7 is a symbolic number of manifold meanings), used in the operation of vertical looms, and several clay balls, arranged in a pyramidal pattern and presumably used for hunting as slingshot-projectiles (Lazarovici, Maxim 1993).

We should like to mention a few of the artifacts, which, in our opinion, may have special importance:

- The amphora, found in Sector **a**, near the midpoint of the statue's back. The amphora was filled with food or liquids, which were used during the ceremonies.
- The 'Fish-tray', found also in Sector **a**, on the altar table. It is shaped as a fish. Such trays were used for frying food such as bacon, eggs or fish.
- A 'Man-faced vessel' containing bones of severed limbs, whose origin (human or animal) could not be determined.

Outside the shrine, about 4–5 m west of the entrance, there was an outside fireplace, which was three times restored. Apparently it was for the night-watchmen, who guarded the shrine, to sit around and keep warm during the night.

2 Astronomical Aspects of the Parța Shrine

During the reconstruction of the shrine we tested various ideas. One of them was to examine the path of sunlight inside the shrine. We made our observation on the 23 September, 1982, at and around sunset, when the sunlight penetrated the shrine through the Sun–Moon opening on the shrine's western wall. This light illuminated the central

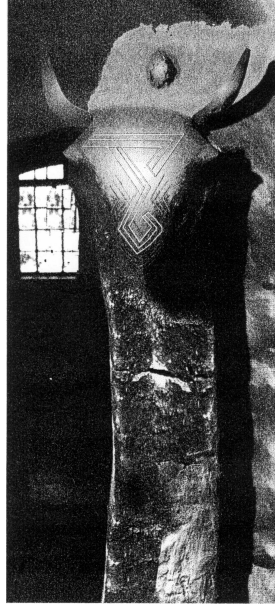


Figure 5: **Bull-head with a bulge between its horns**

area of the statue's back, approximately at the point where the amphora was found. (For the observation we used a cardboard disk of circular shape, stuck on a wooden stick. This represented the Sun–Moon opening.) At this time we observed that at sunset the sunlight (in our case the shade) fell on the division of the statue, touching on the floor, the bust, the fireplace and the man-faced vessel. We have also found the amphora in this area. We assume that it was kept on the statue's pedestal, and it was used to store the sacred liquids used for sprinkling on the freshly sown crops or for similar ceremonial ends. We also noticed during our observations, that that due to the finite thickness of the wall, the spot formed by the entering the interior has assumed different shapes.

The results of this experiment were verified from the astronomical point of view. We know that the points of sunrise and sunset today differ from those seen around 4200 BC, due to the precession of the equinoctial point. The points of sunrise — and sunset — describe an arc during the year, which is limited by the points observable at the winter and summer solstices.

As a first step, we calculated the azimuth of the Sun (the angles are measured from the North, towards the East) at the latitude of Parța ($\varphi = 45^\circ 45'$) for the summer (A_1) and winter (A_2) solstices.

For the calculations we used the formula:

$$\cos A = \frac{\sin \delta}{\cos \varphi} \quad (1)$$

Where: δ = Sun's declination; φ = the geographical latitude of Parța; A = the azimuth (in this case the height h of the Sun measured from the horizon = 0).

It is well known that during one year δ changes between the limits of $+\varepsilon$ and $-\varepsilon$, where ε is the angle enclosed by the Equator and the Ecliptic.

Wittmann (1979) used the following formula to calculate the angle ε :

$$\varepsilon = \varepsilon_0 + \varepsilon_1 \sin \varepsilon_2 (T + \varepsilon_3). \quad (2)$$

Where

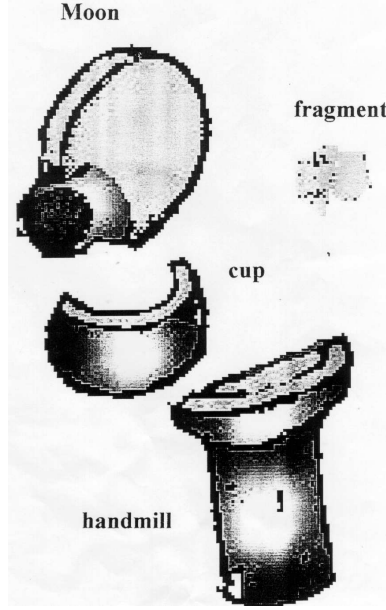


Figure 6: **The Sun–Moon symbol and the artifacts stuck on the western wall**

$$\begin{aligned}\varepsilon_0 &= 23^\circ.496932 \pm 0^\circ.0012; \\ \varepsilon_1 &= -0^\circ.860 \pm 0^\circ.005; \\ \varepsilon_2 &= (0^\circ.87777 \pm 0^\circ.0963)/\text{century} = 0.01532 \pm 0.0009 \text{ rad/century}; \\ \varepsilon_3 &= 3.4 \pm 0.1 \text{ century.}\end{aligned}$$

If we substitute the extreme values $\delta = +\varepsilon$ or $\delta = -\varepsilon$ into Equ. (1), then the Winter and Summer points will be obtained. We know that the angle ε varies with time. Following the example of A. Vince (Vince, 1998) and further C. Cornide et al. (1992), we will also utilise Wittmann's theory.

$$T = \frac{\text{JD} - 2415020}{36525}.$$

Where T is calculated for the epoch of 1900.0 and measured in Julian Centuries (36525 days). For the Parța shrine we obtain $\text{JD} = 187373$ (4200 BC). From this it follows that

$$T = -61; \quad \varepsilon_{4200 \text{ BC}} = 24^\circ.16.$$

It is sufficient accuracy for our problem. This result has been verified using a BASIC program (Sinnott, 1984).

The substitution of $\delta = \pm\varepsilon_{4200 \text{ BC}}$ yields us the azimuths of sunrise and sunset for the winter and summer solstices.

So, the azimuth of the sunset point can move in the range limited by 306° (Northernmost position — Summer solstice) and 234° (Southernmost position — Winter Solstice), that is in a symmetrical arc of $71^\circ.8$ around the EW axis.

	Summer Solstice A_1	Winter Solstice A_2
Azimuth – Sunrise	$54^\circ.086$	$125^\circ.914$
Azimuth – Sunset	$305^\circ.914$	$234^\circ.086$

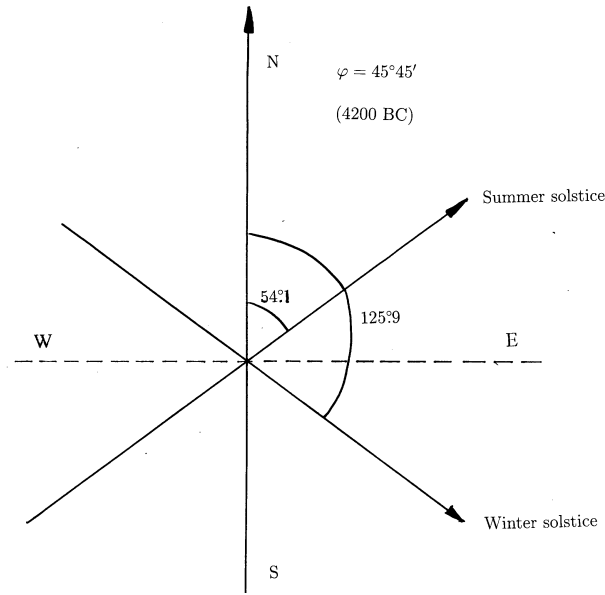


Figure 7: **Orientation of the second shrine. The “solar arc” at the geographic latitude of Parța**

We can fix the position of various elements of the shrine. The Sun–Moon couple is 1.5 m, the opening on the dividing wall is 2.25 m and the statue with the pedestal is 3.05 m away from the north wall. Their elevation (distance from the floor) is 1.35 m, 1 m and 0.90 m, respectively. Accordingly, at sunset the Sun illuminated the interior of Shrine 2 through the Sun–Moon couple.

Here we want to mention that ‘in the beginning’ there were no buildings around the shrine, so there was nothing to obstruct the direct sunlight from illuminating the shrine. We can not be sure, but we assume that later on the access of direct sunlight was somehow prevented. This made the hole through the dividing wall redundant, providing a reason for its elimination.. Another reason could have been, that the opening was usually closed and opened only on special occasions.

During one year the sunset describes an arc between 234° (Winter point) to 306° (Summer point). As, looking from the north wall, the path of the sunlight is not parallel with the EW axis, the following sequence can be observed:

- At the Winter solstice the light of the setting sun touches the shrine’s NW corner, illuminating the hand-loom (weaving was the winter-occupation of the women).
- In springtime the Sun sets more or less parallel with the shrine’s longitudinal axis. So the sunshine can illuminate part of the north wall of the altar and a big enough part of the dividing wall to reach the hole made in it. This way the rear of the statue would be also illuminated. According to some assumptions the amphora — found beneath the statue — was also illuminated (Spring was the time for sowing and other outdoor work, during which a sacred fluids stored in the amphora were most likely to be put to use).
- At the Summer solstice sunset the light touches on part of the dividing wall and later illuminates the southern half of the area, where the vessel filled with corn was

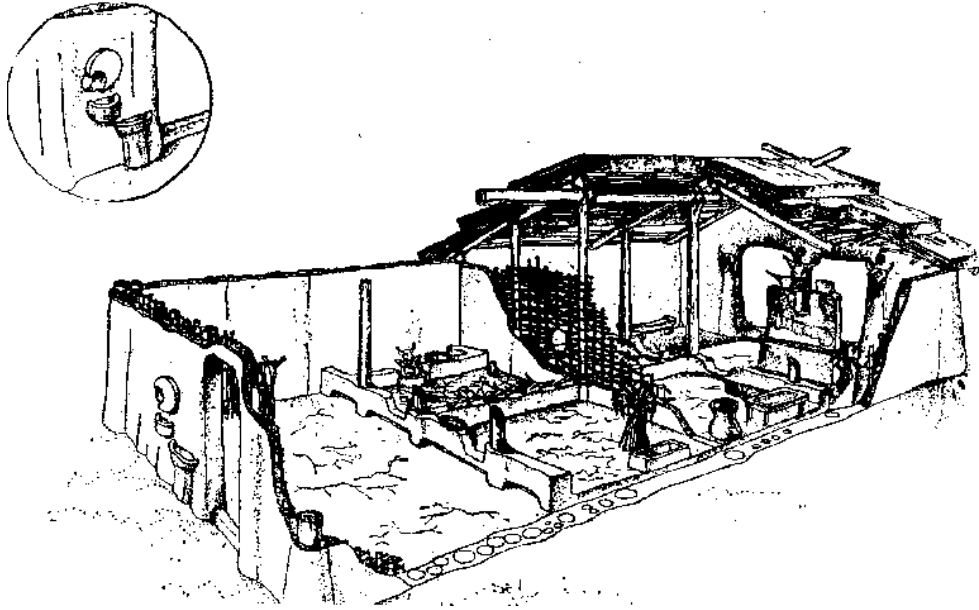


Figure 8: The view of the shrine from the SW

stored (association with the time of the grain harvest).

- After this time the sunlight traverses the same path in the opposite direction, with its reach into the interior constantly diminishing. In wintertime only the hand loom is illuminated, as it was at the beginning of the cycle..

3 A Short Comparison of Parța and the Externstein Shrine

During the examination of the Parța shrine we noticed many points of similarity between it and the Externstein shrine near Bad Meinberg in Germany, which is regarded by historians as one of the most interesting Neolithic shrines in that country (Schlosser, 1996). The wall of the ‘Sacellum’ shrine has also got a circular hole in it, whose azimuth was oriented towards the rising Sun at the summer solstice.

The monumental rock-formations at Externstein are shrouded in mystery. They gave home to many civilisations and challenged men’s ideas in the fields of historical research, ethnography, archaeology, astronomy, geology, stone masonry, politics and other intellectual pursuits.

We are justified in saying that both shrines were Neolithic of origin and were used for similar — such as religious, political, navigational — ends. Both were oriented by the Sun at the Summer solstice, Parța at sunset, Externstein at sunrise.

The circular hole built into the shrine’s wall is an important feature of both. It represents the sun, as the largest heavenly body visible.

Both shrines have an altar and a designated place for the placement of gifts and offerings. In Parța it is a cassette, in Externstein a cavity excavated from the floor.

The walls of both shrines carry interesting symbols painted on the wall (Lazarovici, 1986).

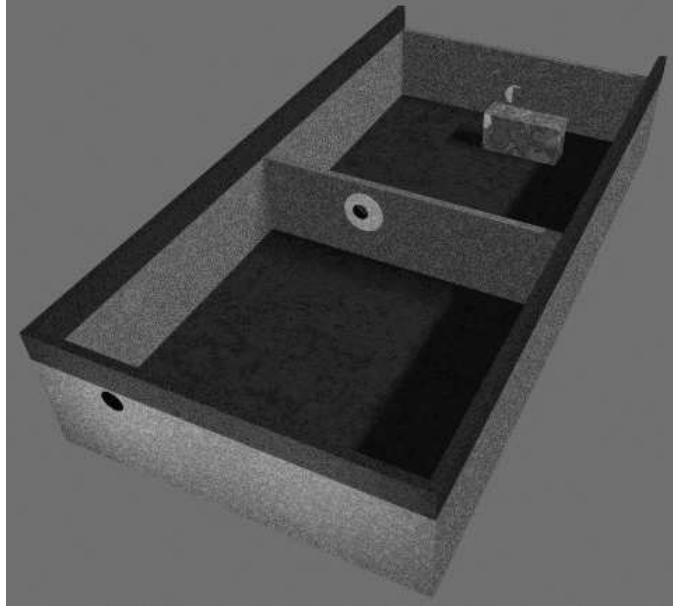


Figure 9: **Computer simulation of the shrine: the sunlight beams through the holes to illuminate the pedestal**

Naturally, there are also differences. Parța was built in a hilly country, and it was constructed out of clay, reinforced with reeds and twines. It was built above ground while Externstein was a collection of holes and caves, dug into solid rock, which made its defence easier.

In Parța the idol is a statue, representing a cult of the Bulls, in Externstein the idol is a column, rising from the hole in the floor.

At Parța there was a representation of the moon in form of a clay symbol stuck to the wall next to the circular hole. The cup and hand-loom were placed below this. In Externstein the circular hole is not cut through the shrine's wall, but through the closing wall of an extension to one of the stone galleries, which could be reached by stairs, constructed at a later time. There was also a small table placed below the circular opening.

While Externstein is visited by about half a million people yearly, only a smaller scale replica of Parța can be seen in the Banat museum.

4 Conclusions

After examining the Parța shrine, we feel to be in a position to draw some conclusions about the ceremonial activities carried out therein. The bringing of gifts and offerings was already a well-established practice even in these ancient times.

The bringers of goods entered the shrine from the west. The gifts and offerings intended for the Sun or the Moon were transferred from the altar table either into the vessel beneath the Moon-symbol or onto the portable fireplace.

Access from the east side was limited. The entrance was opened up only occasionally in connection with the fertility rites and with learning about the origins of the world. The statue of the bull represented power and fecundity. Presumably they were aware of

the fact the equinox was in the constellation Taurus in the time of the building of the sanctuary. It may explain the cult of the Bull. In spring the Sun illuminated the socle of the bull-statue. From this fact one can infer that the people from the shrine of Parța had a good astronomical knowledge. It stimulated their cultic actions with respect to the solar phenomena.

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It seems most probable that only one ultimate cause have been sufficiently important to members of HOMO SAPIENS everywhere and in all ages to have generated the full spectrum of ethnoastronomical, archaeological and historical effects, and that this have been — and still is — man's universal preoccupation with the problem of death.

