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WRITING THE NIGHT: GHEORGHE LAZAROVICI AND THE NEOLITHIC PROTO-SCRIPT OF ASTRAL SYMBOLS

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(Abstract)

Gheorghe Lazarovici's pioneering database and inventory of astro-sacral signs of the Danube Civilization underpins a transformative reevaluation of several Neolithic and Early Copper Age artefacts.
Building on his corpus of signs, this article reconceives portable shell charts, clay discs, spindle whorls, tablets and amphora fragments as interlocking modules within an integrated cosmological system. That system was shared across the vast Danube riverine network and grounded in systematic sky watching and communal rituals.
Comparative analysis uncovers a pan-Danubian visual language based primarily on northern constellations, the *Milky Way* and the pole star. Recurring motifs—spirals, crosses, star-cluster ideograms and the *M/W* patterns of *Cassiopeia*—functioned as precise equinoctial and precession markers, portable horizon dials, and ritual calendars.
Archaeo-astronomical research reveals that these astral symbols were used to map both daily solar motions and long period celestial cycles, enabling communities to calibrate sowing, harvesting and ceremonial observances to cosmic rhythms. Constellational silhouettes and their apparent motions became graphic signs for timekeeping and cultic enactment.
Over generations, these astral archetypes coalesced into a sacred script—primarily logographic—that we now recognize as the Danube Script. Its notation intertwined celestial observation with symbolic motifs and ritual practice.
One of Lazarovici's legacies lies in having established the Danube script as one of the earliest notation systems *partly* based on astronomy. Progression to literacy predated Sumerian writing technology by up to two millennia, challenging conventional narratives about the geographic origins and functions of early writing.
This integrated cosmology reveals how Neolithic sky watchers read the heavens as a living text to guide agricultural practice, structure communal memory, perform seasonal rites and mediate human–divine relationships. It offers a compelling model for the astronomical origins of ritual notation and proto-literacy.

Gh. Lazarovici's Database and Repertory of Sacred Signs Rooted in Stellar Symbolism

Drawing on a monumental database of 3,700 entries documenting spiritual life and religious beliefs, Gheorghe Lazarovici compiled a catalogue of over 650 primary signs and symbols[1]. He deliberately transcended a purely geometric taxonomy by organizing these marks according to both their formal characteristics and their implied meanings.

For the 2004 Novi Sad conference *Signs of Civilization: International Symposium on the Symbol System of Southeast Europe*, he further distinguished between "signs" (1,700 entries) and "symbols" (3,100 entries)[2]. In his framework, a symbol is a conventional sign, object, or image that represents or evokes another concept; Lazarovici poetically terms it a *cipher of mystery*, since its meaning transcends its visible form[3].

Lazarovici's database focuses primarily on sacred symbols—those imbued with divine or revered connotations—and he maintains that interpreting these symbols offers insights into Neolithic and Copper Age mentalities[4]. Yet symbols are inherently multidimensional: their meanings depend on context, placement, and association with other marks. For example, a rhombus may denote a head,

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[1] For a substantial examination of Gh. Lazarovici's catalogue of sacred signs, see Merlini 2009, 135 ff., Id. 2025.

[2] Lazarovici Gh. 2009a.

[3] Chevalier, Gheerbrant 1996, I, 22, 29, 37.

[4] Lazarovici Gh. 2003.

an eye, the human body, or sexuality, depending on its cultural milieu.

Embracing a not integrative approach to writing and symbolism, Lazarovici defines writing technology as the representation of spoken language through conventional signs denoting sounds (phonemes, syllables, words). However, when addressing what he regards as the Danubian Neolithic protoscript, he emphasizes pictographic and ideographic analysis, thereby blurring the boundary between "pure" symbols and written signs. His twostep interpretive method is as follows:

1. Iconic decoding: Identify recognizable elements (e.g., human heads, animal horns, a mother holding an infant).

2. Interpretation: Classify each mark as a pictogram (e.g., bull horns as a bucranium) or an ideogram (e.g., the bucranium as an emblem of sacred bull power).

Many ideograms in the Danube Civilization[5] possess an esoteric quality, likely accessible only to initiated practitioners. To unlock their meanings, Lazarovici employs archetypal categories such as:

- Natural Forces: rain, sky, earth, water.
- Dualities: sun-moon, light-dark, yin-yang, joy-sorrow.
- Sacred numerology.
- Mythological themes: ancestral realms, creation myths, etc.

Within this framework, the signs and symbols in Lazarovici's database form a predominantly pictographic script—arguably the primary communication system of the Neolithic and Copper Age in Europe[6].

An innovative aspect of Lazarovici's later research—conducted in close collaboration with astronomers such as Iharka Szücs-Csillik (Astronomical Institute of the Romanian Academy; Astronomical Observatory Cluj-Napoca)—is the identification of multiple graphemes as intentional cosmic symbols: the Sun, Moon, planets, individual stars, and star clusters, encoding sophisticated astronomical knowledge. By combining archaeology, astronomy, and ethnology, Lazarovici and his colleagues argued that these pictograms and ideograms formed a sacred, magic-religious proto-writing—a symbolic code designed to link Mother Earth with Father Sky[7]. To facilitate comparative study and discussion with peers, they published extensive catalogues of these signs (in exhibition catalogues, edited volumes, and dedicated symposia).

This astro-script approach was very close to Gheorghe Lazarovici's heart in his last years and demonstrates his intellectual honesty. Ever committed to intellectual rigor, he revisited and refined many of his earlier interpretations in light of the new perspective. Having collaborated extensively over time, we together proposed that writing, in part, originated as a cosmic-symbolic system. However, we have conceptually and clearly distinguished the technology of writing from what we define "astronomical signs": namely, sky atlases, constellations figures, and markers of celestial motions, while still treating both as part of a unified semiotic landscape[8].

Drawing on evidence from the remarkable central sanctuary he discovered at Parţa (Banat district, Western Romania),[9] Lazarovici emphasized the importance of domestic and community shrines, whose architectural orientations and abundant symbolic inventories provide crucial archaeo-astronomical data[10].

Observing the regular cyclicality of the heavens, Neolithic communities of the Danube Valley embraced the dictum "as above, so below,"

[5] The concept of "early civilization" can no longer be confined to the regions that have traditionally garnered scholarly attention (i.e., Mesopotamia, Egypt, the Levant, and the ancient Indus Valley). It must be broadened to include the Neolithic and Copper Age cultures of the Danube Valley, which together constitute a unified cultural horizon. The Danube Civilization compels us to rethink the conventional narrative of civilization's emergence. Rather than following the archetypal Mesopotamian trajectory—from foraging to a centralized, state-based agrarian society—it pursued a distinct path: a network of interconnected settlements (or "nodes") bound by shared cultural traditions, reciprocal political alliances, and common socio-economic interests. It was a complex society marked by semi-egalitarian social relations rather than rigid hierarchies; reciprocal exchange systems that balanced mutual benefit; the absence of a centralized state apparatus; and the gradual rise of proto-urbanism, as villages coalesced into densely populated towns of several thousand inhabitants without extensive fortifications. In sum, the Danube Civilization demonstrates that complex societies—indeed, "civilizations"—can emerge outside the paradigms established by Sumer, Egypt and their contemporaries. Merlini 2004; Merlini 2009, 80.

[6] Merlini 2025a.

[7] Szücs-Csillik, Lazarovici Gh., Maxim 2004; Szücs-Csillik, Lazarovici, Maxim 2018; Szücs-Csillik, Maxim 2023; Szücs-Csillik, Lazarovici Gh., Maxim 2024b .

[8] Merlini 2009, 170–171.

[9] Lazarovici Gh. 1982; Id. 1989; Lazarovici Gh. *et alii* 1985; Lazarovici Gh., Maxim 1995a; Lazarovici Gh., Maxim, Drașovean 1994; Lazarovici Gh., Drașovean, Maxim 2001; Lazarovici Gh. *et alii* 2002b; Lazarovici, C.-M., Lazarovici Gh. 2006; Szücs-Csillik, Maxim 2015; Szücs-Csillik, Maxim 2017c; Lazarovici Gh., Lazarovici C.-M. 2019a; Szücs-Csillik, Maxim, Lazarovici Gh. 2019a; Szücs-Csillik, Maxim, Lazarovici Gh. 2020.

[10] Szücs-Csillik, Lazarovici, Lozna 2023.

perceiving every terrestrial element as mirrored in the sky and vice versa. This macrocosm–microcosm unity was articulated through signs and symbols that bound humans and their world in a single, living cosmos[11].

The first "sky-watchers" were priest/priestess astronomers who read celestial movements—of the Sun, Moon, planets, and grouped bright stars—as divine messages governing rain, seasons, and agricultural rhythms[12]. Their constellation groupings had outlines shaped through their cultural archetypes,[13] predate the classical 48 of Greco-Roman lore and differ significantly from the modern set of 88[14].

In collaboration with Szücs Csillik, Lazarovici mapped Neolithic star clusters onto five modern "families" of constellations:[15]

- *Ursa Major* Family, containing northern constellations located in the area of the *Ursa Major* (*Ursa Major*, *Ursa Minor – Draco, Boötes, Corona Borealis*);
- *Perseus* Family, comprising several constellations associated with the Perseus myth (*Cassiopeia, Cepheus, Perseus – Andromeda – Pegasus, Auriga*);
- *Hercules* Family, including the group of constellations in the region of *Hercules* constellation (*Hercules; Aquila, Lyra, Cygnus, Serpens*);
- *Orion* Family, lying at the opposite side of the sky from the *Hercules* Family (*Orion, Canis Major, Canis Minor*);
- Zodiac, with constellations on the apparent path of the Sun through the year (*Leo*, *Virgo*, *Scorpius*, *Sagittarius*, *Pisces*, *Taurus*, *Gemini*, and *Cancer*).