(J. Saul: Archaeoastronomy, IX, 1989–1993, pp.104–107)

THE ASTRONOMICAL ASPECTS OF THE ORIENTATION OF THE GRAVES IN THE BURIAL SITE OF ICLOD

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Abstract

The paper deals with research into the orientation of graves and other remains, found in Transylvania, Romania, whose alignment was mainly done on the basis of astronomical considerations (solar phenomena).

We start with the presentation of the graves found in the ancient (4200 BC) burial site at Iclod, where 72% of the graves were oriented within the solar arc defined by the annual migration of the sunrise's direction.

Similar research was carried out at the burial sites discovered at Tiszapolgár and Bodrogkeresztúr (Hungary), Gomolova and Mokrin (Yugoslavia) and Cernica (Romania)

These results indicate the existence of a Sun-cult.

Introduction

Funeral rites have played an important part in the everyday life of Neolithic societies, as shown by the findings made at the excavation of the Neolithic cemetery at Iclod near Cluj-Napoca (Kolozsvár). The astronomical problem of the orientation of the graves found in the Iclod burial site is identical to the problems presented by the Neolithic cemeteries excavated at Cernica (Romania) [3], [4], [5], at Vésztő-Mágordomb, Kisköre, Villánykövesd and Zengővárkony, Tiszapolgár and Bodrogkeresztúr (Hungary) [1], [3] and at Gomolova and Mokrin (Yugoslavia) [2], [19].

The graves and skeletons were very often oriented relative to the cardinal astronomical directions (N, S, E, W) observable on the date of the burial [1], [2]. In this paper we aim to draw some conclusions regarding the possible existence of a Sun-cult during the Iclod culture (4200 BC, according to our deductions), by calculating the positions of the sunrise

at the winter and summer solstices and relating them to the orientation of the graves [12], [13], [8], [9], [10], [11].

The Neolithic settlement at Iclod was first explored by Márton Roska (1942) at around the turn of the century. There were two burial sites. Site 'A' is on the banks of the river Someş (Szamos). Site 'B' lies between the villages of Iclod and Livada, and extends as far as the road and the railway line. So far 40 graves were discovered in site 'A' and 53 graves in site 'B'. The area of site 'B' includes the whole village. The arrow shows the north.

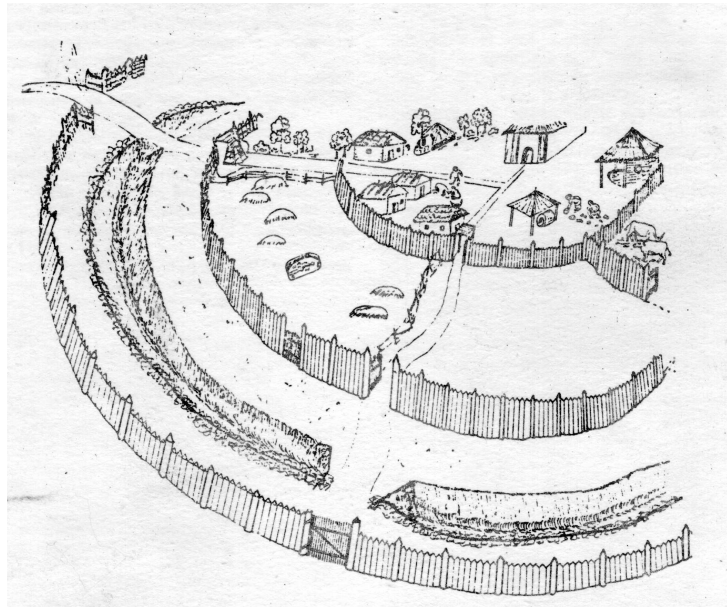


Figure 1: **Reconstruction of the settlement (after Lazarovici,1991).**

It is assumed that site 'A' is the earlier one, but it also contains graves of later origin. The graves in this site are well preserved. With the exception of a few graves, the bodies were laid down on their back. Their look is directed towards the rising sun (except graves M: 9, 12, 13, 18, 23, 26, 27, 28, 22, 38, 39). The graves also contained ceramic cooking utensils, four to five in the graves of site 'A', one to four in site 'B' and four to ten in the earliest graves.

During the later stages other artifacts make their appearance, such as objects made of stone, bones, flint, obsidian and slate. There were also some vessels made of paste of poor quality. We also want to mention graves in cemetery 'B': M18, M39 and M45, which are of special interest on account of some strings of pearls found attached to the skeletons' arms, legs and necks.

The ceramic vessels were placed either in groups, or arranged in rows, next to the corpses' feet, knees, waist or shoulder. Coupled vessels were an interesting feature of the graves buried in site 'A'. In graves of later origin other kinds of artifacts, such as pearls, spatulas, blades, tools made of bones or horns, implements made of flint, shale, opal or obsidian, and axes made of chiselled stone made their appearance.

One interesting skeleton of later origin was laid out in the NS direction, was 1.75 m tall, wore strings of sea shells around his ankles, wrists and neck. Next to his left foot there were four bradawls, made of horn, an obsidian splinter, a deer's thighbone and an axe. Consequently we may assume that it was a final resting place of a hunter.

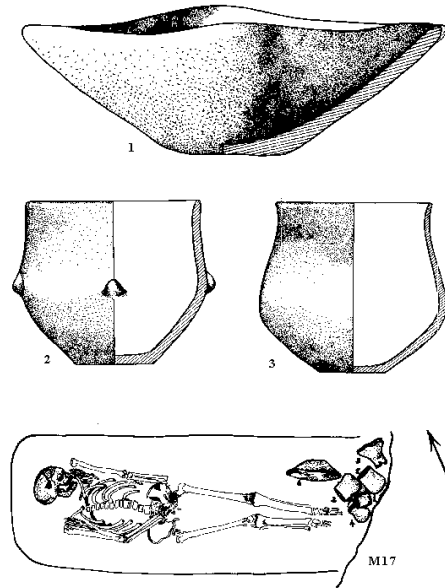


Figure 2: Some vessels of characteristic type in the grave M17. 1.6 m tall skeleton, the angle of orientation is 95° . The arrow shows the north direction.



Figure 3: Grave of a teenage woman (M32); 1.30 m tall skeleton, orientation angle: 61° .

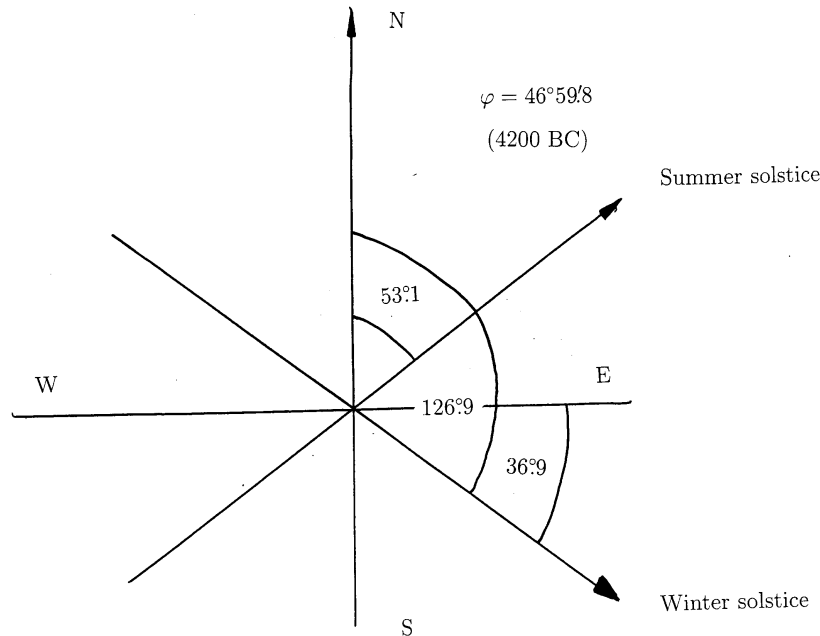
Our explorations at Iclod show that these sites were established cemeteries, operated according to well established customs, rules and rituals, indicating a well developed burial culture.

The distribution of the orientation of the graves at Iclod

In order to verify our assumption that the angles of orientation of the graves fall within the solar arc, we calculated the value of the orientation angles projected to year 4200 BC. The actual points of sunrise and sunset, as seen in our time, differ from the points seen in 4200 BC. This well known effect is caused by the precession of the equinoctial points. During a full year the “sunrise” points describe an arc, whose extreme points define the (summer or winter) solstitial points. For the calculation of the azimuth (A) we used the following formula:

$$\cos A = \frac{\sin \delta}{\cos \varphi}$$

where δ = the Sun’s declination, φ = the geographical latitude of Iclod = $46^{\circ}59'8$. (The h height of the Sun on the horizon is 0.)



v

Figure 4: **The solar arc at the latitude of Iclod.**

The extreme values of the declination of the Sun and the solstitial points were calculated using the method discussed in detail in this volume in the paper about the Parța shrine p.12, (see [6], [18], [20]). The calculated values of angle of sunset and sunrise (measured from the North) are shown in Table 1:

The graves’ orientation was determined from the oriented map of the site, using rulers and protractors. The data of the graves were analysed. We assume that the error of the determination was between 1° and 2° .

Available data of the graves are listed in Table 2/A and Table 2/B.

The distribution of the graves according to their azimuths has been constructed. In the analysis we made use of 20 graves from Site ‘A’ and 43 from Site ‘B’. The result-

Table 1

	Summer Solstice (A_1)	Winter Solstice (A_2)
Azimuth – Sunrise	53°:122	126°:878
Azimuth – Sunset	306°:878	233°:122

ing diagrams of the alignment angles are shown in Figs. 5–8. Using the data of both cemeteries, 'A' and 'B', the combined distribution of the graves can be given in Fig. 9.

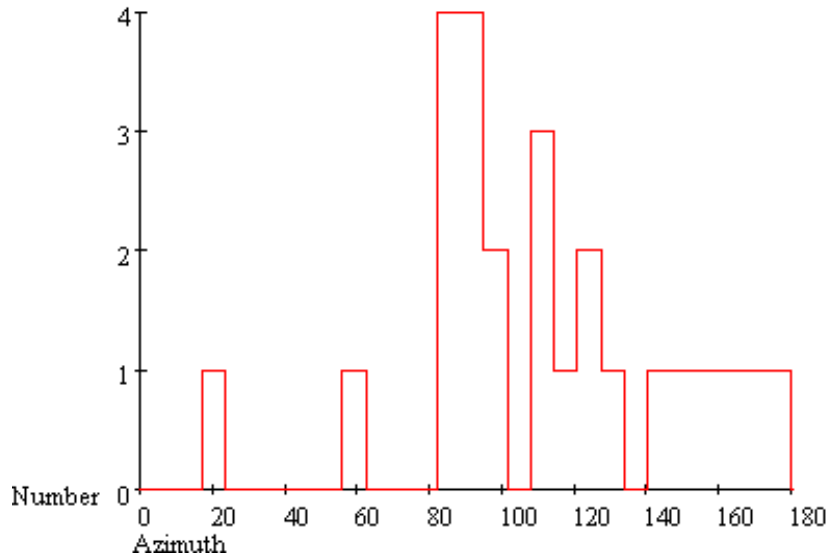


Figure 5: **Distribution in the 'A' cemetery given in 1° distances in azimuth.**

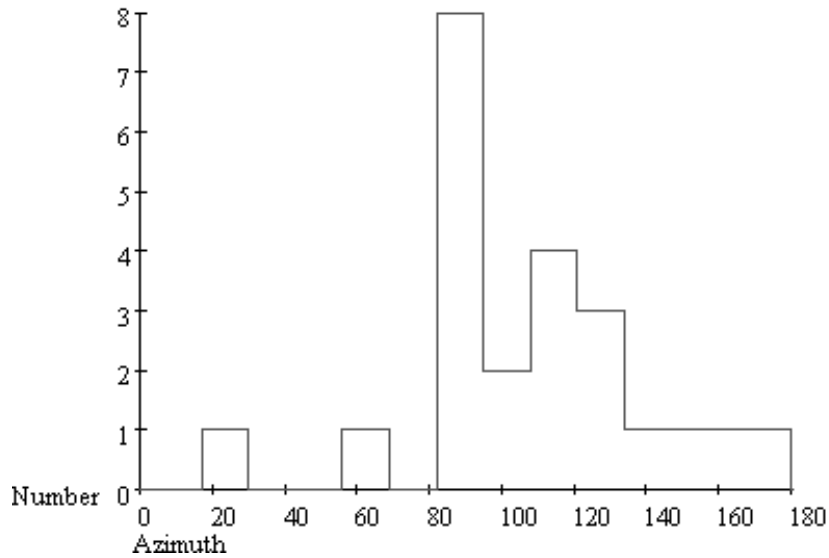


Figure 6: **Distribution in the 'A' cemetery given in 10° distances in azimuth.**

Table 2/A

Grave	Azimuth	No. of findings	Contents
M1	-	2	vessels
M2	-	5	vessels
M3	-	3	vessels
M4	-	2	vessels
M5	-	2	vessels
M6	-	4	vessels
M7	-	3	vessels
M8	-	3	vessels
M9	-	5	vessels
M10	122	7	vessels
M11	90	7	vessels
M12	89	4	1,7 m (skeleton), vessels
M13	147	2	1,1 m (child), vessels
M14	121	4	1,7 m (woman)
M15	-	-	(aged man)
M16	114	5	1,7 m (skeleton, sick), vessels
M17	95	3	1,6 m (skeleton), vessels
M18	112	6	1,7 m (man), vessels
M19	96	2	1,6 m (skeleton), vessels
M20	-	1	(man), vessels
M21	-	2	vessels
M22	92	5	2,6 m (skeleton), vessels
M23	-	-	-
M24	-	1	vessels
M25	90	1	2,1 m (skeleton), spoon
M26	88	5	1 m (skeleton), vessels
M27	-	5	vessels
M28	82	8	(aged man), vessels
M29	57	6	2,1 m (skeleton), vessels
M30	84	1	1,7 m (skeleton), vessels
M31	117	3	1,8 m (skeleton), vessels
M32	-	1	vessels
M33	-	-	-
M34	-	-	aged man
M35	84	-	-
M36	112	2	1,9 m (skeleton), vessels
M37	17	-	(teenage woman), vessels
M38	130	3	1,9 m (skeleton), vessels

Table 2/B

Grave	Azimuth	No. of findings	Content
M1	80	-	-
M2	0	-	-
M3	176	-	-
M4	90	-	-
M5	71	-	-
M6	78	-	-
M7	73	-	-
M8	158	-	-
M9	158	-	-
M10	39	-	-
M11	39	-	-
M12	158	-	-
M13	81	-	-
M14	78	-	-
M15	72	-	-
M16	83	-	-
M17	64	-	-
M18	10	7	1,75 m (skeleton), animal bone, vessels, spondylus, pearls
M19	44	-	-
M20	69	-	-
M21	70	-	-
M22	12	-	-
M23	74	-	-
M24	79	-	-
M25	70	-	-
M26	95	-	(aged woman)
M27	107	-	(aged man)
M28	160	-	(teenage woman)
M29	70	-	(aged woman)
M30	66	7	1,65 m (skeleton), animal bone, 6 years old boy, vessels
M31	55	-	(woman, child)
M32	61	1	1,30-m teenage woman
M33	68	-	aged woman
M34	75	-	1,8-m man, landslip
M35	-	6	1,55 m, aged
M36	110	4	1,25 m, teenage
M37	90	7	-
M38	10	2	1,10 m (skeleton)
M39	132	2	-
M40	90	-	aged

Table 2/B (cont.)

Grave	Azimuth	No. of findings	Content
M41	-	1	man crossing a house of phase II/III
M42	-	3	1,45 m (skeleton)
M43	-	2	1,50 m (skeleton), house crossing
M44	64	3	Mutilatu
M45	68	2	Gabriela
M48			
M49	-	-	7-8 years old girl
M50	-	-	35 years old man
M51	163	7	animal bone, vessels
M52	-	5	animal bone, vessels
M53	33	6	animal bone, 5 clods of ochre at the feet

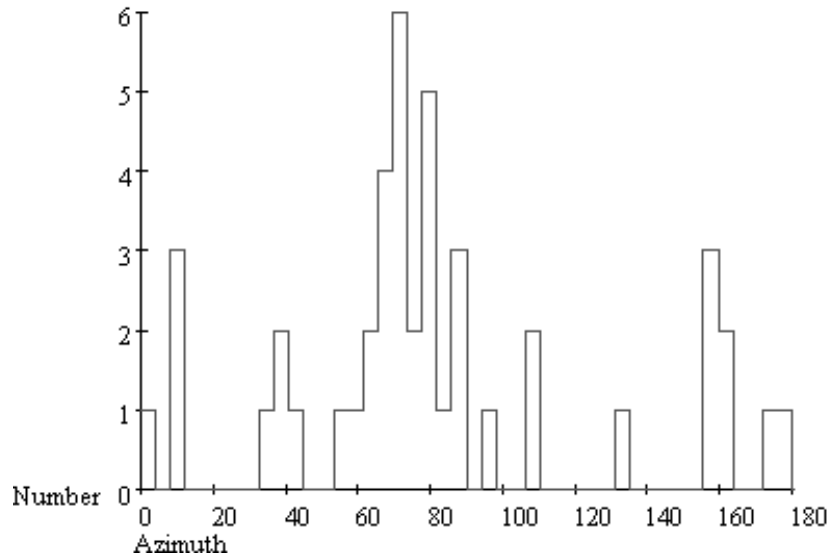


Figure 7: Distribution in the 'B' cemetery according to 1° distances in azimuth.

Inferences

Funeral rites played an important role in the life of Neolithic societies and the findings at Iclod strongly support this assumption. The graves can be divided into three groups, according to the time of their origin (Phases I - III). The earliest graves of phase I are found within the boundaries of the present day settlement, near the defensive earthworks. During phase II the burial ground spread to about 200 m in the SW direction. Towards the end of phase II and in phase III the burial place was re-transferred to the settlement area.

The graves usually contained some utensils buried with the body. It was noted that

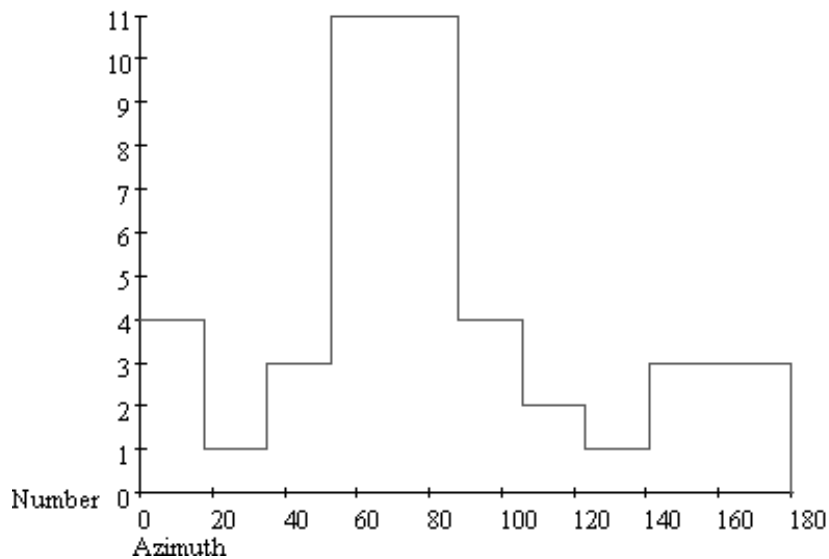


Figure 8: Distribution in the 'B' cemetery according to 10° distances in azimuth.

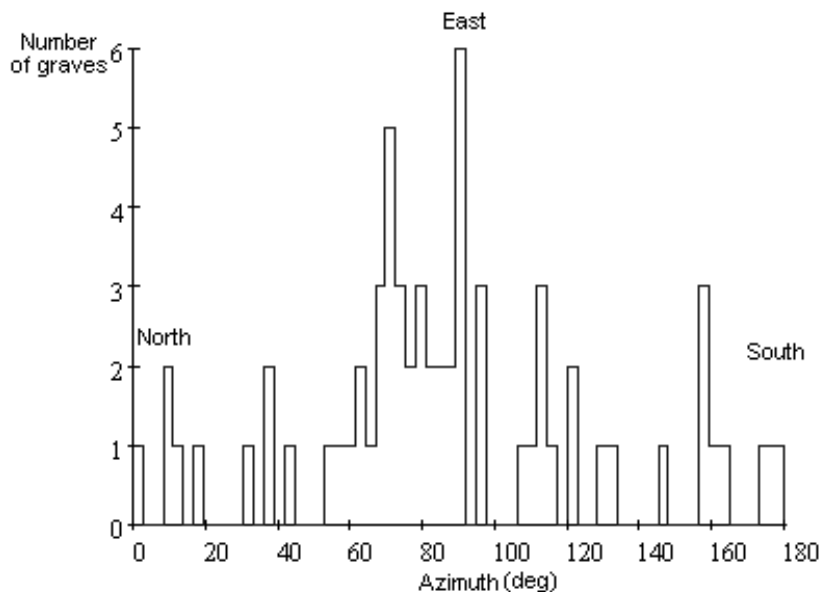


Figure 9: Combined distribution of both cemeteries 'A' and 'B' according to 1° distances in azimuth. The 72% of the graves are to find within the solar arc, which here is about 73°.

right from phase I the vessels found in the graves were arranged in a uniform manner. From the end of phase I graves yielding rich findings made their appearance. In these later times the custom was to place unused vessels (painted ornamental vessels, which, after firing could not be used for any household purpose) in the grave. Some vessels of a distinct type were repeatedly found, but their significance has not been as yet established.

The Iclod groups were found generally in the riverbed, or on the banks or shoals of the river Someş (Szamos). The settlements are quite extensive, as big as 80 hectares in

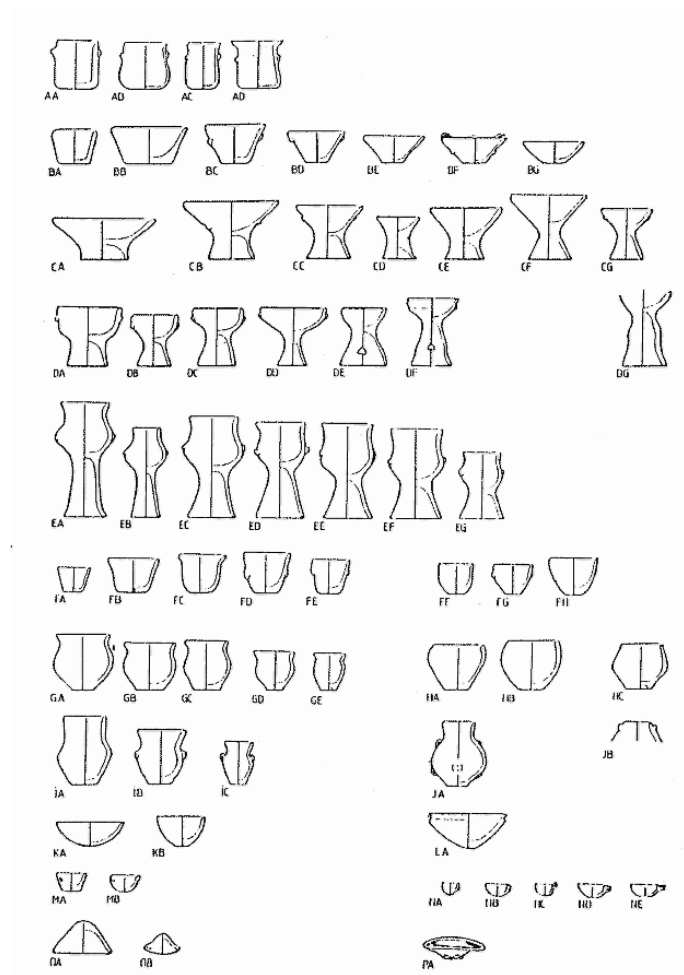


Figure 10: Vessel types (after Lazarovici, 1991, p. 33).

county Cluj, or four to five hectares for each phase at Iclod¹.

On the basis of our findings we can infer that the economy of the Neolithic inhabitants of the area was based on agriculture, hunting, fishing and animal husbandry.

The graves found outside the solar arc contain fewer artifacts (vessels) than those found inside. In these graves such utensils make their appearance as are usually found in the latest graves of the Iclod burial site, such as tools made of chiselled or carved stone. This fact led us to the tentative assumption that the third (last) phase was associated with a drastic change in burial customs, which manifested itself also in the changing of the graves' alignment to the NS direction. These changes in the spiritual and economic life of the community seem to indicate the transition to the Bronze (Eneolithic) age.

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¹Hectare is a Central European area unit. 1 hectare = 2.471 acres

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ORIENTATION OF GRAVES AND SKELETONS IN THE EARLY BRONZE AGE NECROPOLIS OF MOKRIN

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Abstract

The presence of the skeleton/grave orientation toward the cardinal points of azimuth has been confirmed for several prehistoric necropolises worldwide. In this paper the authors have studied orientation data acquired from the Bronze Age necropolis in Mokrin hoping to get more insight on the burial ritual of this ancient population.

In Mokrin cemetery (2300–2100 BC) the orientation of 146 graves and 171 skeletons were studied. Their angular distribution has been determined. Our results show that the graves and skeletons were oriented in north–south or south–north direction, respectively. The faces of the dead pointed toward the sunrise.

General Description

The Early Bronze Age necropolis of Mokrin is situated near the village of the same name in eastern Banat (Serbia), 13 km north of Kikinda, in the immediate vicinity of Yugoslav–Romanian border (45°55' north latitude, 20°22' east longitude) (See the Map at the end of the volume.)

The necropolis is bounded by the river Tisa from the west, the river Moris from the north, the old Begej irrigation channel from the south, and the Romanian border from the east. It is situated on the northern slope of a sand rock, and therefore well protected from floods and underground waters. The choice of such a valuable piece of land together with the funeral rites indicate the importance the survivors attributed to the proper treatment of their deceased in Mokrin.

Research history

The necropolis of Mokrin, with its 312 explored graves and the material they yielded, represents one of the most explored and documented prehistoric necropolises in Serbia. In course of the eight years of fieldwork (1953, 1958–60, 1963–65, 1967, 1969–70) total area of 10.080 m² was investigated. The northern, northeastern and southeastern part of the

necropolis that remained unexplored is believed to contain another 50 to 100 unexcavated graves (Girić 1971:34).

The examination of the anthropological material from the Mokrin necropolis has been conducted by two separate teams: Gy. Farkas and P. Lipták (1971), and I. Lengyel (1972). They have carried out *both morphological and osteo-chemical analyses*. Their data has been used in this paper for analyzing the orientation of skeletons in respect to their sex.

Taking into consideration the number of excavated graves, the satisfactory degree of the preservation of the skeletal material (Farkas and Lipták 1971:240) and the clear demarcation of the grave pit contours, the Mokrin necropolis can give enough data for grave and skeletal orientation to be analysed.

Relative and absolute chronology

The Mokrin necropolis has not been in extensive use. It is dated between 2300–2100 BC and belongs to the Early Bronze Age period. Grave goods are dated in the interval between BIb and the beginning of the BIIIa phase of the Bronze Age according to the chronology of A. Mozsolics, i.e., the end of I and whole II and III Bronze Age period according to I. Bóna. Usage of the necropolis in Mokrin was suddenly interrupted in the BIII phase (A. Mozsolics 1967:127-184), i.e. III period of the Early Bronze Age (I. Bóna 1975) (Girić 1971:235–237).

Burial rites

The people of Mokrin practiced skeletal burials with the dead placed on a side in a contracted or flexed position, with arms bent at the elbow and hands at the shoulder level or just in front of the face (Girić 1971:196). They were laid in the grave-pits of fairly rectangular shape with an extra space left near the feet for grave goods to be placed (Girić 1971:193–194). Most of the burials are single ones with the exception of four graves: three graves (22, 257, 308) which contained a child and an adult (grown up individuals of both sexes were presented) and one grave (122) containing 2 adults (a man and a woman) and a child. Since adults were of approximately the same age it has been assumed that these graves represent family burials (Girić 1971:197).

Apart skeletal inhumation, cremation, which corresponds to the early phase of *Moris culture* (widely known as *Maros culture*) as well, has also been detected in the Mokrin necropolis (five graves). This burial practice, uncharacteristic for Mokrin, is believed to have derived from Nagyrév or Kisapostag group (Tasić 1974:197–198).

Orientation of Skeletons and Graves

By studying sketches of the graves and taking into account the sex of the deceased we can observe the existence of a specific pattern of burial: male skeletons *lay on their left body side and are orientated with their heads toward the north*, while female skeletons *lay on their right side with heads orientated toward the south*. With bodies placed and orientated in this way heads of the skeletons of both sexes faced east. A certain number of exceptions to this rule can be noticed and we can classify them in the next four categories:

1. correctly orientated (male skeletons orientated with heads toward north, female skeletons with heads toward south) and correctly placed skeletons (they face east),
2. correctly orientated, but incorrectly placed skeletons,
3. incorrectly orientated, but correctly placed skeletons and
4. incorrectly orientated and incorrectly placed skeletons.

Skeletal orientation analysis

From the grave sketches (Girić 1971:Tab. I-XXXIII) the orientation of 171 skeletons was analyzed (see Tables 3 and 4 attached to the end of this paper). For this purpose the angle between skeleton axis, determined by spinal column, and geographical north was measured clockwise (from north to east). Results acquired this way are shown as histograms in Figures 1 and 2.

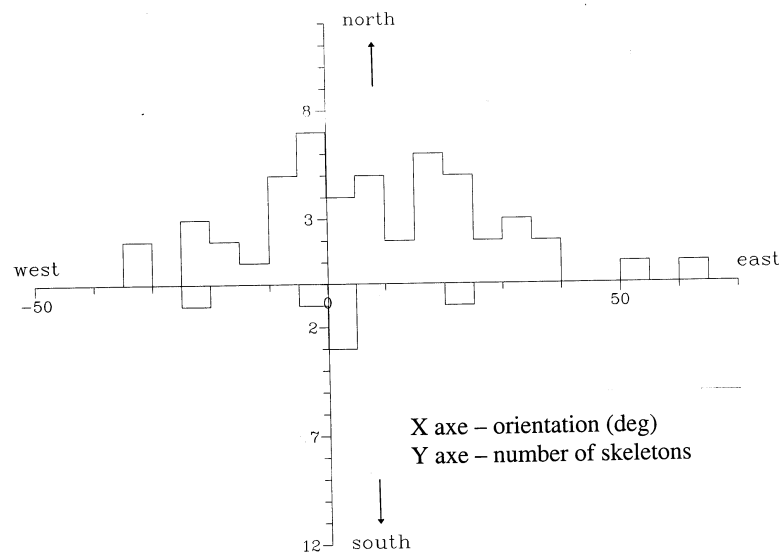


Figure 1: Orientation of male skeletons at Mokrin nekropolis

By analyzing histograms the angular distribution of the skeleton orientation has been determined: male skeletons are orientated heads toward the north with the highest deviation of around 40° toward east and west (Fig. 1). Female skeletons are orientated heads toward the south with the highest deviation of 50° toward the west (Fig. 2).