They also noted striking parallels between these Danubian cosmic symbols and those used by contemporaneous Neolithic cultures in Asia—a testament to shared archaeoastronomical insights across vast distances[16].

Certain bright star-cluster shapes functioned as sacred symbols within the Danube System of Communication[17]—wheels, stars, crescents, and animal totems—their astral and calendrical meanings accessible only to initiates.

With regard to their calendrical function, Lazarovici and his collaborators interpreted various markings on artifacts of the Danube civilization as seasonal indicators, each derived from a particular star cluster. In their view, groups of stars along the ecliptic signaled key transitions in the agrarian year, since their heliacal risings or settings coincided with the onset of each season[18]. Neolithic lunar-solar calendars, based on systematic observations of the Sun, Moon, and principal stars, were indispensable for both farming and ceremonial scheduling[19]. With the arrival of the First Temperate Neolithic and the advent of agriculture along the Danube, population clusters expanded into large settlements[20]. The annual cycle—ploughing, sowing, growth, protection, and harvest—took on dual roles of subsistence and sacred ritual[21]. Priest/priestess astronomers timed field operations by tracking the rhythms of sunrise, sunset, moon phases, and stellar movements, believing that abundant harvests depended on aligning human activity with the divine order written in the sky[22].

Consequently, plant cultivation acquired a sacred cosmic dimension: soil fertility and crop success were understood as reflections of celestial harmony, governed by the "divine ordinances" inscribed in the vault of heaven[23].

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[11] Szücs-Csillik, Lazarovici Gh., Maxim 2004; Szücs-Csillik 2021a; Szücs-Csillik, Maxim 2021b.

[12] Nilsson 1920; Krupp 1983; Kelley, Milone 2011.

[13] Lazarovici Gh. 2000a; Lazarovici Gh. 2000b; Lazarovici Gh. 2003; Lazarovici Gh. 2009b; Lippincott *et alii* 2003; Lazarovici C.-M. 2009a.

[14] Brown 1899; Delporte 1930; Burl 1981; Rappenglück 1997; Roggers 1998; Hughes 2005; Kelley, Milone 2011.

[15] Menzel 1975; Szücs-Csillik, Lazarovici Gh., Maxim 2004.

[16] Szücs-Csillik 2021a.

[17] The Danube Civilization developed a complex, multifaceted Danube System of Communication, of which writing was merely one—and albeit important, original, and unique—component. Its other integral channels included: religious symbols, conveying sacred meanings through shared iconography; geometric decorations, encoding abstract concepts in patterned motifs; figurative language, expressed through images and pictorial narratives, devices for memory support, such as marked tokens, to aid memory; star and land charts, mapping celestial cycles and territorial boundaries; ritualistic markings, inscribed or painted to denote ceremonial use; numeric notations, recording quantities or calendrical information; family identity or community affiliation marks, signaling lineage or social affiliation; and owner/manufacturer/destination/content signs, specifying ownership, provenance and purpose of an artefact. Together, these intertwined media formed a coherent semiotic network—the Danube System of Communication—through which Neolithic and Copper Age communities in the Danube Valley conveyed information, maintained social bonds, and mediated their relationship with both Earth and Sky. Merlini 2004; Merlini 2009.

[18] Szücs-Csillik 2021a; Szücs-Csillik, Maxim 2021b.

[19] Maxim, Szücs-Csillik 2009; Maxim, Szücs-Csillik 2010; Szücs-Csillik, Comșa 2017.

[20] Szücs-Csillik, Lazarovici Gh., Maxim 2024b.

[21] Bowden 2010.

[22] Barlai, Ecsedy 1990; Szücs-Csillik 2021b.

[23] Krupp 1991; Szücs-Csillik, Maxim 2014.

Astronomical symbols occur repeatedly on cultic objects across the Danube Civilization: the *Spondylus* shell from Mostonga (Serbia), the Tărtăria tablets (Romania), a ceremonial disc from Turdaş (Romania), spindle whorls from Slatino (Bulgaria), and an amphora fragment from Lozna (Romania)[24]. These items were likely used in rituals tied to celestial events, reinforcing the bond between Earth and Sky, astronomy and spirituality. Their incised or painted patterns depict seasonal star-group motifs, effectively framing the agricultural year that run from the vernal equinox through the autumnal equinox[25].

Lazarovici further proposed that such astral engravings contributed to the development of an early proto-script, in which abbreviated signs—originally silhouettes of star clusters— evolved into a script code loaded with symbolic meaning aimed at bridging the human and the cosmic realms[26].

A portable Star-Based Fishing Calendar on a Spondylus Shell from Mostonga (Serbia)

An engraved *Spondylus gaederopus* shell—native to the Mediterranean—was recovered from the Mostonga IV–Mostanica site, near Odžaci (Bačka, Vojvodina, Serbia), along the meandering and marshy Mostonga River. Stratigraphic evidence, along with the characteristics of the artifacts found in association with the shell, date the specimen to the Neolithic horizon known as Mostonga IV, contemporaneous with the Vinča A1 and Karanovo III cultures, circa 5500–5200 BCE[27].

The archaeologist in charge, Sergej Karmanski, found the shell resting on the chest of a female skeleton oriented west–east[28]. Nearby Vinča-type ceramic fragments suggest that the *Spondylus* was used as a funerary amulet. Since the Early Neolithic, *Spondylus* shells—valued for their beauty, rarity and Mediterranean origin—had functioned as prestige goods in mortuary contexts across Southern-Central Europe[29].

The shell's surface features a complex arrangement of concentric rings and punched-dot motifs. Karmanski identified six primary pictograms arranged in a bilateral sequence: on the right, two large fish (1–2) and a large hooked fish (3); on the left, a star-cluster image (4), a house raised on posts over water (5), and a small boat with rowers (6). He termed this sequence a *mythogram*,[30] treating the motifs as symbolic codes connected to a funerary context. He did not advance a coherent astronomical interpretation, even if he unconventionally proposed that the three fish symbols on the right side of the shell correspond to the constellations *Hercules*, *Boötes*, and part of *Virgo*, each imagined in mythology as humanheaded star figures[31]. In his view, each "fish head" pictogram doubles as a human head—an emblem for a bright star or star group[32].

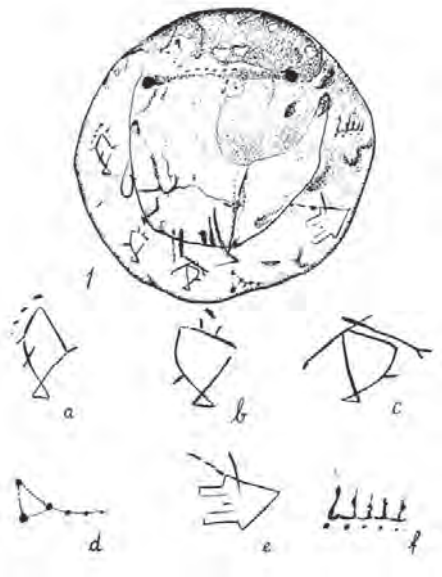

Fig. 1. The inner side of the Spondylus *shell with an engraved mythogram composed of six early Neolithic symbols from Mostonga (Serbia), according to Sergej Karmanski. (After Karmanski 1977, Pl. VII.3).*

Later, Michael Séfériadès proposed that the engraved symbols referred to specific constellations[33]. He suggested the object belonged to a shaman-healer who wore it as a necklace and employed its celestial signs in ritual healing that implied astronomical knowledge[34].

Michael Séfériadès proposed that the symbols on the *Spondylus* shell refer to specific constellations.

Building on this hypothesis, Iharka Szücs-Csillik, Gheorghe Lazarovici, and Zoia Maxim catalogued additional signs (labeled *i–m*) and, in 2018, collaborated to analyze astronomically the punched-dot

[24] Szücs-Csillik 2021a.

[25] Barlai 2010; Rotblum 2019; Szücs-Csillik, Maxim, Lazarovici Gh. 2019a; Szücs-Csillik 2021b.

[26] Szücs-Csillik, Lazarovici, Maxim 2018; Szücs-Csillik, Maxim, Lazarovici Gh. 2019a; Szücs-Csillik, Maxim, Lazarovici Gh.2020.

[27] Chapman 1981; Merlini 2009, 468.

[28] Karmanski 1977; Anthony, Chi 2009, 28–57.

[29] Siklósi 2004.

[30] Karmanski 1977.

[31] Karmanski 1977; Hiller, Nikolov 2000.

[32] Szücs-Csillik, Lazarovici Gh., Maxim 2004; Szücs-Csillik, Lazarovici, Maxim 2018.

[33] Séfériadès 2009, 189, Pl. 8.15.

[34] Séfériadès 1994.

motifs of the artifact. Using reconstructed star charts for circa 5500 BCE, Szücs-Csillik overlaid the constellations onto the shell's incisions, revealing a remarkable astral map consistent with several modern stellar "families" and the *Milky Way* in its spring orientation:

• Major constellation families mapped across the shell: *Perseus family* (underside) with *Perseus*, *Andromeda*, *Pegasus*, *Auriga*; *Ursa Major family* (upper side) with *Ursa Major*, *Ursa Minor, Draco, Boötes, Corona Borealis*; *Orion family* (side) with *Orion*, *Canis Major*, *Canis Minor*; *Hercules family* (right side) with *Hercules*, *Lyra*, *Cygnus*, *Aquila*, *Serpens*; and some Zodiacal constellations (left side), *Cancer*, *Gemini*, possibly *Leo*.

• A thick dotted line between two natural perforations was identified as representing the *Milky Way* in its spring arc, visible as a bright band crossing the sky from east to west and passing through the zenith in 5500 BCE[35].

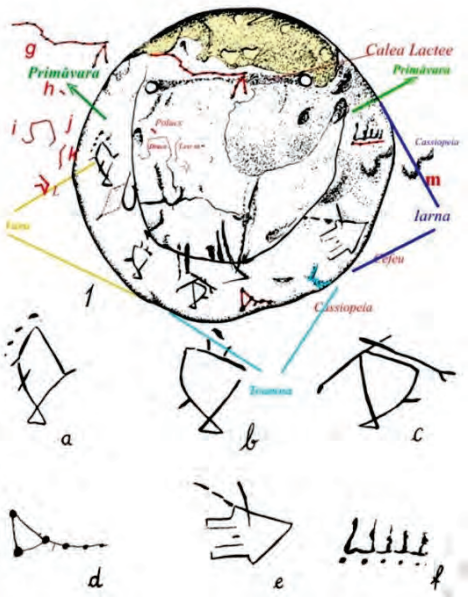

Fig. 2. The new symbols identified on the Mostonga Spondylus *shell by Iharka Szücs-Csillik, Gheorghe Lazarovici, and Zoia Maxim compared to the old ones. (After Lazarovici Gh., Lazarovici C.-M. 2019b, 87, Fig. 19.c.).*

Beneath the thick line, clustered dots correspond to the constellations of *Perseus*, *Andromeda*, *Pegasus*, and *Auriga*—all visible in the eastern sky during the spring months[36]. *Perseus* was a prominent northern constellation of the *Milky Way*, positioned between *Cassiopeia* and *Auriga*[37].

The *Auriga* constellation is pinpointed just above the left perforation[38]. Its brightest star *Capella* is the sixth brightest star in the night sky and lies near the galactic anti-center (the point directly opposite the *Milky Way*'s core)[39]. On the shell it is indicated by one of the two perforations through which the suspension cord passed[40].

Blurred dots above the central band are interpreted as *Cepheus*[41].

To the left of the perforations, four bright dots represent stars in the *Winter Hexagon* (Mirfak, Capella, Betelgeuse, Aldebaran). To the right, three lines indicate the *Summer Triangle*: Altair, Vega, and Deneb from the constellations *Aquila*, *Lyra*, and *Cygnus* respectively[42].

Based on this evidence, the researchers have proposed that the prominent line connecting the two perforations on the *Spondylus* shell symbolizes the *Milky Way* as it appeared during the spring season. Around 5500 BCE, the Milky Way formed a striking arc across the sky, extending from east to west and passing through the zenith[43].

These features strongly suggest that the Mostonga shell encodes a spring–summer sky map, emphasizing the *Milky Way*'s prominence and serving calendrical and ritual functions. Gheorghe Lazarovici and team contextualized this information within the cosmology of the Danube Civilization. According to their interpretation, Neolithic communities believed that human souls resided—between incarnations—within the center of the *Milky Way*. The *Milky Way* thus frequently appears in the Danube Communication System as a double spiral or "Spiral of Life," denoting the soul's passage from this world to the Other World. This double spiral motif, placed at the celestial center, symbolized the cyclical nature of existence, embodied the balance of opposing forces (life/

[35] Szücs-Csillik, Lazarovici Gh., Maxim 2018; Id. 2019; Szücs-Csillik 2021b; Szücs-Csillik, Lazarovici Gh., Maxim 2024b.

[36] Maxim, Szücs-Csillik 2010; Szücs-Csillik, Lazarovici, Maxim 2018; Szücs-Csillik 2021a; Szücs-Csillik, Lazarovici Gh., Maxim 2019. *Pegasus* and *Andromeda* are described as the trough according to Romanian mytho-astronomy;

[37] Szücs-Csillik *et alii* 2023, 40.

[38] In traditional astronomy, Auriga is represented as a chariot and its driver.

[39] Ridpath 1988; Szücs-Csillik, Maxim 2021b.

[40] Szücs-Csillik *et alii* 2023, 38.

[41] Maxim, Szücs-Csillik 2010; Szücs-Csillik, Lazarovici, Maxim 2018; Szücs-Csillik 2021a; Szücs-Csillik, Lazarovici Gh., Maxim 2019.

[42] Szücs-Csillik, Lazarovici Gh., Maxim 2019. In 2023, Lazarovici and colleagues maintained that the two holes mark two equally bright stars, Capella (in *Auriga*) and Vega (in *Lyra*). See Szücs-Csillik *et alii* 2023, 32.

[43] Szücs-Csillik, Lazarovici, Maxim 2018; Id. 2019; Szücs-Csillik 2021a.

death, earth/sky) and served as a portal to parallel cosmic dimensions[44].

Fig. 3. The symbol of the double Spiral of Life on Cucuteni vessels. (After Szücs-Csillik, Maxim 2023).

The horseshoeshaped natural ridge on the interior of the Mostonga *Spondylus* shell visually corresponds to *Ursa Major*[45]—a large, circumpolar constellation that never set below the horizon in Neolithic Europe. Within this larger curve—inside the horseshoe—the shell also bears blurred points and finer curved lines, which have been identified as *Ursa Minor* and *Draco*, the winding "Dragon" constellation that coils between *Ursa Major* and *Ursa Minor* as guardian of the celestial pole. All three constellations were regarded as sacred and "immortal" because, as key elements of the circumpolar sky, they never disappeared below the horizon. In Neolithic starmapping traditions, they symbolized eternity and cosmic order.

The researchers describe the horseshoe form of *Ursa Major* as a kind of celestial boundary encompassing the northern sky. Historians of astronomy recognize *Ursa Major* as one of the most archaic star groups, since c. 10000 BCE. Across diverse ancient civilizations—separated by geography and millennia—its bright stars were variously imagined as a great bear, bull, or other large animal with a long tail (the dipper's "handle"). Each culture wove its own myths to explain how that creature became fixed in the heavens[46].

Comparing Neolithic Cultures in opposite regions of the Earth, a remarkable parallel appears in northeast China. In 2006, a 3.10 m yamshaped boulder from Baimiaozi Mountain near Chifeng City (Inner Mongolia) was found carved on its north face, during the Neolithic period, with nineteen round indentations interpreted as the stars of the *Big Dipper* (part of *Ursa Major*)[47]. This discovery links the Hongshan culture's ritual objects—jade dragons, pigmouthed pendants, and cloudshaped ornaments (c. 4700–2900 BCE)—to early skywatching practices and highlights the *Big Dipper*'s symbolic importance in prehistoric China[48].

On the Mostonga shell, *Ursa Minor* and *Draco* appear nestled between *Ursa Major*'s "legs," encircling the celestial pole at mid-northern latitudes. Thus, the artifact may encode this mythic geography of the northern heavens, emphasizing the eternal circumpolar constellations as integral to a Neolithic cosmogony.

Outside the horseshoe, the shell registers *Corona Borealis*—rendered as a small, crownshaped triplering motif adjacent to *Serpens*—and *Boötes*, which lie just south of *Ursa Major*'s arc and would frame the outer edge of a circumpolar "shield," consistent with their placement on the shell.

In Neolithic iconography, *Corona Borealis* crowns female idols, signifying their superhuman, divine nature and then their participation in the celestial realm[49]. In traditional agrarian calendars, the crown of *Corona Borealis* heralds the onset of summer; such crowns appear in midsummer rites of passage (weddings, initiations) across various Old European cultures[50].

Boötes is a conspicuous northern-hemisphere constellation of the spring–summer sky, most readily identified by its brightest star, Arcturus[51].

The analysis further extends to several additional constellations, each placed roughly according to its annual cycle: *Orion*, *Canis Minor*, *Leo*, *Cancer*, *Gemini*, *Hercules*, *Serpens*, and *Coma Berenices–Canes Venatici*[52].

The *Orion* family is recognizable in the shell's lowerleft quadrant. A marked spot adjacent to the "boat" motif represents *Orion*, the Hunter. Straddling the celestial equator, *Orion* is among the most conspicuous winter asterisms and one of the best-known constellations in the Danube Civilization[53]. In many Neolithic and later agrarian

44 Szücs-Csillik, Maxim 2023.
45 Szücs-Csillik 2021a.
46 Gingerich 1992.
47 Wu 2007.
48 Merlini 2009, 292; Sparavigna 2025, 42.
49 According to the Romanian mytho-astronomy, *Boötes* is represented as a human creature and *Corona Borealis* as a shanty. See Maxim, Szücs-Csillik 2010; Szücs-Csillik, Maxim 2017a; Szücs-Csillik, Lazarovici, Maxim 2018.
50 Szücs-Csillik, Maxim 2018; Szücs-Csillik 2021a.
51 Szücs-Csillik *et alii* 2023, 40.
52 Szücs-Csillik, Lazarovici Gh., Maxim 2019.
53 Szücs-Csillik, Maxim 2021b.

societies, its disappearance before dawn in March heralded the start of spring fieldwork. It would have been visible around the autumnal equinox[54]. Then its heliacal rising in autumn signaled harvest time and the close of the agricultural year. These reliable cycles endowed *Orion* with profound calendrical importance, directly linking its appearance and disappearance to seasonal labor and sustenance[55].

A blurred linear motif at middle left, resembling a hook-shaped motif, corresponds to *Canis Minor*[56]. The pattern comprises only two bright stars, the brightest being Procyon—the seventh most luminous star in the sky. In the Danube civilization, under pristine winter skies, *Canis Minor* would have been optimally visible during its upper culmination[57]. In Romanian mythoastronomy, the "Lesser Dog" is viewed as a fairy-tale animal visible at daybreak, embodying dawn's approach[58].