Out of the total number of male skeletons analyzed (72) 63 are orientated toward north. Nine skeletons orientated toward south are the exception (skeletons 1, 79, 147, 122S, 202, 208, 210, 226 and 281) (Tab. 1).

In case of the skeleton 1, chemical and morphological analyses haven't been carried out and consequently this skeleton has not been taken into the consideration. For skeletons 147 and 210 *chemical and morphological* analyses gave different results (Lengyel 1972:89). The position in which they lay in the grave (right side) indicates the female burial ritual so it could be speculated that these skeletons were indeed of female sex. Gy. Farkas and

Table 1: Anthropological analysis of male skeletons orientated toward south

No. of grave	Chemical analysis of Lengyel	Morphological analysis of Lengyel	Morphological analysis of Farkas and Lipták	Body position	Face orientation
1	-	-	-	right	east
79	-	-	male	right	east
147	female	male	male	right	east
122S	male	male	male	right	east
202	male	male	male	left	west
208	male	male	male	left	west
210	female	male	male	right	east
226	-	-	male	left	west
281	male	male	male	right	east

P. Lipták (1971:241) came to the same conclusion and subsequently these skeletons were not used in the analysis.

Skeletons 10 and 167 belong to a different exception group. Skeleton 10 is male by both I. Lengyel's (1972:88) and Gy. Farkas–P. Lipták's (1971:119) analyses. Skeleton 167 is also determined as male by morphological analyses of Gy. Farkas and P. Lipták (1971:119). Both skeletons are correctly orientated, but incorrectly placed in the grave, i.e., they face west.

Skeletons 79, 122S and 281 are definitely male, which was confirmed by chemical and morphological analyses of Lengyel (1972:89) for skeletons 122S and 281, and morphological analyses of Gy. Farkas and P. Lipták (1971, Tab. 1) for all three skeletons. These skeletons were placed on the right hand side, so they were both orientated and placed as female skeletons. They belong into the category of incorrectly orientated, but correctly placed skeletons facing the east.

Skeletons 202 and 208 are male (chemical and morphological analyses of Lengyel (1972:89) and morphological analyses of Gy. Farkas and P. Lipták (1971:134, 137)). For skeleton 226 we only have morphological analysis of Gy. Farkas and P. Lipták (1971:144) according to which this skeleton is male (Tab. 1). These three skeletons are incorrectly orientated and incorrectly placed with their faces turned to west. There is no visible trace of any attempt to turn their heads toward east by force.

Relations between correctly orientated and correctly placed skeletons and those listed above have been analyzed in order to detect any feature which could help us understand and explain the reasons for which these skeletons were excluded from the usual manner of burial. For this purpose the richness of grave goods, age and the position of hands was analyzed. *No differences were detected.*

Orientation of 99 female skeletons was also analyzed. Out of this number 88 were correctly orientated (head toward south) and correctly laid (facing east). Eleven skeletons show deviation from this pattern. These are skeletons 62, 63, 64, 94, 95, 127, 132, 159, 266, 272 and 299 (Tab. 2). Sex of these skeletons was determined by Gy. Farkas and P. Lipták's *morphological analysis solely* (1971, Tab. 1).

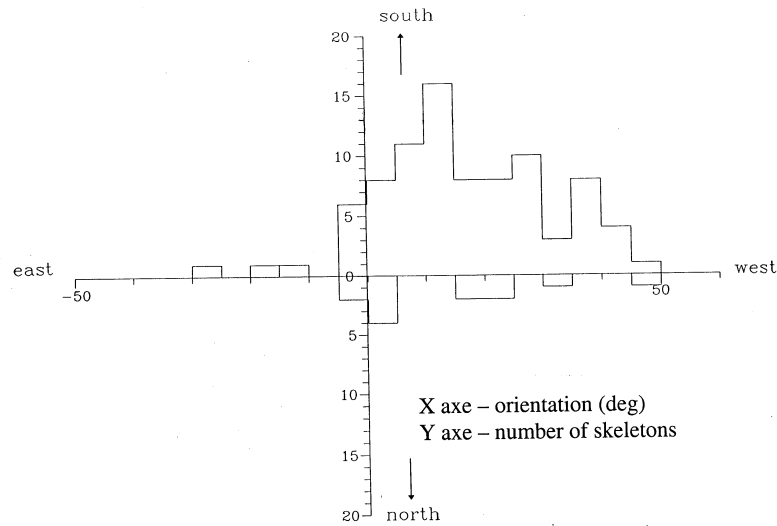


Figure 2: Orientation of female skeletons at Mokrin nekropolis

Table 2: Female skeletons that differ from burial ritual oriented toward north

No. of grave	Morphological analysis of skeletons	Body orientation	Skeletal orientation	Face orientation
62	female	left	north	east
63	female	right	north	west
64	female	right	north	west
94	female	left	north	east
95	female	left	north	east
127	female	right	north	-
132	female	right	north	west
159	female	right	north	west
266	female	right	north	west
272	female	left	south	west
299	female	right	north	east

Only one skeleton is *correctly orientated* (272) and *incorrectly placed* so that it faces west. Girić mentions other female skeletons (138, 141, 153 and 270) that faced west (1971:197). However, except skeleton 138 whose orientation could not be precisely determined from the illustration of the grave, sketchings of other graves mentioned were not published. Skeletons 62, 94 and 95 are *incorrectly orientated, but correctly placed* in the grave and they face east. These skeletons are actually buried as if they were male. Skeletons 63, 64, 127, 132, 159, 266 and 299 are *incorrectly orientated* (head toward north) and *incorrectly placed* in a grave (on the right hand side) so they face west, except skeletons 127 (skull dislocated) and 299 (facing east). There are indications that the head of skeleton 299 was turned in an unnatural position to face east by use of force *which is a unique occurrence in the Mokrin necropolis*.

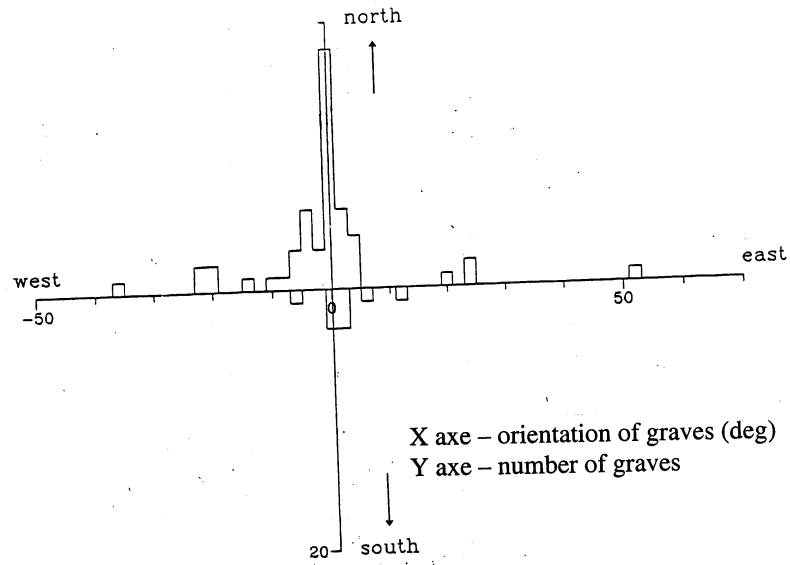


Figure 3: Orientation of male graves at Mokrin nekropolis

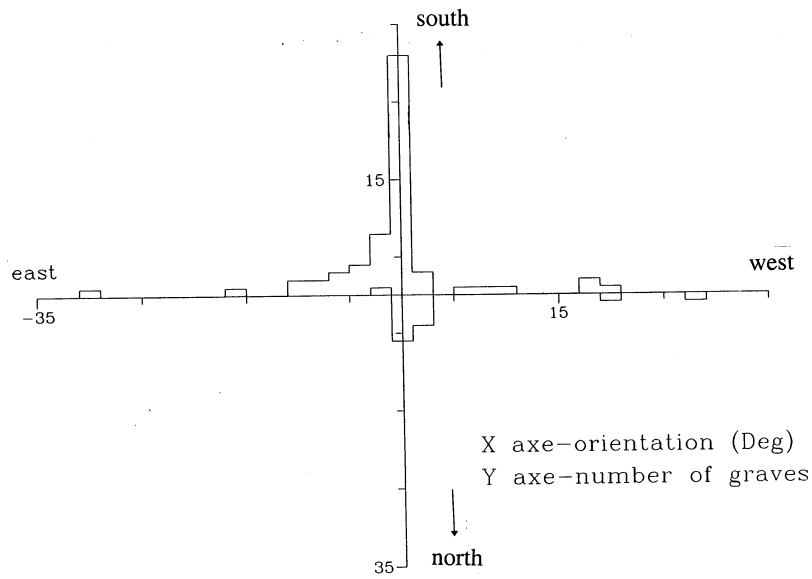


Figure 4: Orientation of female graves at Mokrin nekropolis

Relations between correctly orientated and placed female skeletons and those female skeletons that differ from this rule have been analyzed. Same criteria as with male skeletons have been used. *No other differences in burial rite were detected in this case either.*

Grave orientation

The orientation angle of a grave was measured between one longer side of the grave and geographical north clockwise (toward the east). Orientation of 154 graves was measured. Graves were divided into male (67) and female (87) ones based on the orientation of the skeletons they contained. The direction of graves was determined so that the precision of orientating graves could be compared with the precision of orientating skeletons in them.

Orientation of male and female graves is presented in histograms (Figures 3 and 4). Angular distribution of grave orientation shows two sharp peaks on the azimuth of 180° for female and 0° (i.e. 360°) for male grave pits, which corresponds with the custom of burying male deceased in the north–south direction (head to north) and female in the south–north direction (head to south). When compared with the width of the angular distribution of skeleton orientation from histograms 1 and 2, it is clearly visible that grave pits were much more precisely orientated.

To determine the accuracy of skeleton and grave orientation, we have disregarded the difference in the direction male and female skeletons were orientated in and incorporated the peaks of their histograms (see Figures 5 and 6). The angular distribution was then approximated with a Gaussian. The halfwidth of the Gaussian was taken as unit of the deviation. Results acquired this way show that the precision of orienting graves is $\pm 7.5^\circ$ off the north–south axis, while in the case of skeletons the deviation is $\pm 25.9^\circ$, which means that the width of the distribution of skeleton orientation is 3.4 times bigger than in the case of graves. Deviation of only 7.5° to the north–south axis indicates that greater attention was paid to orientating grave pits (Vince 1996:201). On the other hand, deviation of skeleton orientation of 25.9° testifies that prehistoric inhabitants of Mokrin did not bother with precise orientation of skeletons once within a grave. It seems that by orientating grave pits demands of the burial custom were satisfied.

Orientation of the necropolis and patterns in grave distribution

The Mokrin necropolis was orientated in two directions: north–northwest and south–southeast. Gy. Farkas and P. Lipták have singled out few parallel rows in the north–south direction. Within these rows certain regularity was detected: younger male individuals were buried in the northern part, younger female individuals in the southern part, while older individuals were buried in-between. No analysis has been carried out in order to determine if there were any genetic links among the deceased buried in the same row (Farkas and Lipták 1971:262).

Gy. Farkas and P. Lipták have also observed several groups of 6 to 8 graves concentrated on one elliptic area. Analysis of blood types that was conducted on them revealed that skeletons within one group were related (Farkas and Lipták 1971:262).

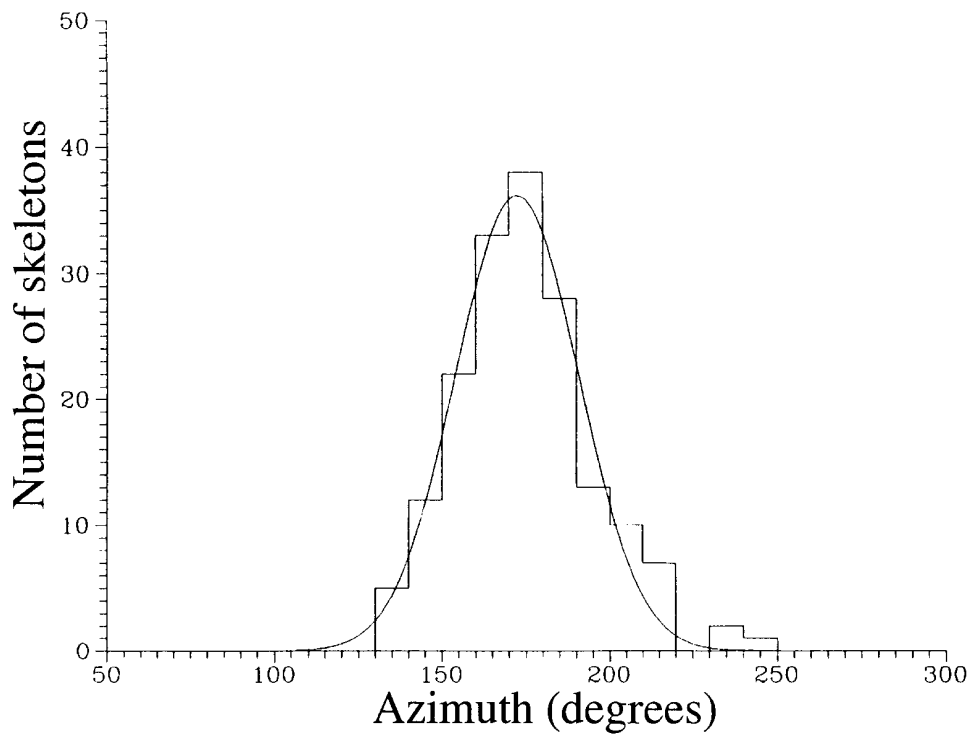


Figure 5: Orientation of skeletons in the cemetery at Mokrin deduced to 180°

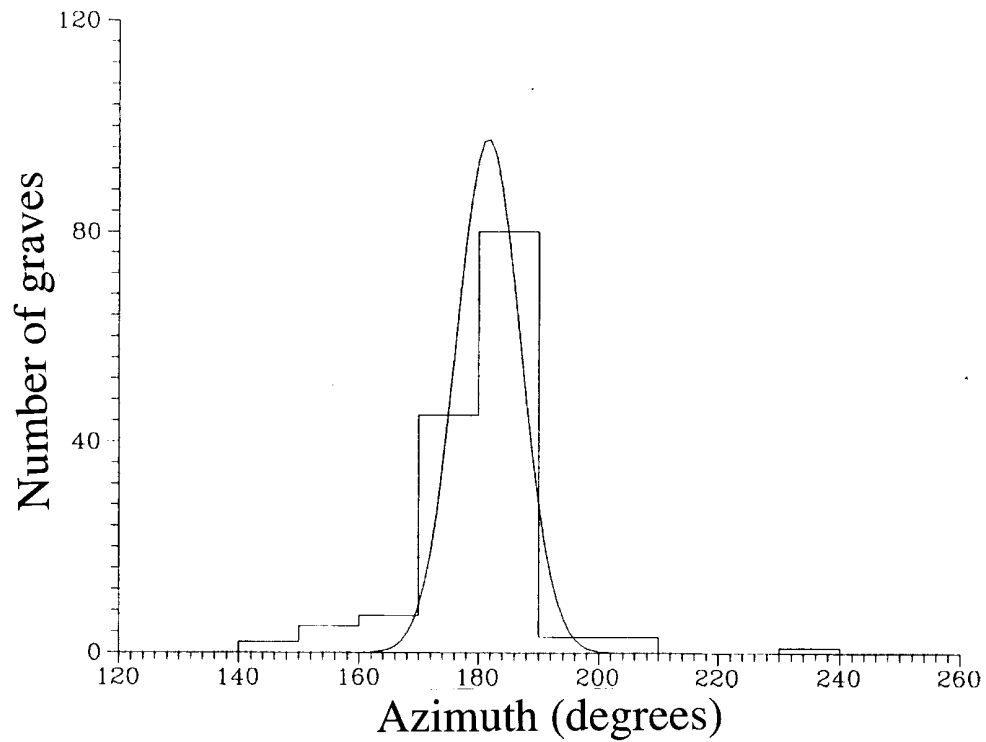


Figure 6: Orientation of graves in the cemetery at Mokrin deduced to 180°

Conclusion

The consistent orientation of grave pits in north-south direction and vice versa could be explained in the same way as the east-west orientation — by the basic movement of the Sun: the north is cold, the south is sunny/warm. But in case of Mokrin, another, equally persistent, orientation exists — face orientation toward east/west depending on the sex of the deceased.