Zodiacal constellations also appear on the *Spondylus* shell, illustrating the Neolithic artisans' advanced celestial literacy. At upper left, *Leo* is rendered in two discrete segments along the margin of the shell, perhaps highlighting its principal star groups. The first segment, associated with its brightest star Regulus, is known as the lion's sickle and resembles an inverted question mark. The second segment corresponds to the star Denebola and forms the lion's tail in a triangular configuration[59].

Nearby *Leo*, the faint constellation *Cancer* is encoded as a small "house on posts"[60]. This pictogram likely represents *Praesepe* (M44, the Beehive Cluster)—one of the nearest bright open clusters to Earth—traditionally associated with the sign of *Cancer* and visible near the ecliptic as a diffuse clear patch. The depiction of *Cancer* as a dwelling on posts that elegantly encodes *Praesepe* is a plausible calendrical marker for summer.

The "small boat with oarsmen" motif is read as *Gemini*, the Twins—an imaginative parallel between the paired rowers and the twin stars Castor and Pollux[61].

The *Hercules* family occupies the left side of the *Spondylus* shell. In this sector, Gheorghe Lazarovici and team identified the constellations *Hercules* and *Serpens* beneath *Corona Borealis*[62].

In local mythoastronomical tradition, the serpent is a beneficent creature: it hibernates underground for half the year and emerges for the remaining months. Remarkably, during the Danube Civilization the constellation *Serpens* mirrored this lifecycle in the sky:

- Spring (March/April): *Serpens* reappeared on the eastern horizon with its head directed westward toward *Corona Borealis* and *Hercules*, and its tail unfurling eastward toward *Aquila*[63].
- June: it culminated at its highest point, an echo of "laying celestial eggs"
- Autumn (September/October): it sank below the western horizon.

The Danube Civilization harnessed this cosmic–terrestrial parallel as a living agricultural clock—especially for cereal cultivation (notably wheat). Their agrarian year comprised two principal seasons, "agrarian summer" and "agrarian winter." The serpent's return marked the onset of spring sowing, while its disappearance signaled the close of the productive season. Fertility, fecundity, and communal healing rites were timed to these celestial events[64]. Thus, the beneficial celestial snake motif recurs in Neolithic and Copper Age ideograms as an emblem of seasonal renewal and divine guardianship[65].

A persistent echo of this symbolism survives in Romanian folk custom: Saint George's Day (March 17) commemorates the snakes' emergence, whereas the Feast of the Exaltation of the Holy Cross (September 14) marks their hibernation[66].

Let us begin by summarizing the constellations engraved on the shell according to Gheorghe Lazarovici and collegues, and the nature of this artifact as a Neolithic sophisticated astral calendar and portable star-clock, embedding seasonal star-group pointers within its funerary symbolism. The shell's circular form evokes the celestial, spherical dome, charting the night sky through an agrarian year around 6000 BCE[67]. On the right side

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54 Szücs-Csillik *et alii* 2023, 39.

55 Szücs-Csillik, Maxim 2017b; Szücs-Csillik, Maxim 2021b.

56 Szücs-Csillik, Maxim 2021a.

57 The hook-shaped motif on the *Spondylus* shell could alternatively indicate *Hydra*'s head (rendered as a trapezoid), reflecting the fact that *Hydra* is the sky's longest constellation. See Szücs-Csillik *et alii* 2023, 37.

58 Maxim, Szücs-Csillik 2010.

59 Szücs-Csillik *et alii* 2023, 36.

60 Karmanski 1977; Hiller, Nikolov 2000.

61 Karmanski 1977. In Romanian mytho-astronomy, Gemini constellation is a treasure. See Szücs-Csillik, Lazarovici Gh., Maxim 2004; Szücs-Csillik, Lazarovici, Maxim 2018.

62 Szücs-Csillik Maxim, 2016a; Szücs-Csillik, Maxim, 2016b; Szücs-Csillik, Lazarovici, Maxim 2018.

63 Szücs-Csillik *et alii* 2023, 41.

64 Szücs-Csillik, Maxim 2016a; Szücs-Csillik, Maxim 2021a.

65 Dumitrescu 1968, Fig. 48, cat. 48.

66 Szücs-Csillik, Maxim 2014, 230.

67 Szücs-Csillik, Lazarovici Gh., Maxim 2019; Szücs-Csillik *et alii* 2023.

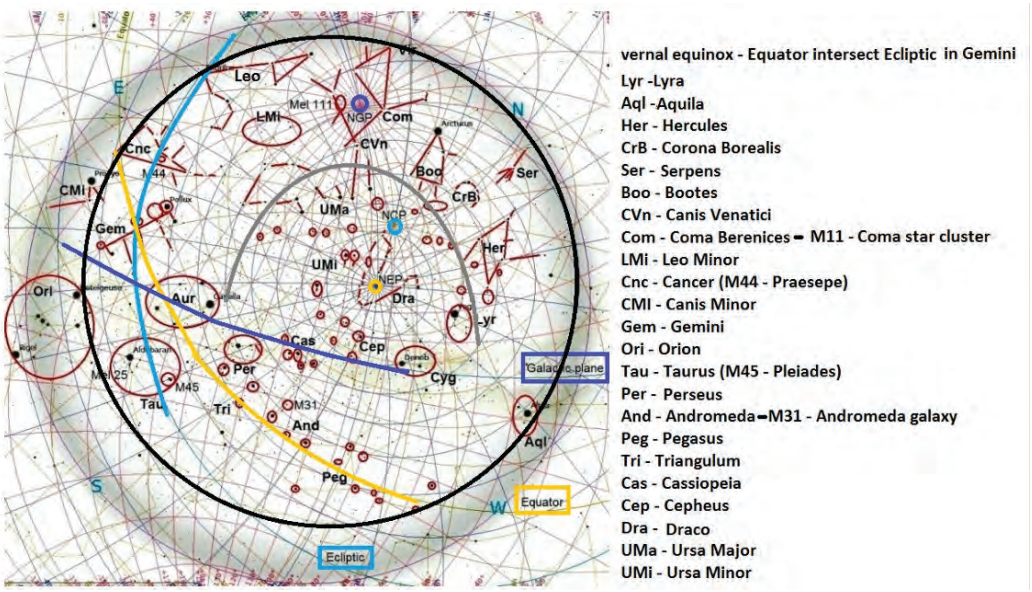

Fig. 4. Comparable star patterns to the engraved symbols on the Mostonga Spondylus *shell emerge in a Stellarium-modeled sky chart for 5500 BCE. (After Szücs-Csillik 2021b, Fig. 3:a).*

of the *Spondylus* shell, three "fish" motifs actually represent the constellations *Hercules*, *Taurus*, and *Virgo*. On the left, the puncheddot cluster denotes *Leo*, the stiltedhouse pictogram encodes *Cancer*, and the small boat with rowers signifies *Gemini*[68].

Building on this identification, Gheorghe Lazarovici and team proposed that the shell portrays the spring–summer night sky: the starmap extends from *Gemini* (left), across the *Summer Triangle*—Vega, Deneb, Altair—to *Virgo* (upper register), while *Andromeda* and *Pegasus* occupy the lower register above *Pisces*[69].

The Neolithic priestess-astronomer at Mostonga could have used this artifact to:

– Determine the ecliptic plane by aligning the boatmotif (*Gemini*) and fishmotifs (zodiacal series) with horizon risings.

– Track lunar, solar, and planetary motions through the zodiacal band to predict seasonal markers (solstices, equinoxes), thereby scheduling agricultural and ritual events[70].

– Locate key celestial poles as geometric relationship and not only as mythic metaphors:

• The *North Celestial Pole*, the point around which the entire star field appears to rotate; defined by Earth's rotation axis. The *North Celestial Pole* is the most directly observable (via Neolithic counterpart of Polaris).

• The *North Ecliptic Pole*, the point perpendicular to the plane of the Sun's apparent annual path (the ecliptic).

• The *North Galactic Pole*, the point perpendicular to the plane of the *Milky Way* galaxy[71].

These three "pole points," together with star-group orientations, would have afforded comprehensive skymapping for ritual and practical purposes[72].

The Mostonga IV–Mostanica site, investigated by Sergej Karmanski, lies on a tributary less than ten kilometers from the Danube. Its proximity to abundant waters made fishing central to local subsistence—an importance attested by the numerous fishing rods and harpoons unearthed during excavation.

Building on this information, Gheorghe Lazarovici and team proposed a novel interpretation of the Mostonga *Spondylus* shell as a fishing calendar rather than merely a star-map. They began with the position of *Cassiopeia*, whose line-shaped motif is inclined at 45° during both equinoxes and recurs on sanctuaries, cult vessels, and figurines throughout the Danube Civilization[73].

They argue that the six primary pictograms recorded by Karmanski encode seasonal fish

[68] Szücs-Csillik *et alii* 2023.

[69] Szücs-Csillik *et alii* 2023.

[70] Szücs-Csillik, Maxim 2017c; Szücs-Csillik, Lazarovici, Maxim 2018, Id. 2019.

[71] It is unlikely that the practical determination of the Galactic North Pole was within the reach of Neolithic observational capabilities.

[72] Szücs-Csillik, Lazarovici Gh., Maxim 2019.

[73] Dumitrescu 1968, Fig. 48, cat. 48; Lazarovici Gh. *et alii* 2002b; Golan, 2003, 124, Fig. 115.2, 118.3; Pohribný, Richards 2007, 242–245; Lazarovici Gh., Lazarovici C.-M., Merlini 2011, 244–247. Cassiopeia is "the throne" in Romanian mytho-astronomy. See Szücs-Csillik 2021a.

behavior along the Mostonga River, marking optimal fishing periods:[74]

1. Spring (March–May): the pictogram of two fish (large and small), accompanied by a cluster of punched dots, signals the spawning season, when large fish move into the shallows. Early fishing would target both adult and juvenile fish.

2. Summer (June–July): the hooked-fish pictogram denotes peak fishing or trapping; nets and fyke-nets are set for abundance.

3. Autumn (August–October with solstice marker): the "stilthouse" symbol (marked "e"), originally noted as a marsh dwelling, is reinterpreted as the *Cepheus* constellation—a "houselike" star group[75]. This signals the end of fishing and the construction of camps for fishing processing in late autumn. Meanwhile, *Cassiopeia*'s equinoctial position heralds the onset of winter.

4. Winter (November–February): the small-boat motif, framed by five bright stars (pictogram "f") arrayed along the *Milky Way*,[76] corresponds to the "W" shape of *Cassiopeia* as seen low on the horizon of the winter solstice. It signals the onset of the cold season and marks the abandonment of fishing camps and the cessation of fishing due to cold, management in preparation for winter, or river-flood ritual activities[77].

This fishing calendar clearly carried a ritual dimension. As Mary Głowacki observed, the flesh of *Spondylus* is toxic between April and September, suggesting that off-season consumption formed part of ceremonial practices[78].

Finally, the *Spondylus* shell was interred over a female skeleton—possibly the first known female astronomer—indicating its role as a portable celestial globe. She could have used it to track the ecliptic, lunar and solar cycles, and planetary motions for both agricultural scheduling and ritual timing[79].

The astronomical identifications on the Mostonga shell place it among Europe's earliest portable star-fishing calendars, uniting a schematic fishing timetable with a seasonal star-clock. Here, seasonal fish behavior is mapped in concert with celestial signals marking the equinoxes and solstices, yielding a dual-system calendar: a schematic fishing timetable overlaid with a seasonal star-clock. When the device used in life by the priestess-astronomer became her funerary good, its engraved constellations may have been intended to guide her on the initial stages of the afterlife journey[80].

Below is a concise quadrantandsector breakdown of the constellations that Gheorghe Lazarovici and team detected on the Mostonga *Spondylus* shell, held so that the two natural perforations lie horizontally:

Constellations detected by Gheorghe Lazarovici and team on the Mostonga *Spondylus* shell

Sector	Location on Shell	Constellation(s)
Upper side	Above the horseshoe ridge	*Ursa Major* family: *Ursa Major* (horseshoe outline), with interior blurs for *Ursa Minor* and *Draco*
Right side	To the right of the perforations	*Hercules* family: pictogramfish → *Hercules*, *Taurus*, *Virgo*
Lower side (underside)	Beneath the thick band	*Perseus* family: clusters for *Perseus*, *Andromeda*, *Pegasus*, and *Auriga*
Left side	To the left of the perforations	Zodiacal constellations: puncheddot cluster = *Leo*, stilthouse = *Cancer* (Praesepe/M44), boat = *Gemini*
Side sector	Lowerleft quadrant	*Orion* constellation (adjacent to the boat motif)
Thick dotted band	Between the two perforations	Spring Milky Way, with *Capella* (Auriga) and *Vega* (Lyra) marking its ends (holes); a 45°inclined line for *Cassiopeia*
Outer rim (above)	Outside the horseshoe curve	*Corona Borealis* (crown motif) and *Boötes*
Seasonal asterisms	Flanking the perforations	Winter Hexagon (e.g. Mirfak, Capella, Betelgeuse, Aldebaran) to the left; Summer Triangle (Altair, Vega, Deneb) to the right

[74] Lazarovici Gh., Lazarovici C.-M. 2019b, 88.

[75] The identification of *Cepheus* with the stilthouse motif is innovative but plausible given its quadrantal position near *Cassiopeia*.

[76] Exemplary are the boats represented among celestial symbols on the megalithic Gobustan sundial Observatory. The site belongs to the Gobustan State Historical-Artistic Reserve (Azerbaijan) and is known for its over 6,000 petroglyphs dating back between 5,000 and 20,000 years. Rustamov, Rustamova 2015.

[77] Lazarovici Gh., Lazarovici C.-M. 2019b, 84.

[78] Glowacki 2005: 257–268; Szücs-Csillik, Lazarovici Gh., Maxim 2019.

[79] Szücs-Csillik, Lazarovici Gh., Maxim 2019.

[80] Karmanski 1977; Séfériadès 2003, 366; Siklósi 2004; Merlini 2009.

Tărtăria: An Astronomical Farmer's Calendar in a Burial to Consecrate a New Ancestor

In 1961, archaeologist Nicolae Lassa discovered three inscribed clay tablets at Tărtăria–*Groapa Luncii* (Transylvania, Romania), along the valley of the Mureş River [81]. Two tablets are rectangular, and one is round, featuring a circular hole near its upper edge for suspension. The artifacts were deposited within a mortuary context radiocarbon-dated to 5370–5140 cal BCE. The burial place intended to consecrate a newly revered ancestor: an elderly, gravely ill, yet powerful woman: "Milady Tărtăria"[82].

After her death and subsequent defleshing, her skeletal remains were disarticulated and interred in a cultic pit representing her ritual grave. This locus functioned as the axis mundi through which Milady Tărtăria continued to influence the living—shaping descendants' memories, prescribing expected social behaviors, and providing supernatural support.

Her remains and associated artifacts constituted a medium of devotion and facilitated communication with spiritual powers via distinctive liturgies performed within this sacralized space[83]. Thus, the burial site forged a tangible link between generations—and possibly between neighboring communities.

Scholars remain divided regarding the inscribed signs. Some emphasize their graphic simplicity in shape and arrangement, arguing that they function as ownership or manufacturer's marks, or as magicreligious emblems employed during rituals[84]. For example, Marco Merlini found very few correspondences between the signs of Tărtăria and those listed in the Danube Script sign inventory. The conclusion was that the signs on the Tărtăria tablets do not belong to the Danube Script[85]. Others propose that the signs belong to an archaic writing technology—an enigmatic protoscript akin to the Vinča symbols. A third group associates the Tărtăria tablets with a more developed, yet undeciphered, logographic system referred to as Old European Writing or the Danube Script. Although similar signs had been documented at late nineteenth and early twentiethcentury excavations in Turdaş, Vinča, and other prehistoric sites, the discovery of the three Tărtăria pieces ignited controversy over whether Neolithic and Copper Age cultures of southeastern Europe achieved a form of literacy predating Near Eastern scripts by one to two millennia[86].

Regardless of the signs' writing status, several researchers have linked their motifs to celestial shapes[87]. Joan Marler (2008) compared the incised signs on the Tărtăria round tablet with those on Turdaş (Transylvania, Romania) spindle whorls—often deliberately placed in ritual pits or around shrines—and identified direct correspondences: spirals, crosses, dot clusters, ladder motifs, and undulating lines[88]. She argued that Transylvanian settlements shared a standardized repertoire of astral signs, constituting the earliest coherent "protoscript" of sacred ideograms grounded in sky observation in Neolithic Europe. In this view, each sign encodes a specific astronomical concept—constellations, lunar phases, or solstices—thereby anchoring an embryonic form of "writing", an "Old European script", in celestial semantics.

Comparative Table of astronomically rooted signs on the Tărtăria round tablet

Symbol	Celestial Referent	ProtoScript Function
Spiral / Hook	*Auriga* (star cluster)	Ideogram for "life-cycle" or cosmic renewal
CrossinCircle	Equinox sunrise/sunset	Logogram for "year" or solar power
Three concentric dots	*Cassiopeia* cluster	Plural marker for "stars" – possibly a numeral sign for "three"
Ladder / Comb	*Gemini* (the Twins)	Ideogram for deogram for "duality" or "pairing"
Wavy line	*Aquarius* (water bearer)	Logogram for "water," "fertility," or "rain"

Marler 2008, 110.

Ritual Notation vs. Functional Writing. Marler contrasted this Transylvanian cosmological notation system with Mesopotamian proto-cuneiform, emphasizing that Vinča-horizon signs primarily encoded cosmological cycles and ritual calendars

[81] Vlassa 1962; Vlassa 1976.

[82] Lazarovici Gh., Merlini 2005, 208–209; Lazarovici Gh., Merlini 2008, 39–51; Merlini 2004, 289; Merlini 2009, 533; Merlini, Lazarovici Gh. 2008.

[83] Merlini 2009, 536.

[84] Garašanin 1960–1961; Garašanin 1973; Tringham, Krstić 1990: 609.

[85] Merlini 2009.

[86] Merlini 2009, 80.

[87] Lazarovici Gh. 2003; Winn, 2008; Lazarovici Gh., Lazarovici C.-M., Merlini 2011; Szücs-Csillik, Lazarovici Gh., Maxim 2019; Szücs-Csillik, Maxim, Lazarovici Gh. 2020.

[88] Marler 2008, 110.

rather than commercial transactions. Over successive centuries, this astral-semantic repertoire of simplified ideograms evolved into discrete, repeatable abstract units—very much like the letter-forms of Bronze Age scripts (e.g., Aegean scripts, Anatolian hieroglyphs, early Greek signs)—underscoring a significant Danubian contribution to the origins of writing[89].

According to David W. Anthony and Jennifer Chi (2009), the most striking feature of the Tărtăria round tablet is its central cross, which divides the disc into four nearly equal quadrants and aligns it with known Neolithic equinox and solstice architectures—enclosures, longhouses, shrines, and hengelike pits[90]. This "cross" therefore functions as a portable horizon dial: each quadrant represents one quarter of the solar year, echoing fixed installations such as the Goseck Circle (c. 4900 BCE) and timberditch enclosures in the Carpathian Basin. The vertical arm aligns roughly north–south, marking the path of the Sun at the winter and summer solstices, while the horizontal arm aligns approximately east–west, corresponding to sunrise and sunset points at the vernal and autumnal equinoxes.