Comprehensive explanation of such ritual can only be speculated for the present: men face east, in the direction of approaching Sun, with the free right hand, the one that governs arms and that has always symbolized warrior's strength. Women also face the Sun, the origin of all life; women have a free left hand, the one on which a newborn lays. Neolithic Great Goddesses of Life are most commonly presented in that position.

All stated indicates the existence of complex religious beliefs in the Early Bronze Age of Danube and Tisa valley manifested in the particular burial ritual obligatory for all members of the population

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Table 3: Male skeletons: age, body position, angle of skeleton and grave orientation and face orientation.

Grave No.	Age	Body position	Skeletal orientation angle	Grave orientation angle	Face orientation
1	inf1	left	180	-	-
6	inf2	left	0	357	east
10	sen	right	356	24	west
12	ad	-	-	3	-
13	inf1	-	-	4	-
14	ad	left	358	-	east
16	juv	left	2	0	east
23	inf2	left	4	4	east
24	ad	left	14	356	east
26	ad	left	0	0	east
36	inf2	left	353	340	east
38	ad - sen	left	8	0	east
40	ad	left	39	-	east
41	inf2	left	-	0	-
42	ad	-	-	180	-
49	-	-	-	0	-
57	ad	left	1	21	-
74	ad	left	355	-	east
79	mat - sen	right	177	180	east
83	ad	left	25	3	-
85	ad	left	357	0	-
91	sen	left	29	0	east
92	sen - mat	left	16	2	east
110	ad	left	31	-	east
112	inf2	left	0	-	east
115	inf1	left	340	2	east
118	mat	left	0	356	east
122b	inf2	left	22	185	east
122S	ad	right	190	185	east
123	inf1	left	30	-	east
125	mat	left	38	24	east
126	mat	left	62	53	east
129	mat	left	32	4	east
134	inf1	-	-	0	-
139	inf1	left	25	0	east
145	ad	left	354	358	east
147	ad	right	175	167	east
148	inf1	left	11	351	east
149	sen	left	351	353	east
150	sen	left	356	350	-
157	-	-	-	2	-
158	mat	left	344	338	east
164	inf1	-	-	346	east
167	ad - mat	right	337	0	west

Table 3: continued.

Grave No.	Age	Body position	Skeletal orientation angle	Grave orientation angle	Face orientation
168	mat	left	22	-	east
169	inf2	left	8	-	east
171	ad	left	6	-	east
173	mat	left	358	0	east
177	sen	left	348	-	east
185	mat	left	6	0	east
187	ad	scattered bones	-	0	-
189	mat	left	54	-	east
198	sen - mat	left	35	358	east
202	inf2	left	155	-	west
208	mat	left	203	-	west
210	sen	right	175	-	east
211	mat - sen	left	357	357	east
212	inf2	left	-	355	east
218	ad	left	17	-	east
226	mat	left	180	177	west
230	mat - sen	left	17	354	east
232	ad	left	22	0	east
234	ad	left	17	0	east
238	inf2	left	-	5	east
239	inf2	left	345	0	east
240	mat	left	5	357	east
241	ad	left	330	340	east
242	ad	-	-	177	-
243	ad	left	32	354	east
244	ad	-	-	173	-
250	mat	left	353	324	east
259	ad	left	24	358	east
262	inf1	left	-	3	-
263	ad	left	17	357	east
264	mat	left	9	-	east
265	inf2	left	17	0	east
274	ad	-	-	339	-
277	ad	left	12	-	east
280	ad	left	21	358	east
281	sen	right	160	-	east
282	juv	left	24	-	-
286	ad(?)	-	-	355	-
290	inf2	left	10	0	east
291	ad	left	0	-	east
292	inf1	left	9	0	east
295	juv	left	357	0	east
296	ad	left	0	0	east
301	ad	left	9	354	east

Table 4: Female skeletons: age, body position, angle of skeleton and grave orientation and face orientation.

Grave No.	Age	Body position	Skeletal orientation angle	Grave orientation angle	Face orientation
2	inf1	right	-	180°	east
3	mat	right	152°	357°	east
5	inf1	right	165°	357°	east
7	ad	right	162°	180°	east
8	sen	-	-	0°	-
9	ad	right	148°	-	east
11	ad	right	-	198°	east
15	ad - m	at right	152°	-	east
19	ad	right	-	177°	east
20	mat	right	169°	180°	east
22	inf1	right	164°	180°	east
25	inf1	right	167°	-	east
39	ad	right	140°	-	east
47	inf1	-	-	181°	-
48	inf1	-	-	180°	-
52	ad	right	0°	0°	-
53	ad	right	184°	176°	east
55	inf2	right	137°	179°	east
56	juv	right	173°	165°	east
61	ad	right	177°	-	-
62	inf2	left	0°	-	east
63	ad	right	325°	-	west
64	ad	right	358°	0°	west
69	ad	right	176°	180°	east
73	ad	right	132°	145°	east
76	sen	right	156°	-	east
77	ad	right	152°	360°	east
78	inf1	right	165°	-	east
80	ad	right	168°	180°	east
82	ad	right	171°	180°	east
84	sen	right	158°	180°	east
89	mat	right	150°	180°	east
90	-	right	175°	180°	east
94	inf1	left	358°	340°	-
95	inf1	left	-	332°	east
96	inf2	right	165°	179°	east
97	ad	right	177°	180°	east
98	ad	right	137°	175°	east

Table 4: continued.

Grave No.	Age	Body position	Skeletal orientation angle	Grave orientation angle	Face orientation
100	ad	right	167°	175°	east
101	ad	right	172°	178°	east
102	ad	right	160°	180°	east
104	ad	right	167°	173°	east
108	ad	right	179°	180°	east
109	ad	right	161°	173°	east
113	ad	right	148°	-	east
117	ad	right	196°	198°	east
119	mat	right	145°	145°	east
124	mat	right	208°	180°	-
127	ad	right	2°	-	-
128	inf2	right	167°	178°	east
132	ad	right	342°	357°	west
133	ad	right	156°	180°	east
135	inf2	right	174°	180°	east
136	ad	right	151°	159°	east
137	ad	right	178°	178°	east
140	ad	right	137°	177°	east
144	ad	right	180°	170°	east
151	ad	right	168°	-	east
154	mat	left	140°	180°	east
155	mat	right	142°	-	east
159	ad	right	340°	358°	west
161	inf 2	right	157°	168°	east
165	mat	right	157°	-	east
170	mat	right	175°	-	east
172	ad	right	175°	-	east
174	mat	right	172°	-	east
179	mat	right	158°	-	east
180	mat	right	191°	-	east
181	ad	right	166°	180°	east
182	ad	right	166°	182°	east
186	inf2	-	-	180°	-
191	inf2	right	165°	-	east
194	inf2	right	158°	-	east
200	ad	right	-	179°	east
201	ad	right	163°	-	-
205	sen	right	165°	180°	east
206	sen	right	140°	-	east
209	ad	right	172°	-	east
215	inf2	right	-	177°	-

Table 4: continued.

Grave No.	Age	Body position	Skeletal orientation angle	Grave orientation angle	Face orientation
221	sen	right	150°	-	east
222	mat	right	140°	-	east
223	inf2	right	167°	-	east
227	mat	right	171°	180°	east
228	mat	right	172°	180°	east
229	ad	right	163°	178°	east
231	ad	right	150°	190°	east
235	ad	right	143°	180°	east
237	ad	right	160°	-	east
245	ad	right	142°	188°	east
246	ad	right	157°	183°	east
247	inf2	right	151°	-	east
248	mat	right	171°	175°	east
252	mat	right	-	180°	east
256	ad	right	-	180°	-
257/A	ad	right	152°	-	east
261	ad	right	180°	183°	east
266	ad	right	339°	0°	west
267	inf1	right	178°	180°	east
268	inf2	right	-	180°	-
269	sen	right	170°	177°	east
271	mat	right	153°	180°	-
272	ad - m	at left	160°	151°	west
279	ad	right	168°	180°	east
283	ad	right	138°	-	east
287	ad	right	180°	178°	east
288	sen	right	180°	180°	east
293	ad	right	181°	-	east
297	sen	right	180°	2°	east
299	ad	right	50°	-	east
300	ad	right	168°	-	east
302	ad	right	170°	187°	east
305	juv	right	141°	-	east

The orientation of graves from the Period of the Hungarian Land Conquest

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Abstract

The orientation of graves in seven cemeteries from the Period of Land Conquest (10th–11th c.) were measured. The distribution of the angles strongly suggests that the pits were aligned by the direction of daily sunset/sunrise.

Before the “invention” of light pollution, men had a more intimate connection with the sky. The sky, for example, provided events which could be used to construct a calendar.

Another case of the effect of the sky on the everyday life (and death) of our ancestors is connected to the various burial rites. The rites themselves are not known but their result, i.e. cemeteries, standing stones, various types of buildings show it through their orientation. It seems quite certain that already Neolithic or Copper Age people used the sunrise/sunset for the time of burial (Barlai 1980, Barlai et al. 1992, Heggie 1982, Schlosser & Čierny 1982).

A promising field of investigation is the orientation of graves in cemeteries from the Period of Hungarian Conquest (10th century). There are several well documented cemeteries (e.g. see Fodor et al. 1996), a few of them were used for the present paper. An earlier attempt by Csalog (1967) focused on other than astronomical sides of the question. A few years later Dienes (1974), however, convincingly argued against Csalog’s conclusions.

The measurements were made on the maps with an angle-measuring instrument (the maps are from Fodor et al. 1996). We both measured the angles (West was 0°, North was 90°). The difference between the two sets of measurements were rather small (difference (EVS–BSZ)=0°48). Since both the error of the digging of the grave and that of measuring the angle by the archaeologist could produce significantly larger error (Barlai 1980, Barlai & Bognár-Kutzián 1995), the above small systematic error was neglected.

Figures 1a–g show the result of the measurements. Notes on individual cemeteries:

- **Sóshartyán-Hosszútető** (Fig. 1a): The cemetery contains the graves of the ‘middle-class’ of the conquerors (Fodor et al. 1996). The orientation angles show a more or less even distribution around 25–30°, implying that the cemetery was used mostly during the summer.

- **Karos II–III** (Fig. 1b-c): The Karos cemeteries are part of a princely burial place (Fodor et al. 1996). Karos II was the earlier, but both II and III belonged to the same ethnic group (i.e. Hungarians) (Révész 1996). Karos II shows the kind of distribution of angles which is most naturally explainable by burial at the daily sunrise/sunset (in contrast to a burial at a fixed — e.g. the Sun at the vernal equinox — orientation). The small number of graves at Karos III makes it impossible to draw conclusions.
- **Aldebrő-Mocsáros** (Fig. 1d): The cemetery belonged to the wealthier free class (Fodor et al. 1996). Here, again, the number of graves is too small. Nevertheless, the distribution seems to be the same as in the case of Karos II.
- **Sárrétudvari-Hízó föld** (Fig. 1e): This is a very large cemetery, belonging to the first generation of conquerors (M. Nepper 1991). It shows nicely the W–E orientation of the graves. The base of the diagram is, however, much larger than the solar arc.
- **Tiszafüred-Nagykenderföldek** (Fig. 1f): The graves show the same distribution as in Karos II. The solar arc is filled in.
- **Ibrány-Esbóhalom** (Fig. 1g): This cemetery proved to be the most interesting among the seven. It is on a small, 3.5 m high oval sand hill running from south to north (Istvánovits 1996). It fills in the solar arc, and is oriented in the same way as Karos II. The peak in Fig. 1g, however, is doubled. The reason for this is apparent from the map of the cemetery (Fig. 8 in Istvánovits 1996, Plan 6 in Fodor et al. 1996). The earlier graves (10th century) were dug in the western side of the hill, while the later (early 11th century) ones found place only on the eastern and northern side. Those dug in the eastern side had a horizon several metres higher than the ones in the western sides (or vice versa). Supposing graves were dug at sunset (but it works in the opposite direction, too) the eastern diggers saw the sun disappear earlier (because of the higher horizon), and therefore their graves were oriented more to the south.

There are some other interesting features of the cemeteries. In two cases — Ibrány-Esbóhalom and Aldebrő-Mocsáros — there are graves with greatly different orientation angles. The reason for this, in the former case at least, was the different ethnicity of the deads (Istvánovits 1996).

Ibrány-Esbóhalom deserves more attention. Figure 2a-d shows the orientation of the different components of this cemetery. Istvánovits (1996) divided it into three parts:

1. The lowest line on the western slope, it is the earlier part of the cemetery. The orientation is shown on Fig. 2a.
2. The other western graves. See Fig. 2b.
3. The eastern and northern graves. See Fig. 2c. (Fig. 2d is the total omitting the discrepant graves).