In conclusion, Anthony and Chi argued that the quadrants represent seasonal "houses" and served as a portable horizon dial, enabling Neolithic users to track the solar year's four quarters in a compact, mobile form. They do not, however, assign specific constellations or lunartally functions to the tablet's symbols.

Marco Merlini (2008, 2009) interpreted the central cross on the round tablet as a cosmic or solar ideogram—a sacred cosmogram of the *axis mundi* common in Danubian ritual art—linking it to Neolithic calendar logic without asserting precise solstitial alignments. He further identified the spiralhook glyph as the Vinča "lifespiral," emblematic of regeneration and cosmic continuity[91].

In a subsequent reinterpretation (2011), Merlini proposed that the round tablet functioned as a menstruallunar calendar: ten crossarms mark days 7–16 of the menstrual cycle, with an emphasized arm at day 8 signifying ovulation. The crosssegment's orientation points to the Full Moon—considered the pinnacle of fertility—while other phases denote menstruation (Black Moon) and waxing/waning intervals. Thus, the tablet is a "qualitymark" device, indicating the Full Moon as the optimal window for conception. Its glyphs operate as esoteric signs for initiates, promising divine lunar lineage and heroic status to those conceived under the Full Moon[92].

András Záhonyi (2011) introduced the concept of the Tărtăria round tablet as a "star clock," reconstructing a bifurcated celestial map reflecting constellations visible around 5500 BCE. He positioned *Auriga* and *Serpens*/*Sagitta* in the upper half—marking spring–summer skies—and *Gemini* plus *Sagittarius* in the lower half—denoting autumn–winter skies—without imposing a strict fourquadrant schema. Although Záhonyi did not include *Cassiopeia* or *Perseus* for the northwest quadrant, nor *Aquarius* for the southeast, those constellations appear in his analyses of other Vinča artifacts (e.g., the Mostonga shell) [93].

By 2021, Záhonyi argued the tablet embodies a double script: constellationforms—pictorial outlines of celestial figures—and Sumerianlanguage labels—pictograms naming those figures[94]. He identified a continuous, eclipticfollowing sequence from *Auriga* through *Sagittarius* around the tablet's rim, describing the upperleft through lowerleft quadrants as parts of one continuous belt rather than four or six isolated seasonal "houses":

• UpperLeft (UL): *Auriga* and *Gemini*, with a small "V" sign for *Aries* hidden between them.

• UpperRight (UR): A long curve for *Hydra*, under which nest *Corvus*, *Crater*, *Sextans* and *Cancer*.

• LowerRight (LR): *Libra*, *Lupus* (or *Centaurus*), *Serpens* (and *Ophiuchus*), with a ligature interpreted as the Sumerian sign PA.BIL = *Sagittarius*.

• LowerLeft (LL): An Arrowhead motif for *Sagittarius*, reinforced by its Sumerian names PA (L.295) and PA.BIL (L.172).

Indirectly, *Leo* and *Virgo* appear via adjacent forms.

The tablet's central hole and cross, Záhonyi posited, serve dually as a sighting device—allowing sky observation through the hole—and a grid reference, aligning the map to the celestial equator and meridian when properly oriented.

He further contends that, at the vernal equinox around 5000–4500 BCE, this constellation ecliptic band—from *Auriga* to *Sagittarius*—would be simultaneously visible just after sunset. Thus, the tablet records its manufacture date: a skyconfiguration marker for the late sixth millennium BCE.

Beyond pictorial outlines of the signs, he argued that many of them functioned as Sumerian

89 Marler 2008, 115–118.
90 Anthony, Chi 2009, 143–149.
91 Merlini 2008; Id. 2009.
92 Lazarovici Gh., Lazarovici C.-M., Merlini 2011, 320ff.
93 Záhonyi 2011.
94 Záhonyi 2021.

ideograms denoting the same constellations (e.g., *PA/PA.BIL* for *Sagittarius* in the lower-left quadrant), implying cultural exchange between Transylvanian Middle Neolithic communities and Mesopotamia.

In conclusion, aligning form (constellation outlines) and meaning (Sumerian names), Záhonyi argued that the Tărtăria round tablet embodies a double script: a visual star map plus a linguistic label set, together forming one of Europe's earliest astral-based proto-scripts.

Iharka SzücsCsillik, Gheorghe Lazarovici, and Zoia Maxim interpreted the tablet's circular form and the dividing cross lines on it as evoking the motion of a wheel—a solar chariot symbol. The round disc bisected by a cross represents the solar disc *pars in toto*, deriving from prehistoric Sun Wheel iconography. In the Neolithic, the Sun was worshipped as a supreme, lifegiving force. Deploying the Sun Wheel motif invoked cosmic powers to bless the Earth with fertility, abundance, and prosperity[95].

The engraved cross also encodes the solar calendar, the Sun Wheel of the Year: each of the four quadrants denotes one season—spring, summer, autumn, winter. The horizontal axis may distinguish north–south, upper and lower worlds or the sky–earth division, while the vertical axis evokes double concept-direction such as east–west or left-right[96]. The equalarmed cross within a circle was a ubiquitous prehistoric symbol[97]. It functions on the tablet as the Wheel of the Year or Wheel of Life, signifying the four elements and the cyclical nature of existence[98].

Fig. 5. Some tablets of the Danube Civilization showing the four astral directions and seasons. (After Lazarovici Gh., Lazarovici C.-M. 2024).

The research team compared the astral symbols on the Tărtăria round tablet with those on the *Spondylus* shell from Mostonga (Serbia). They identified three shared motifs representing constellations: a "house" for *Cancer*, a "boat" for *Gemini*, and a symbol for *Canis Minor*. Around 6000 BCE, these constellations bordered the vernal equinox, marking spring's onset as the Sun crossed northward over the celestial equator[99]. This observation led the team to an interpretation of the signs engraved on the Tărtăria round tablet centered on the vernal point[100].

Additionally, both tablet and shell bear sign clusters corresponding to *Capricornus* and *Scorpius*. Circa 5500 BCE, these constellations laid near the autumnal equinox, when the Sun crossed southward[101]. To summarize, Gheorghe Lazarovici and team argued that the Tărtăria tablet was calibrated to equinoctial points: in the Middle Neolithic, the vernal equinox occurred in the *Gemini–Cancer* sector (the boat and house symbols), whereas the autumnal equinox was in the *Sagittarius–Scorpius–Capricornus–Aquarius* sector (the arrowhook and loopladder motifs)[102].

Fig. 6. Stars' patterns of Gemini, Cancer and Canis Minor constellations compared to three symbols on the Tărtăria round tablet and three symbols on the Mostonga Spondylus *shell. (After Szücs-Csillik, Maxim, Lazarovici Gh. 2019a, 603, Fig. 4.a).*

When suspended as a pendant, the hole at the tablet's apex would have served both as a fixed

95 Szücs-Csillik 2021a.
96 Maxim, Szücs-Csillik 2010; Szücs-Csillik, Comșa, Maxim 2016; Szücs-Csillik, Maxim, Lazarovici Gh. 2019a; Szücs-Csillik, Maxim, Lazarovici Gh. 2019b.
97 Szücs-Csillik 2021a.
98 Drößler 1976.
99 Szücs-Csillik, Maxim, Lazarovici Gh. 2019a, 604.
100 Szücs-Csillik, Lazarovici Gh., Maxim 2018; Szücs-Csillik, Lazarovici Gh., Maxim 2019; Szücs-Csillik 2021a, Fig. 4; Szücs-Csillik 2021b.
101 Szücs-Csillik, Maxim, Lazarovici Gh. 2020.
102 Szücs-Csillik, Maxim, Lazarovici Gh. 2020, 437–453; Szücs-Csillik 2021b.

vertical axis—akin to an amulet's suspension point—and as an orientation guide: positioning the hole at true north enabled correct reading or display of the signs. Since the suspension hole was not decorative but functional, it anchors the original intended orientation reflecting the tablet's authentic sky-model structure.

Fig. 7. Comparison between the signs on the Tărtăria round tablet (on the left) and constellation patterns (on the right). (After Szücs-Csillik 2021a, Figure 4:a).

Close inspection of the Tărtăria tablet's upper-right quadrant revealed the "boat" symbol of *Gemini*, significant because around the summer solstice—celebrated as the longest day—the Sun appeared to dwell in this constellation[103]. Neolithic observers perceived the Sun as pausing ("standing still") for several days before reversing its path. The Sun stood in the *Gemini* constellation, which shape with bright stars was imagined as a celestial boat, an event mythologized as the Sun traversing the sky in a celestial boat. This motif resonates with the role of the Danube River and is tributaries as vital waterways in the Danube Civilization: boats were the principal means of travel and trade, elevating the solar boat to a powerful cosmological symbol[104].

Beneath the boat motif, four small circles have been interpreted as the stars Castor, θ Gem, ε Gem, and μ Gem. These stars are multiple systems whose variable brightness and binary nature may have reinforced their symbolic potency for Neolithic skywatchers.

A related Late Neolithic depiction appears on the bottom of an amphora from Zbradila (Serbia), where a linear logboat with tapering prow and stern carries the Sun. Parallel grooves define the hull, while an ithyphallic figure—likely a solar deity—stirs the surrounding waves, depicted as a whirlpool or perpetual current propelling the solar boat[105]. This iconography evokes a cosmology of sunrise and sunset traversing primordial waters[106].

Christian Schuster situated this motif within the Lower Danube tradition, where Neolithic pottery and portable art depict watercraft as metaphors for cosmic journeys, underscoring the interdependence of solar-mythic belief systems and practical riverine mobility[107]. The symbolism incised on an invisible place, as the bottom of the amphora, may have served not only religious but also apotropaic functions, protecting both cargo and crew during Danubian transport. The combination of solarboat imagery and water symbols (e.g., whirlpools) suggests the mirroring of the perpetual flow of river life and that of the cosmic cycle[108].

Olaf Höckmann's analysis of Early Thracian rock engravings at Razlog (Bulgaria) revealed similar stylized boats aligned with solar motifs, thereby reaffirming a continuous Danubian representational vocabulary—both in content and style—from the Neolithic through the Bronze Age, wherein watercraft iconography embodies solar and astral concepts[109].

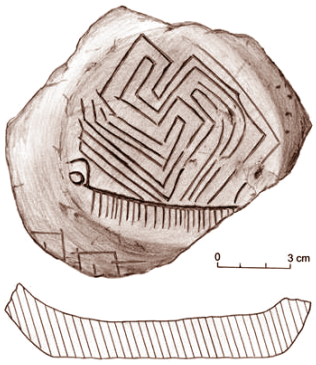

Fig. 8. Complex symbolism on the underside of a Neolithic vessel from Zbradila (Serbia), evoking the Sun's daily journey across primordial waters. (After Merlini 2009, 315, Fig. 5.281).

Oriented by its suspension hole—aligned to true north—the Tărtăria tablet's quadrants correspond to specific constellations detected by Iharka Szücs-Csillik, Gheorghe Lazarovici, and Zoia Maxim:

Upper Right: This quadrant is occupied by *Gemini* with four punched circles = Castor, θ Gem, ϵ Gem, μ Gem (variable stars).

103 Szücs-Csillik 2021a.
104 Szücs-Csillik 2021a.
105 Höckmann 1998; Sarić 2003, 187–192, Fig. 2b.
106 Merlini 2009, 315.
107 Schuster 2003; Schmidt 2012, 118–123.
108 Merlini 2009, 315.
109 Höckmann 1998; Dimitriadis 2006.

Upper Left: Engraved motifs represent *Aquarius* and *Capricornus*.

Lower Left: The symbols for *Sagittarius* and *Scorpius* occupy this quadrant. This ecliptic constellation was visible in the summer night sky, reaching its highest culmination in August[110]. Around the autumnal equinox—when the Sun crosses the celestial equator southward—*Sagittarius* appeared low on the southern horizon at Transylvanian latitudes,[111] its faint, complex stars challenging to discern[112].

Scorpius, lying near the *Milky Way*'s center, was optimally visible in summer. Its heliacal rising—marked by the red supergiant Antares (α Scorpii)—possibly heralded the rainy season and the ploughing period as in Mesopotamian agrarian calendars[113].

The juxtaposition of *Sagittarius* and *Scorpius* on the Tărtăria round tablet thus signals a transitional equinoctial or solstitial interval[114].

Lower Right: The 'house' pictogram denotes *Cancer*, while an adjacent mark corresponds to *Canis Minor*, completing the tablet's celestial schema.

Quadrantbyquadrant starmap for the Tărtăria round tablet

Quadrant	Position	Constellation(s)
I. TopRight	NE	*Gemini* with four punched circles = Castor, θ Gem, ϵ Gem, μ Gem (variable stars)
II. TopLeft	NW	*Aquarius* & *Capricornus* (Seasonal markers for midsummer rites)
III. BottomLeft	SW	*Sagittarius* & *Scorpius* (Signals late summer/autumn transition)
IV. Bott.Right	SE	*Cancer* & *Canis Minor* (Marks spring equinox/early planting season)

Szücs-Csillik 2021a, Fig. 4, 123.

In conclusion, the Tărtăria round tablet records clear markers of the equinoxes, identifying star groups associated with these pivotal celestial points, indicating use as a seasonal calendar: around the vernal equinox, *Gemini* (Boat), *Cancer* (House), and *Canis Minor*; around the autumnal equinox, *Aquarius* (Ladder), *Capricornus* (Hook), *Sagittarius* (Arrow), and *Scorpius* (Noose)[115].

In the Middle Neolithic farming community of Tărtăria, priest/priestess astronomers observed that the vernal equinox laid between *Gemini* and *Cancer*, and the autumnal equinox between *Capricornus* and *Aquarius*[116]. They inscribed this information on the round tablet, effectively marking the shifting equinoctial points in the cycle of precession[117]. According to Gheorghe Lazarovici and team, this artifact constitutes the earliest evidence of equinoctial precession recognition by a Neolithic culture, demonstrated by the gradual drift of equinoctial points from one constellation to another[118]. This celestial motion awareness implies sophisticated sky-watching tradition.

Beyond daily rotation and annual solar revolution, precession became the third celestial cycle detected by DanubeCivilization priest/priestess astronomers, as the equinoxes and solstices slowly shifted through the constellations over generations[119].

The central cross and suspension hole functioned as an orientable horizon dial, enabling tracking of solstices and equinoxes in a mobile format.

Concerning astral semantics, standardized celestial ideograms (spirals, crosses, ladders, boats, houses) encode constellations and lunar phases, reflecting a proto-script grounded in cosmological observation.

Multiple interpretations (Sun Wheel, menstruallunar calendar, star clock) demonstrate integrated solarlunar calendrical systems adapted to ritual and agricultural need.

Consistency with other Vinčahorizon artifacts (Mostonga shell, Zbradila amphora, etc.) situates

110 Szücs-Csillik *et alii* 2023, 42.

111 Szücs-Csillik, Maxim, Lazarovici Gh. 2020.

112 Szücs-Csillik, Maxim 2021a.

113 Pizzimenti, Polcaro 2021; Szücs-Csillik, Maxim 2021a.

114 Szücs-Csillik, Maxim 2021a.

115 Szücs-Csillik 2021a; Szücs-Csillik, Maxim, Lazarovici Gh. 2020.

116 Szücs-Csillik, Maxim, Lazarovici Gh. 2019a; Szücs-Csillik, Maxim, Lazarovici Gh. 2020. In 2021, Gheorghe Lazarovici and team had instead established that the autumnal equinox was between *Capricornus-Aquarius* and *Sagittarius-Scorpius* stars patterns. See Szücs-Csillik 2021b.

117 Szücs-Csillik 2021a.

118 Szücs-Csillik *et alii* 2023.

119 Due to the Earth's precession, the equinoxes shift westward along the ecliptic at a rate of approximately 50.4 arcseconds per year. This gradual movement causes both the vernal and autumnal equinox points to transition into different constellations over time—typically after about 2,000 years—though the exact duration depends on the angular extent of each constellation along the ecliptic. For instance, the vernal equinox point was located within the constellation *Gemini* between roughly 6500 and 4500 years ago, and subsequently within *Taurus* from around 4500 to 2200 years ago. See Szücs-Csillik, Lazarovici Gh. 2023a.

the tablet within a broader regional cosmological tradition: a celestial iconography within the Danube Communication System.

The Black Disc of Turdaş: An Agrarian Celestial Cult Yearbook

An emblematic Neolithic perforated and inscribed black disc was unearthed from the large Late Neolithic settlement of Turdaş, along the Mureş River (Hunedoara County, Romania), and dated to 5000–4800 cal BCE[120]. One side of the artifact is convex and the other flat[121]. It was discovered in the late nineteenth century by Zsófia von Torma—Hungarian archaeologist, anthropologist, and paleontologist—who identified it as evidence of a "Turdaş script"[122].

This doughnutshaped stone bears engravings on both faces and along its rim (wavy lines)[123]. The recorded number and form of its signs have an extraordinary history, because they have been varied with successive interpretative frameworks—reflecting the mutable understanding of their nature and meaning. The dynamic potency of the signs on the Turdaş disc is all the more striking given that this is not a small, time-worn potsherd, but a well-preserved artifact measuring 9.4 centimeters in diameter with sharply defined incisions[124].

Márton Roska (1941) first published the disc, cataloguing twelve signs on only one side and treating them as decorative elements[125]. Later, Nicolae Vlassa reinterpreted the engravings as "short ideographic notations" constituting a primitive writing system. He then reworked their outlines in line with this concept, emphasizing their morphological correspondences with the Jemdet Nasr "Blue Tablet" of Mesopotamia[126].

The circular arrangement of signs around the perforated axis led Marco Merlini (2009, 2011) to propose a sequential constellation map—an incised zodiac filled with white pigment to simulate groups of stars against a nocturnal sky. He noted relevant correspondences between the disc's motifs and his Danube Script inventory, suggesting that astral symbols may have influenced early script development[127]. As Merlini wryly observed, "Perhaps future critics will accuse me to interpreted the signs on the black artifact as representations of constellation because I succumbed to the astro-fashion dominating contemporary archaeology"[128].

Investigating astronomical roots of the signs on the disc, Iharka SzücsCsillik, Gheorghe Lazarovici, and Zoia Maxim identified equinoctial markers. The conical, convex (top view) face displays star clusters associated with the autumnal equinox, while the flat side (bottom view) records patterns for the vernal equinox[129].

Conical Face (Autumn Equinox): Surrounding the central suspension hole—interpreted as the autumnal equinox point ("viewless Sagittarius")—engraved shapes correspond to *Aquila*, *Capricornus*, the IndianPeacock (possibly *Pavo*), *Ara*, *Lupus*, *Scorpius*, and *Ophiuchus-Serpens*[130]. Some bright stars from *Aquarius*, *Microscope*, *Scutum*, *Sagittarius*, *Delphinus* constellations could be present in addition[131].

The occurrence of *Scorpius*, *Ophiuchus*, and *Capricornus* sign shapes prompted Gheorghe Lazarovici and team to recognize the artifact's astronomical function. Neolithic observers at Turdaş noted that, at the autumnal equinox, sunrise occurred in *Sagittarius*, while the stars of *Gemini* (Castor and Pollux) shone prominently in the autumn night sky. Thus, on that equinox the Sun culminated at midday within *Sagittarius* and at midnight within *Gemini* high in the southern sky. Conversely, at the vernal equinox the Sun reached its zenith in *Gemini* by day and in *Sagittarius* by night[132]. It is noteworthy that both *Sagittarius* and *Gemini* lie along the *Milky Way*.