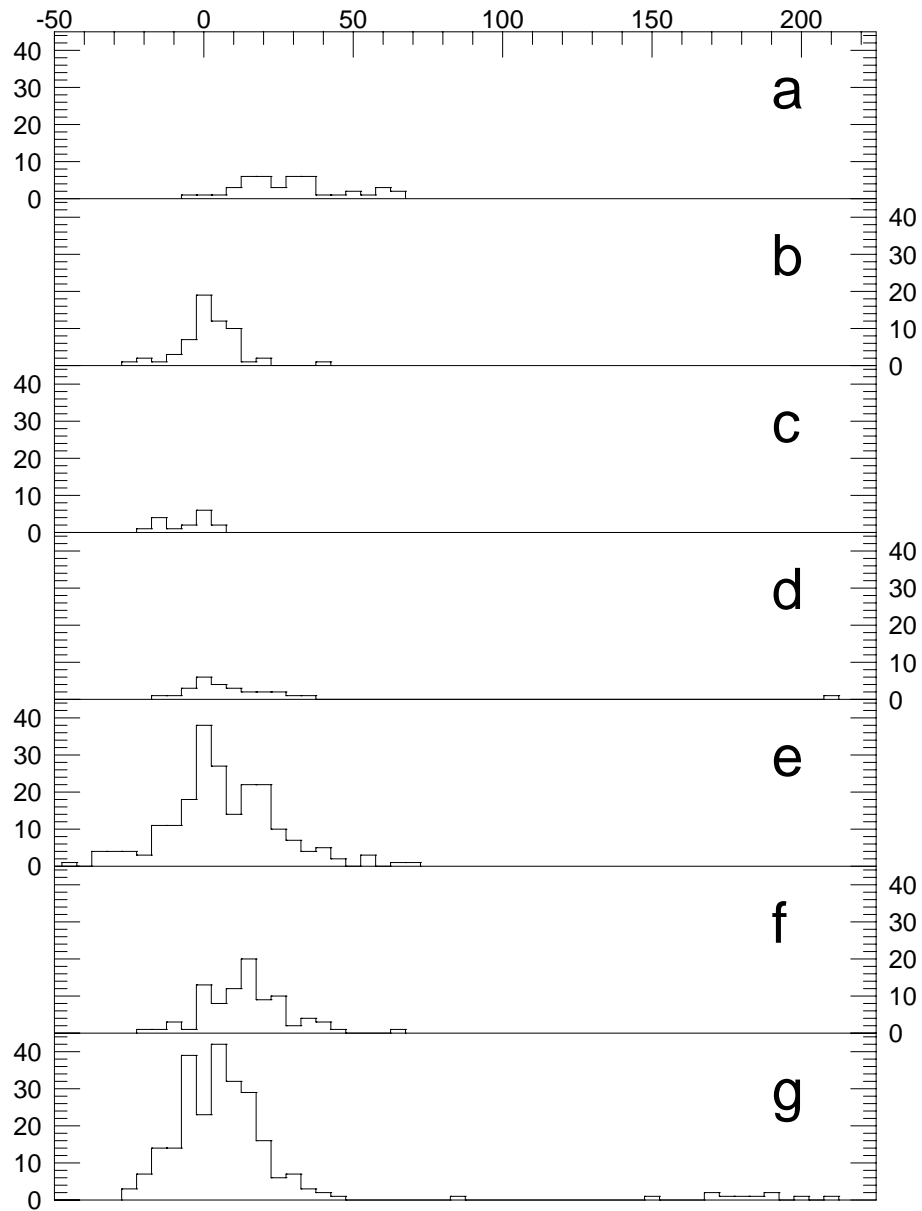


Figure 1: The orientation of graves in Conquest Period cemeteries. (a): Sóshartyán-Hosszútető, (b): Karos II, (c): Karos III, (d): Aldebrő-Mocsáros, (e): Sárrétudvari-Hízóföld, (f): Tiszafüred-Nagykenderföldek, (g): Ibrány-Esbóhalom. West is at 0° , North is at 90° .

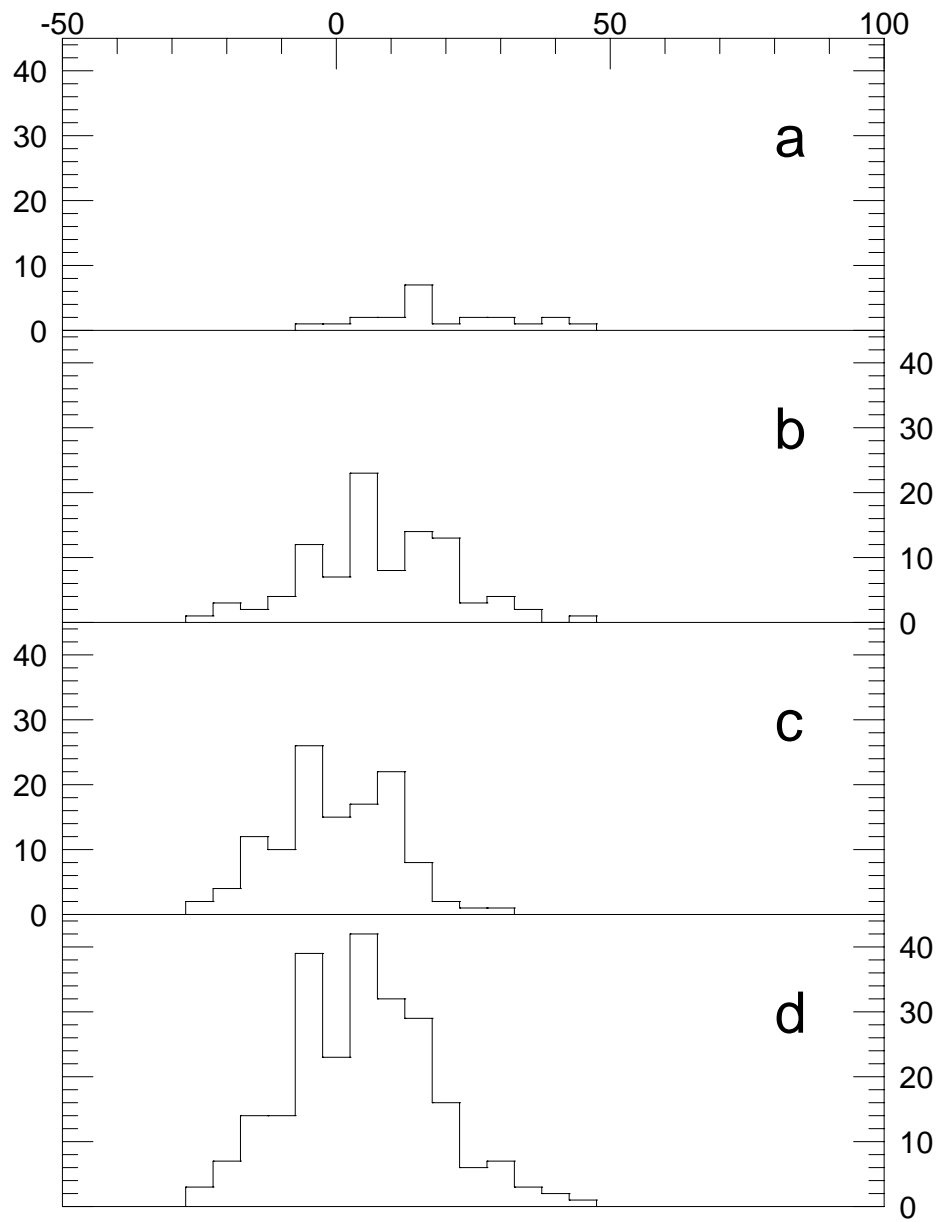


Figure 2: The orientation of the three components of Ibrány-Esbóhalom. See text for explanation.

The most western graves show the most northern orientation (either because they saw sunset at the lowest horizon or because they saw sunrise at the highest horizon). The second group is similar, their difference is not significant because of the small number of graves in the first group. Finally, the last (chronologically last, too) graves show a more southern orientation (either because they saw sunrise at the lowest horizon or because they saw sunset at the highest horizon).

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”...ecclesiarum situs plerumque talis erat, ut fideles facie altare versa orantes orientem solem, symbolum Christi, qui est sol iustitiae et lux mundi intuerentur.”

”...the location of the churches was generally such that the faithful, in praying, with their faces turned toward the altar, would be looking toward the rising sun, the symbol of Christ, who is the sun of justice and the light of the universe.”

Athanasius, bishop of Alexandria (299 - 373 A.D.)

THE MURALS OF THE ROMANESQUE CHURCH OF VELEMÉR

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Abstract

The village of *Velemér* is in western Hungary. Data regarding the village go back to the end of the 13th century.

According to available data, the church has always been known by the Holy Trinity name. Although recorded documentation references the church only from 1360 on, scholars of ancient architectural styling surmise that it was most likely erected during the last decades of the 13th century.

Upon entering the church of Velemér, one would see to emerge slowly from the mystical dimness the colors, images, and compositions of what is left from the works of art of a master — and, maybe, of his school of the middle ages. The totality of the paintings i.e. the complete iconography comes together, in a manner typical of the period of scholasticism, according to the rules of sermonic-theory, so called *ars praedicandi*. The images provide a sort of pictographic essay about each member of the Holy Trinity. Thus, the murals reflect a great homily presented not verbally but in a closely related, artificial language system of icons and symbolism. Hence, the individual images are not words, not even depictions of concepts, but the ‘couriers of truth’.

1 Introduction

Rising to an elevation of 217 m (712 ft) above sea level, the *Holy Trinity Church* of Velemér in western Hungary is a filial adjunct of the Roman Catholic parish of the next village, *Kercaszomor*.

Data regarding the village goes back to the end of the 13th century. It is likely that the name of the village means ‘white light’ or ‘sunshine’, and, perhaps, can be linked to the name of *Prince Velemér*, one of the chieftains of the Eastern Goths who settled in this region, *Pannonia*, during the middle of the 5th century.

According to available data, the church has always been known by the Holy Trinity name. Although recorded documentation references the church only from 1360 on, scholars of ancient architectural styling surmise that it was most likely erected during the last decades of the 13th century.

At one time, murals adorned the church on both the inside and outside walls. Today, only traces of the exterior murals are visible, specifically on the south wall of the steeple and on the adjoining westward wall surface. This latter mural of yore once depicted a



Figure 1: Southern view of the church.



Figure 2: The eastern window.

scene with *St. Christopher* urging people to lead a Christian life and go to church. This mural complied with the ancient practice of presenting Christopher as he is carrying Christ so that his face is turned in the direction of the settlement and, thus the villagers approaching therefrom could meet the gaze of his eyes. Thence the saying from the middle ages: “Nobody dies an evil death the day they saw St. Christopher.”

Based on writings dating to the middle of the 18th century, we know that the arriving worshipers were able to see in the doorway at the foot of the steeple a mural that showed an *Adam & Eve* scene and in the tympanon above the door a picture of Christ reminding us of His biblical statement “I am the way”. Nothing is left of these paintings.

Let us then proceed with a visual examination of the images or, rather the building blocks that support them.



Figure 3: Detail from the upper part of the sanctuary.

2 The Sanctuary

The church has been built with strict adherence to ancient construction rules. Accordingly: its lengthwise orientation is east-to-west, the sanctuary being to the east and its window positioned in such a way that, through it, the first rays of the rising Sun, on the feast of after whom the church is named, would illuminate the image or symbol of the name-giver, in this case, the three concentric circles on the inner side of the victory arch.

The images provide a sort of pictographic essay about each member of the Holy Trinity. In examining the murals, we do not follow the ordering set by theology but, rather start with the most striking image.

The Son. Opposite the symbol of the Holy Trinity inside the chancel, we can see the face of Christ as if it were imprinted upon a cloth, reflecting what tradition holds about Veronica, the maiden who handed a veil to Christ to wipe His face while He was carrying the cross on the way to Calvary. The name Veronica comes from the classical Greek *veronikon* meaning ‘true image’, and, by depicting Christ in this form, the artists of the middle ages intended to emphasize a “credible” vs. “man-made” face of Him.

In the Christian creed, Christ, the Son of God who became man, has a dual personality, His divinity is symbolized by the brightness of the window: “I am the light.” His humanness is depicted by a floral ornamentation in the window recess: starting out of a letter ‘O’ on one side of the window, a vine ascends to form a stylized ‘M’ at the top and descends on the other side into a second ‘O’ (OMO = *homo*, meaning ‘man’ in Latin). The ‘M’ is adorned by nine flowers signifying the nine months of the human fetal growth. The Latin text around the window admonishes us that the respect the image garners should be directed at what is depicted, not the art work.

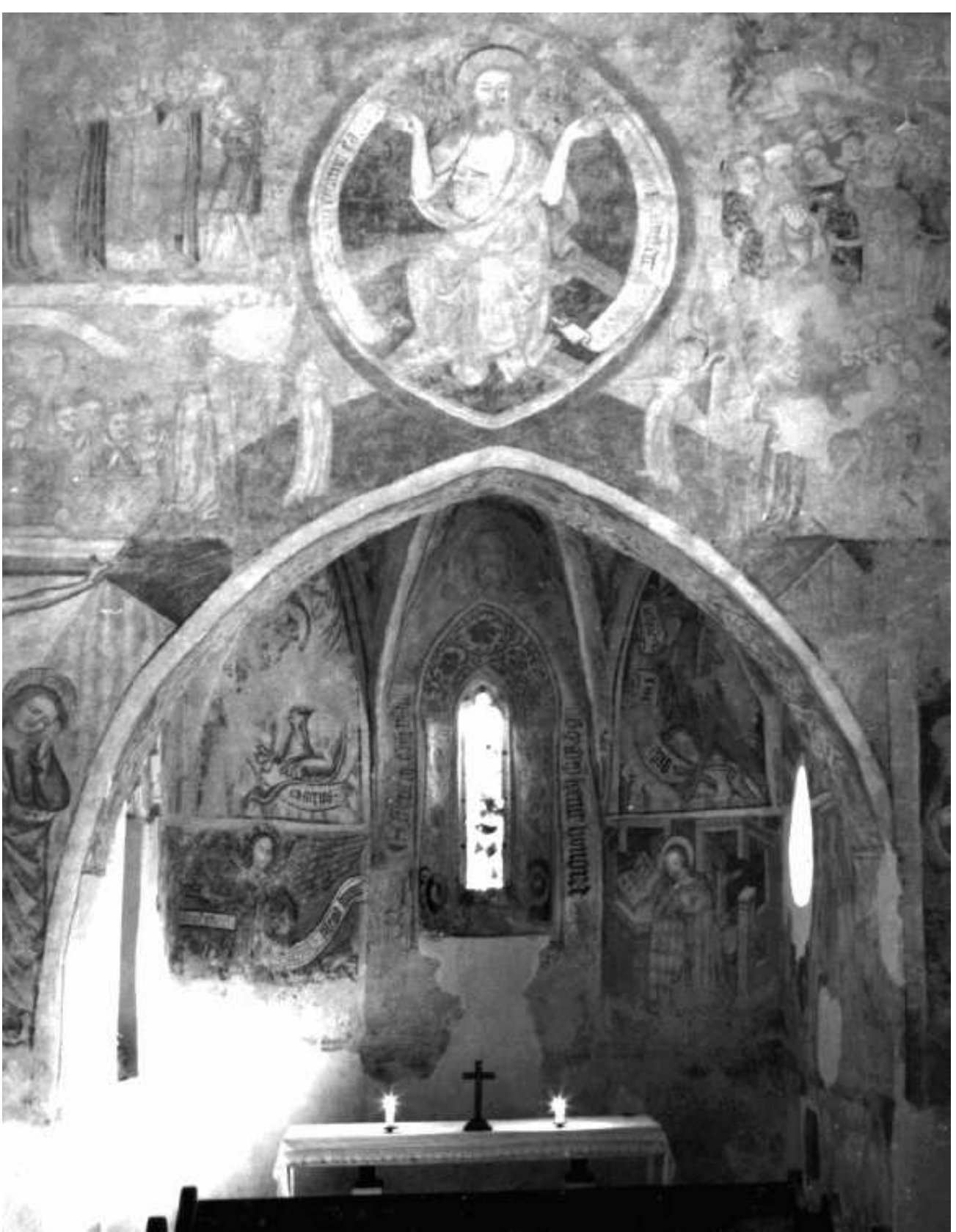


Figure 4: The Annunciation inside the sanctuary.

This window representing the dual nature of Christ is integrated into a scene that heralds the imminent of Christ, the man. On the left of the window, i.e. on the north-east wall, archangel *Gabriel* gestures the sign of 'V' (*verbum* = 'verbose') with his fingers, his greeting spelled out on a flowing ribbon: "Ave, gratia plena. Dominus tecum." (Hail, full of grace. The Lord be with you.) Above Gabriel, a winged lion symbolizes *Mark the Evangelist*. On the right, there is Mary with an open book next to her. Readable is the prayer from her lips: "Magnificat anima mea Dominum..." (My soul glorifies the Lord...) Above her, the eagle is the sign of the evangelist *John*.

We must mention here that the order in which the evangelists are depicted does not always follow the canonical sequence of Mathew, Mark, Luke, and John. Certain religious writers established different sequences. For example, *Hugo de Saint-Victor* or *Honorius d'Autun* established an ordering principle whereby the Sun (symbolizing Christ) and its relation to the four compass points set the sequence: a) Mathew on the north — his gospel starts with the birth of Christ; b) Luke on the west — his gospel is about the tribulations and death of Christ: the Sun sets in the west; c) John on the south — his gospel glorifies God's eternal Light — the Sun is the brightest in the south; d) Mark on the east — his gospel ends with Christ's resurrection and ascension; rising Sun.

In this iconography at Velemér, the Holy Trinity symbol occupies the west wall and the sanctuary is not rectangular (see the diagram); hence, the artist was unable to position the signs of all four evangelists according to the compass points. Starting with Mathew on the north and skipping the west wall, he goes full circle in a counter-clockwise direction, Luke on the south, John to the south-east, and Mark to the north-east. It is interesting to note that, if September is considered the starting point of the year — as in the ancient religious calendars — the same sequence is evident: the feasts of Mathew, Luke, John, and Mark are observed on Sept. 21, Oct. 18, Dec. 27, and Apr. 25, respectively.

The Father. The person of the Son refers back to the one who has begotten Him. In the artist's rendition, this is manifest in Gabriel archangel's right wing spreading over to the northern wall surface, whose icons represent the Father. Since it is impossible to portray Him in a painting, He is depicted through actions and characteristics construed to be uniquely His own: Creator and Almighty (this is called the appropriative method); there is, however no creation scene. He is perceived only through a symbolic image structure whose certain elements were derived from interpretative religious explanations of biblical statements and allegories: "In the beginning God created the heaven and the earth" and "Wisdom builds a house for itself". The phrase "in the beginning" may have several meanings: "the beginning of time", "in the Son", or "before everything".

The artist elaborated on the last interpretation. To that end, he chose the angelic symbol, the cherub (a human-faced angel or a winged youth). Today, only fragments of the green cherub wings are visible. It is noteworthy that the cherub is also the symbol of St. Mathew.

The interpretation of the "artist of the universe, wisdom builds a house for itself" is apparent in two symbolic representations: Through the arts: on his knees in front of the ark of the covenant, *King Solomon*, while consecrating the ornate house he has built for the Lord, prays with an entranced expression and arms stretched out toward heaven, his prayer on a ribbon flowing from his hands.

According to the findings of art-history, the Solomom image, in addition to depicting a biblical scene, is also the self-portrait of the artist. The proof of this is evident in the triangular artist-emblem visible on the floor next to the knees and also in the text of

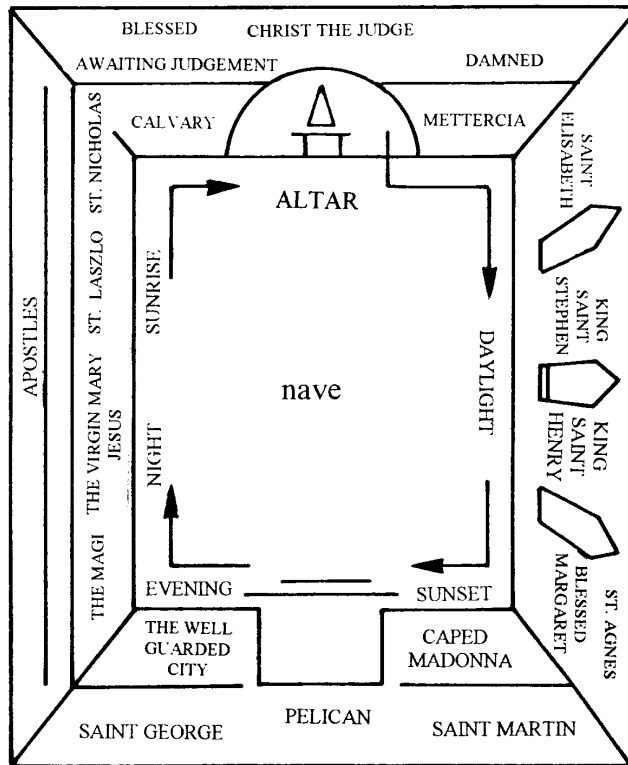
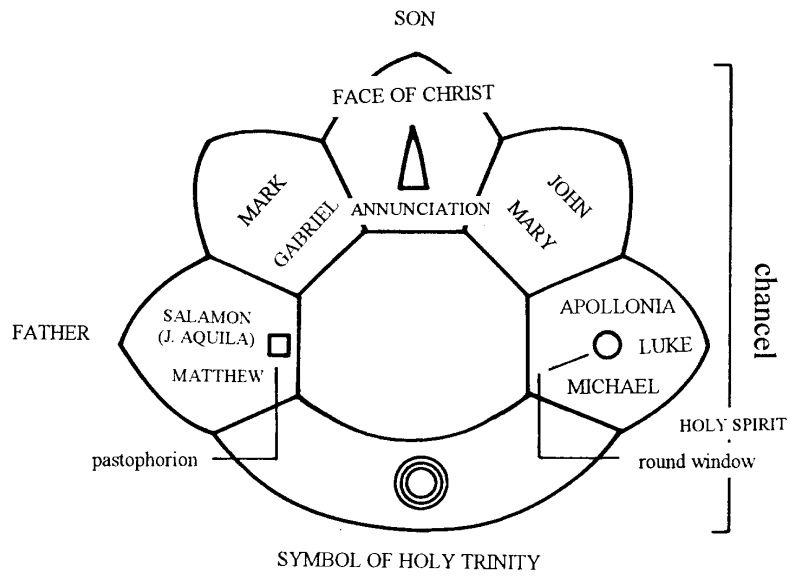


Figure 5: Overall view of the murals.



Figure 6: Fragmentary parts of the Holy Wisdom.

the prayer. In Latin it is: “Omnes Sancti Orate Pro Hoc Ioanni Aquila + pictore.” It carries a dual meaning. The capitalized initials convey a hidden content: O SOPHIA = Oh Wisdom! (holy Wisdom, the church-builder!). The direct meaning of the prayer reads in English as “All Saints, pray for me, John Aquila painter”. Thus the duality of the image is complemented by the dual nature of the prayer’s contents. It is very likely, though that *John Aquila* was not the real name of the artist for, in medieval times, the name John Aquila was commonly used in reference to scribes, codex-copyers, and masters of religious art. Also, St. John — the author of gospel and epistles, and considered the patron saint of artists — was represented by the biblical iconographic symbol of an eagle (Latin *aquila*).

Some details are known about the accomplishments of the artist, incognito “John Aquila”. He prepared the murals in Velemér (1377-1378), in Bántornya (today: Turnisce, Slovenia; 1382), and in Mártonhely (today: Martjanci, Slovenia; 1392). At this latter site, he professes to have been the builder of the church and designates his birthplace as Radkersburg in Austria (Regede, Radgona). He is thought to have painted one of the layers of the multi-coated murals of the round-church, and also the murals of its cupola, in Nagytelek (today: Selo, Serbia). Style critics credit him with murals in Muraszombat (today: Murska Sobota, Slovenia). According to others, he has painted in Transylvania, Vienna, Florence, and Radkersburg; this, however, is merely conjecture without any proof.

It is not known whether the artist was a clerical or layperson, even though art-historians classify him as a worldly individual, particularly because of his self-portrait referenced above. The cutoff/slashed, striped shirt, in which *King Louis the Great* of Hungary from the Royal House *Anjou* is also depicted in pictorial chronicles, might prompt us to think that he could have had connections to the royal court. As for the artist’s emblem, it can also be found on an artifact in Kígyópuszta and, in Buda, on the grave-stone of a painter by the name Abel.

Through the allegory of Holy Wisdom: below the wing of Archangel Gabriel, there is depicted, in the glow of an aura, a saintly Lady holding a church in her arm. The

church is the house erected by the Holy Wisdom, i.e., the temple is Christ's Body which is destroyed and subsequently rebuilt on the third day.

The Holy Spirit. The south wall of the sanctuary holds an iconographic treatise about the third person of the Trinity. A round window denotes the Sun at high noon and, indirectly, the Holy Spirit. In religious literature, the biblical statement "God comes from the south" was used as a reference to the Holy Spirit.

Below the window, a chalice, a missal, and decanters are visible. They imply the *epiclesis*, i.e. that part of the eucharistic prayer that follows the consecration of the bread and wine during mass, to invoke the Holy Spirit's blessings upon the sacrificial gifts.

Above the window, a bullock faced man signifies St. Luke whose gospel starts with Zacharias sacrificing a bullock. The name Luke has a connection to the Latin *lux* meaning brightness (south). On a writing stand, two books credit him with the gospel and the *Acts of the Apostles*. St. Luke is shown wearing slippers; in iconographic images, only Christ's immediate disciples are depicted bare-footed. In Luke's gospel, Christ says "This is the cup of my blood" instead of "This is my blood"; this emphasis on the container instead of the contents is manifest in the prominently detailed chalice.

To the east of the window, the image of *St. Apollonia* used to be located, as the name still visible above implies. It is unfortunate that the image is eroded for, researchers believe, it was the earliest painting of the saint in Hungary. From her biography, we know only that, when threatened with being burned alive unless she would loudly curse God, she voluntarily leaped into the towering flames because the the Holy Spirit's fire glowing in her soul was much greater than the blazing pyre.

To the west of the window, we find the judgment scene. Wearing a violet-colored tunic (*tunicella* — princely garb), an angel stands, with a double-edged sword held in his right hand and poised to strike from eye-level, the hilt of the sword ending in a small orb in a manner typical of the time period. In the left hand, he holds a scale ready to "weigh" the merits of an earthly life that just ended. The angelic figure is that of St. Michael, the chief officer and guardian of Heaven. In one pan of the scale, the soul of the departed is symbolized by a spired church (a medieval practice), the pan being pulled downward by an angel; in the other, a naked body represents the flesh, and bat-shaped devils are yanking it down (bats are creatures of the darkness with wings unfit for soaring). The names of the devils are still legible *Sathanas* & *Beelsebul*.

The Calendar. Let us again look at the cherub (green wing), the sign of St. Mathew, on the north wall of the sanctuary. His feast is Sept. 21. One year plus eight days tacked on — as hinted by the eight flowers of the ornamentation on the inside of the victory arch (west wall) — would reach the feast of St. Michael, Sept. 29 of the following year (his sign is on the south wall, directly opposite). At the astronomical midpoint of this "extended year" is March 25, the feast of the Annunciation (the sign of Archangel Gabriel is on the north-east wall, roughly in the middle!). Thus the spatial positioning of the three images depicting St. Mathew, St. Michael and the Annunciation, on the one hand, and the calendar dates of their respective feasts on the other, have an interdependence.

Some further thoughts concerning the iconography of the south wall of the sanctuary result in some rather interesting conclusions. The round window between the images of St. Apollonia and St. Michael, fell on June 6 which is the astronomical midpoint between the feast of St. Apollonia, Feb. 9, and St. Michael, Sept. 29. The Sunday preceding *Pentecost*, (May 30 in 1378) which is also the Sunday following the feast of the Ascension, was the medieval feast of Christ's Face — especially is Rome's Christian church that was

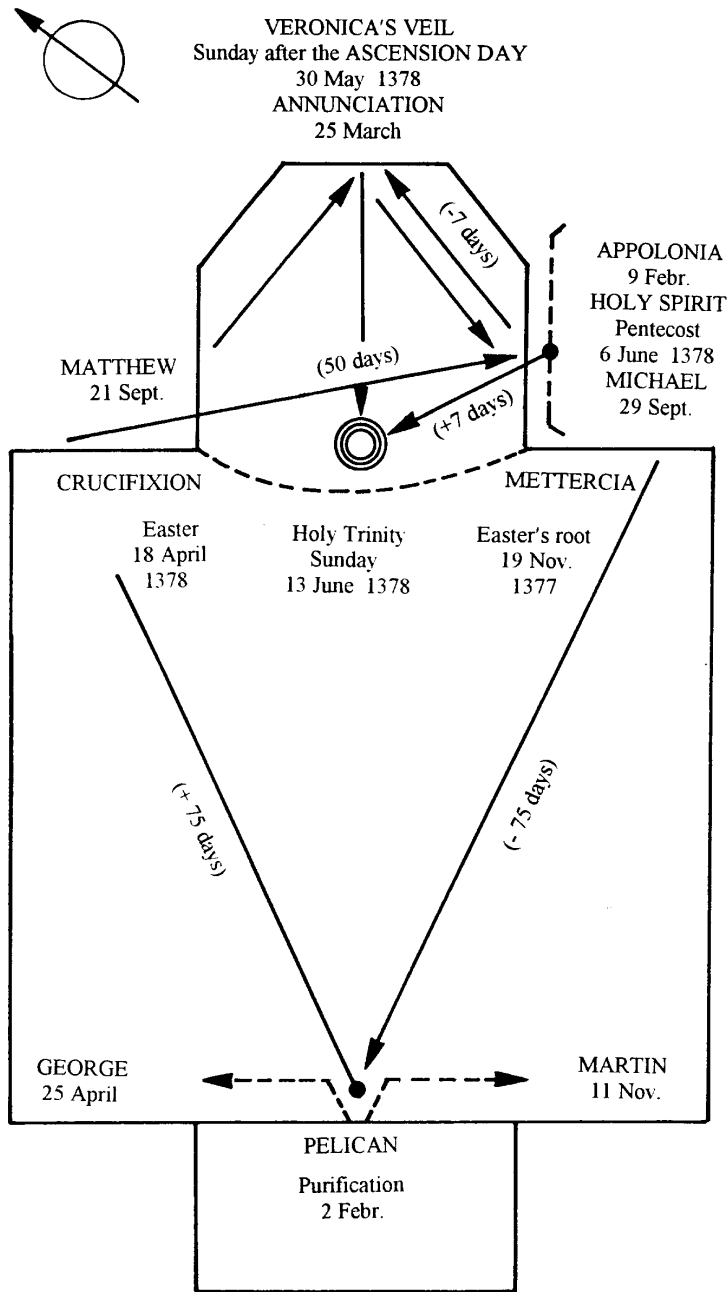


Figure 7: The calendar connections.

formerly the *Triniton*. The Sunday following Pentecost (June 13 in 1378) is the feast of the Holy Trinity. These dates demonstrate another example of the independence of the spatial positioning of the images and the date sequence of the feast symbolized by those icons: Christ's face (east) directly opposite the triple Sun = Trinity (west) and the Holy Spirit smack in the middle (round window — south).

Where does the Sun rise? Before exiting the sanctuary let us draw imaginary straight lines from the Trinity symbol on the west wall Ythrough the centers of the two windows of the sanctuary. These two lines mark the direction of the sunrise in winter and summer, respectively. This observation is of interest because in the middle ages there was an on-going argument as to what easterly direction should be relied upon in designing churches. Generally, true east was accepted as that at the time of the spring equinox.

3 The Nave

Let us view the nave side of the victory arch. The left leg of the arch depicts Easter, as it is symbolized by an image of the crucified Christ and the statement: “Pascha nostrum immolatus est Christus” (Our Easter, Christ has been sacrificed). In 1378, Easter Sunday fell on Apr. 18 (a significant date in the history of the Church: the first papal coronation in Rome, after Avignon). The other leg supporting the arch shows the *Mettercia*-image, the *Anna-Maria-Jesus* grouping, with a date of 1377 as documented Flóris Rómer in the 19th century. The ancient feast of St. Ann fell on Nov. 19 in 1377. That was the root of the Easter of 1378. The midpoint between Nov. 19, 1377 and Apr. 18, 1378 is Feb. 2, 1378, feast of Mary's Purification. On the center of the west wall above the entryway, the image of a pelican represents this feast (legend has it that the pelican washed her nearly-dead chicks with her own blood in an attempt to revive them). This is still another example of the afore-mentioned interdependence of images and dates. Furthermore the dates associated with the imagery demonstrate the inescapable conclusion that the murals were prepared in the 1377/78 time-frame and that the name of the church derives from, and honors Holy Trinity Sunday, June 13, 1378.

The message of the rest of the imagery in the nave is that the church is a house of worship. Christ admonishes us never to cease praying. In medieval times this admonishment implied an observance of the canonical hours. The images are based on these hours of worship.

The south wall. South is the triumph of the Sun, the compass point of maximal brightness. To the medieval man, it symbolized a graceful merging with God, the bravery found in faith, the role of righteousness in every-day life, thus the virtue of mercy and unselfishness and an active, charitable life. Hence it follows that, the south wall should be adorned by pictures of saints whose lives were steeped in these qualities, who were “abiding the heat of the Sun”.

The three narrow windows divide the wall into four fields, each of them depicting a saint that marks a specific prayer-hour and also signifies one of the virtues.

Prima — the first hour, the beginning of the workday: 6 am; the virtue of wisdom being represented by an image of the wise woman, *St. Elizabeth of the Royal House of Árpád of Hungary*.

Tertia — the third hour, the day's second prayer session, 9 am, and the virtue of justness (righteousness) symbolized by St. Stephen of Hungary. Stephanos means crown,



Figure 8: Look at the nave.



Figure 9: Crucifixion



Figure 10: St Anne, Holy Mary and the child Jesus:the so called *Mettercia image*.

and in biblical context the crown of justice (*corona justitiae*). That the badly damaged painting is indeed a depiction of King Stephen is attested to by official documentation from the middle of the 18th century. The same document provides data relating to the next two images.

Sexta — the sixth hour, the third prayer time, 12 noon. The virtue of fortitude was aptly portrayed by an image of *St. Henrick*, the brother-in-law of St. Stephen. The artist chose him because of his character, determination, and bravery. In ancient times, it was believed the devil's temptations were the most intense around noon (*diabolus meridianus* = noon devil), hence that is when one needed to be strongest in resisting.

Nona — ninth hour, the fourth prayer hour, 3 pm, the time when Christ's head slumped as He has given up his soul. The badly damaged image is that of a woman saint. By deductive reasoning, based on known methods of iconographical symbolism, it is very likely that the painting represented the virtue of temperance through the image of either *St. Agnes* virgin martyr or *Beatific Marguarite* (since canonised) of the House of Árpád.

The west wall. The entry-way splits the lower part of this wall into two fields, facilitating a double-tiered image structure which, nonetheless presents a unified message. The medieval man considered the sunset, the twilight and the west compass point as the power of darkness and temptation from which one needs to find refuge. To the south of the entrance on the lower part of the wall, such a haven is depicted by the Virgin Mary's cape, a shelter that stops the advances of evil; Her cape protectively covers those who are seeking her help. Above Her, in the top tier, is another example of saintly protection, *St. Martin*, the soldier-man on his horse, offering half of his cloak to a clothesless beggar. The coupling link is the horse in jumping to the north side of the upper tier where *St. George* fights the dragon from his horse. Below him in the lower tier is the counterpart of Mary's cape, is the city guarded by a wall protecting its peaceful citizens.

St. Martin also signifies the time of the twilight prayer (*lucernarium*) and also the day the trade shops started working by lantern-light. On the feast of St. Martin, (Nov. 11) the lighting of lanterns was a ceremonious event. The picture of St. George symbolizes the time of total darkness and the night-prayer hour (*completorium*).

In the center above the entry-way is the image of the pelican, as we have seen earlier. It is noteworthy that, in addition to representing the feast of Purification, it symbolizes purgatory as well.

The north wall. Having no windows, it shields the worshipers from the cold of the North. The huge wall surface has room for a sizable, three-tiered composition. It treats the north compass point interpretively by fixing the times of night-time prayer hours and is, in its entirety, based on the Scripture readings for the feast of Epiphany.

Here is a broad-brush description of the composition, proceeding from west to east: in the bottom tier, three kings from the orient arrive and are received, from under a canopy, by the Christ Child in His Mother's arm; since the Scripture states that every king serves the New-born King who hears and listens to the prayers of the poor, the image of *King St. László of Hungary* is included to the right of the canopy to represent all the worldly kings and *Bishop St. Nicolaus*, on behalf of the poor, completes the lower tier. In the top tier, in two-some groupings, the bare-footed apostles used to be depicted; this painting is very badly damaged. In the white field between the top and bottom picture-rows, at one time, the beginning words of the twelve sentence s of the Apostles' Creed were visible in Latin.

The three kings came to Jerusalem from Tarzis, the same place from where King



Figure 11: Details of the north wall's painting (a) Adoration of the Kings (b) King St.László and St.Nicolaus

Solomon has purchased a monkey, a peacock, and gold out of which He had spears and drinking vessels made. Hence, there is a monkey in one of the saddles and, in the “toasting scene”, a Saracen drinker holds a golden cup and his servant carries a spear. The name of the king in front of the canopy is legible: *Caspar(us)*. It is likely that he is also a depiction of Hungary's King Louis The Great. The second king is middle-aged, the third is young. The horses are noteworthy in that the snorting, kicking, and rearing horse sequence is identical to that found in a description in the Book of Job. Further notable is the fact that the kings are shown wearing falconry gloves; very likely, this is a reference to the concurrent observance of the shamanistic falcon holiday and the Christian Christmas. The three kings also symbolize the prayer hour of the night vigil (*nocturni*).

On the other side of the canopy, King St. László is wielding a halberd in his right hand, his left hand resting on the hilt of his sword. An angel is placing the crown on his head because, according to chronicles, he was elected king against his wish and he longed for a heavenly crown and that of the Living King more than he wanted the earthly one. Because of his personality, he was considered and is depicted here as the bright Morning Star and symbolizes the Church's prayer awaiting the dawn (*duliculum* = dawn or *laudes* = exaltation).

St. Nicolaus, whose name means victory (*Niké*), signifies the triumph over the night and, indirectly, over the darkness of sin. According to the story on which the scene depicting him is based, there were three maidens whose poor widowed father was unable to marry them off for lack of dowry. When the father was about to allow his daughters to prostitute themselves, St. Nicolaus saved them from sin and poverty by secretly tossing money to them through their window. The daughters are visible by a third-floor window as, two floors below, the father is reaching out and touches the cloak of the secretive benefactor.

The apostles are included because, in one of the readings taken from St. Augustine, it is said that, just like the star heralded the birth of Christ to the wise men, the apostles, like a second sky (hence the top-tier presentation), herald the same news to us.

The frontal of the victory arch. The iconography is organized around three images of Christ: a “dear Christ” with Ann and Mary (south side of the arch) — a “suffering Christ” on the crucifix (north side) — and a “Majestic Christ” (top center). In ancient times, the crucifixion scene always portrayed Christ facing west and with His back toward

Jerusalem, thus the guarded city on the opposite (west) wall is symbolically Rome and, in an indirect sense, a soul that is closed to sin. It is interesting to note how Mary's hands are clasped together and the folds of Her garment are more pronounced than in the other images.

In the middle of the top picture series, inside an almond shaped aura, Christ sits on the vault of the sky, his feet resting on earth, and His countenance is dreadfully stern. Against the blue background of the universe, He is raising His scarred hands and His judgmental utterances are on a flowing ribbon. Above the multitude awaiting the final judgment on His right, He summons those who gained salvation: "Enter the kingdom of My Father"; to the damned on His left: "Away into eternal flames!"

Thus concludes — only to start again — the pictorial sermon about the One God in Three Persons and the man who created this monument in God's honor and for the betterment of his own and every one who would follow him down *through the corridors of time*, that silent keeper and ravager of all works of art.

Acknowledgement. It is my pleasant duty to express my appreciation to *Károly Falvay*, *Balázs Tatai jr.* and *Imre Tóth* for their generosity in placing a valuable collection of photographs at our disposal. Further I express my gratitude to *dr. J. Kelemen* for his unstinting labour in scanning and technical preparation of the pictures.

The Editor

DETERMINATION OF THE AXIS OF THE MEDIIEVAL CHURCH IN VELEMÉR

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Introduction

On 22 September 2000, three independent methods: astronomical, magnetic, and GPS-aided ones were obtained for determination of the orientation of the *Velemér* (Hungary) medieval church (see the paper by Kovács, page 51).

The Astronomical Method

The differences between the azimuth of the Sun and the azimuth of the main (east–west) outer walls of the church were measured by a theodolite several times, and the mean azimuth of the walls was derived from the computed azimuth of the Sun for the given date and time.

The results are given in the following table:

Measurement		Azimuth of the	
no.	time (MET)	north wall	south wall
1	10 ^h 15 ^m 35 ^s	71°455	—
2	10 ^h 22 ^m 35 ^s	71°18	—
3	10 ^h 33 ^m 00 ^s	71°07	—
4	10 ^h 47 ^m 50 ^s	71°10	—
5	10 ^h 57 ^m 45 ^s	71°058	—
6	11 ^h 04 ^m 00 ^s	—	71°761
7	11 ^h 12 ^m 30 ^s	—	71°744
8	11 ^h 21 ^m 07 ^s	—	71°629
9	11 ^h 35 ^m 10 ^s	—	71°551
mean:		71°173 ± 0°165	71°671 ± 0°099
mean azimuth of the axis		71°4 ± 0°15	

The Magnetic Method

With the aid of a Bezar compass, the azimuthal angle between the magnetic north and the direction of the church walls was measured, and the mean result was corrected by the known value of magnetic deviation. The results are the following:

azimuth of the east–west main walls: $70^{\circ}3$,
azimuth of the north–south front wall: $338^{\circ}9$ (\rightarrow azimuth of the main walls: $68^{\circ}9$).

From these data, the mean magnetic azimuth corrected to the magnetic deviation (2° east):
 $71^{\circ}6 \pm 0^{\circ}99$.

The GPS Method

The GPS coordinates for two points in the extended line of the front wall (supposed to be perpendicular to the main walls) were determined, and the azimuth of this line was computed. From track measurements along the extended axis of the front (north–south) wall, the azimuth of the main (east–west) walls was computed. The mean value is $69^{\circ} \pm 2^{\circ}$ (the instrument had a readout rounded for degrees). The bigger errors are due to the limited length of the baseline, because there is a forest around the church.

Summary

The results mentioned above:

$71^{\circ}4 \pm 0^{\circ}15$ (astr.)
 $71^{\circ}6 \pm 0^{\circ}99$ (magn.)
 $69^{\circ} \pm 2^{\circ}$ (GPS)

exclude the idea of the exact east–west orientation (90°) of the main axis of the church. It is near the average of the azimuth of the rising sun for the date of Easter ($74^{\circ}4 \pm 4^{\circ}$) between 1370 and 1375 (the supposed period of the building of the church).

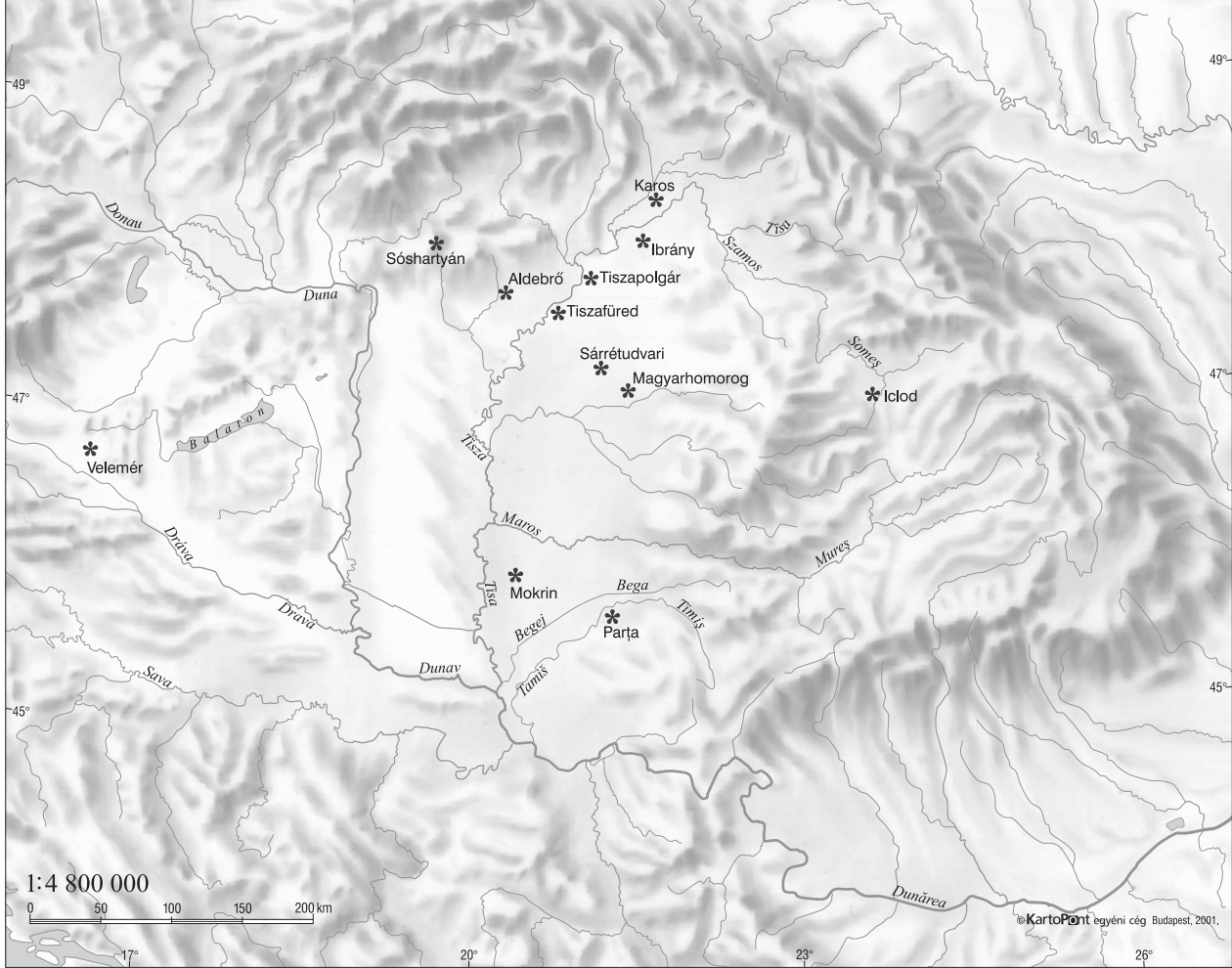
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MAP of the CARPATHIAN BASIN

The map shows only the archaeological sites discussed in the volume. The names of a few rivers, necessary for the orientation and identification of the sites, are also quoted. The political borders are not shown.

To ease the problem of orientation, the names of localities and archaeological sites in the text and the rivers in the map are written in all the languages used by the present inhabitants of the region discussed.



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