Flat Face (Spring Equinox): Around the central perforation—interpreted as the vernal equinox marker (*Gemini*)—the disc bears engraved signs corresponding to clusters from *Orion*, *Auriga*, *Taurus*, *Perseus*, *Ursa Major*, *Leo*, *Cancer*, *Canis Major*, *Canis Minor*, and *Hydra*[133]. Bright star motifs likely represent Aldebaran, the *Pleiades* and *Hyades* clusters in *Taurus*, as well as *Sirius* in *Canis Major*. These patterns underline the prominence of winter–spring constellations visible at midnight during the vernal equinox period[134].

120 Merlini 2009, 566.
121 Szücs-Csillik 2021a.
122 Torma 1879; Torma 1882, 27–28; Makkay 1969, 9–49; Makkay 1990; Merlini 2004; Merlini 2025.
123 Szücs-Csillik, Maxim, Lazarovici Gh. 2020.
124 Merlini 2009, 382.
125 Roska 1941.
126 Vlassa 1971, 43–44, Fig. 5; Vlassa 1976, 180.
127 Merlini 2009, 384; Lazarovici Gh., Lazarovici C.-M., Merlini 2011.
128 Merlini 2009, 384.
129 Szücs-Csillik, Lazarovici Gh., Maxim 2024b.
130 Szücs-Csillik 2021a; Szücs-Csillik, Maxim 2014.
131 Szücs-Csillik 2021a; Szücs-Csillik, Maxim, Lazarovici Gh. 2020; Szücs-Csillik *et alii* 2023, 34.
132 Szücs-Csillik 2021a; Szücs-Csillik, Maxim, Lazarovici Gh. 2020; Szücs-Csillik, Lazarovici Gh., Maxim 2024b.
133 Szücs-Csillik 2021a; Szücs-Csillik *et alii* 2023, 34.
134 Szücs-Csillik, Maxim 2014, 234.

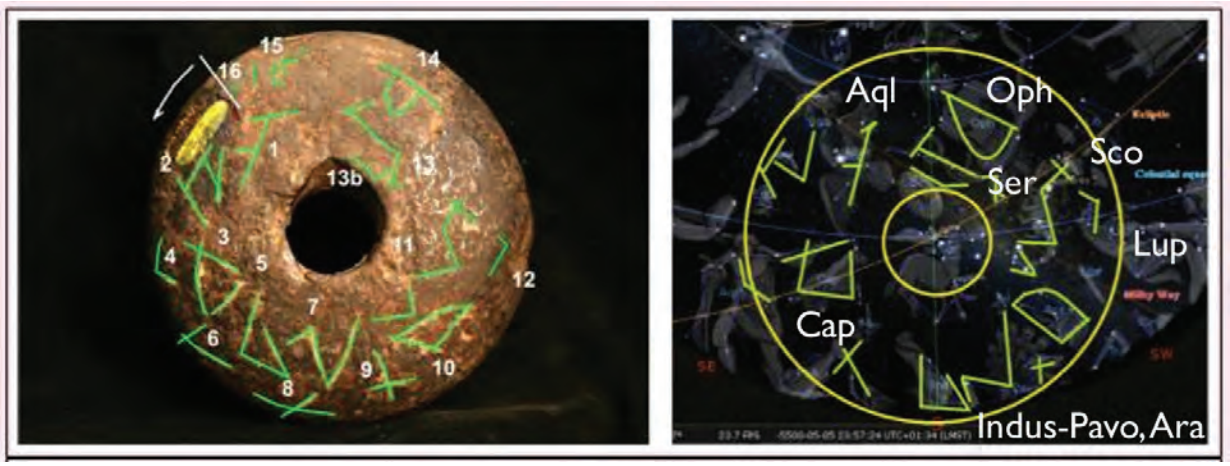

Fig. 9. The signs on the Turdaș ritual black disc (top view), on the left. Stars patterns around the autumnal equinox, on the right. (After Szücs-Csillik, Lazarovici, Maxim 2024a).

All detected celestial shapes correspond to Neolithic agrarian constellations[135].

Between the disc's faces runs a wavy line, possibly symbolizing the cyclic boundary between day and night at the equinoxes, the transition from spring to summer or autumn to winter, and even the Earth's axial wobble[136]. This precession wobble, caused by the Sun's and Moon's gravitational torques on the spinning Earth (much like a top leaning as it spins), completes a cycle of approximately 26 000 years. Remarkably, the disc's form and engravings may simulate this ancient awareness of Earth's slow celestial motion.

The central perforation on each face—marking *Gemini* on the flat side and *Sagittarius* on the convex side—denotes the beginning of the vernal and autumnal seasons, respectively[137]. As for the Tărtăria round tablet, this hole may also have functioned as an observational aperture, akin to a primitive sighting tube, enabling focused viewing of specific sky regions or individual stars[138].

The Neolithic community of Turdaș accorded great significance to the disc's form and engraved symbols. Its large, noncylindrical perforation on a doughnut shape—one convex face and one flat face—suggest intentional design: the axis may symbolize the *axis mundi*, connecting the mythical world center to the celestial pole (zenith), while the disc represents the celestial equator.[139] Crafted from sandstone and coated with a thick black slip,

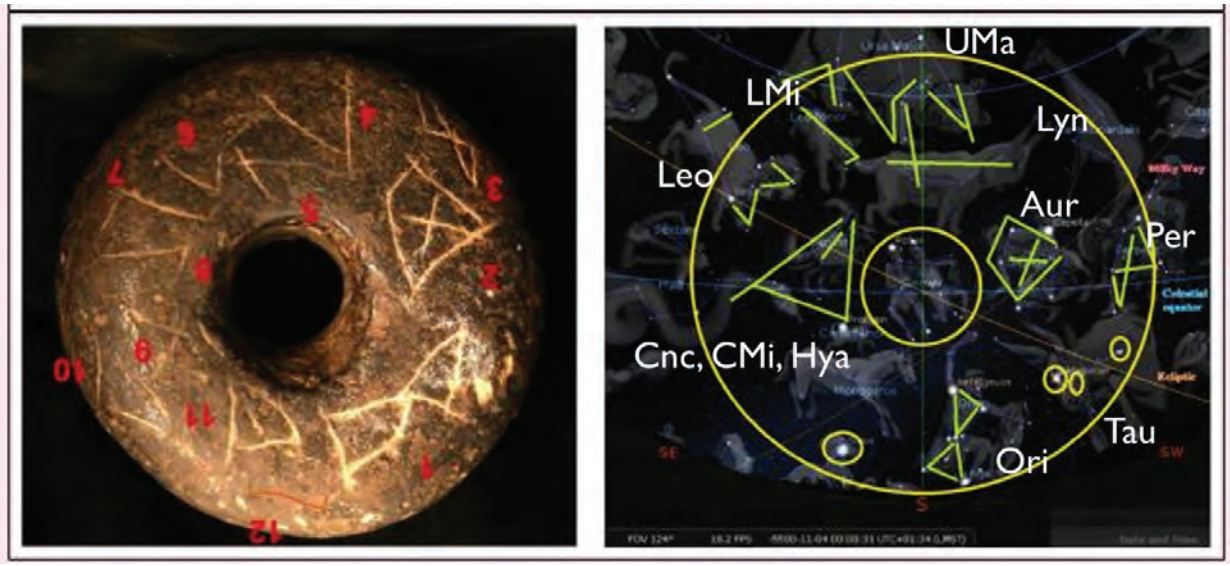

Fig. 10. The signs on the Turdaș ritual black disc (bottom view), on the left. Stars patterns around the spring equinox, on the right. (After Szücs-Csillik 2021a, Fig. 6).

[135] Szücs-Csillik, Maxim 2014, 234.
[136] Szücs-Csillik, Maxim, Lazarovici Gh. 2020; Szücs-Csillik 2021a; Szücs-Csillik *et alii* 2023, 34.
[137] Szücs-Csillik, Maxim, Lazarovici Gh. 2020, 448.
[138] Szücs-Csillik *et alii* 2023, 34.
[139] Rappenglück 2007; Comșa, Szücs-Csillik 2018.

the artifact's astral signs were protected beneath a layer of natural shellac, underscoring their ritual importance[140].

Gheorghe Lazarovici and team concluded that the disc functioned as a cultic celestial instrument, its constellation outlines encoding a pattern of the spring and autumn night sky[141]. They proposed that, during magicreligious ceremonies, a priestpriestess astronomer would rotate the disc and observe which engraved sign fell into the axis's shadow—thus indicating where to look in the sky. Such orientational practice could answer practical questions: for instance, the shadow passing through the *Capricornus* motif might signal forthcoming rains when the Sun, Moon, or a particular planet entered that constellation[142].

In conclusion, the black disc of Turdaş appears to integrate multiple layers of symbolic, functional, observational, ritual, and astronomical dimensions.

It served as a cosmogram representing the world axis (*axis mundi*) and celestial equator. This identification is supported by comparative cosmologies in Neolithic and later traditions (e.g., Mesopotamian, Vedic, and early Indo-European cosmograms). The dual face (flat/convex) symbolism is well within known symbolic systems of duality.

The disc encodes seasonal constellations, especially those appearing in the night sky at the vernal and autumnal equinoxes: *Sagittarius* and *Gemini*. The identification of specific signs with modern constellations by the Lazarovici's team (e.g., *Lupus*, *Ara*, *Hydra*) is speculative, based on stylistic and positional analysis. However, it is well within the bounds of archaeo-astronomical hypothesis.

The suggestion that the wavy line represents cyclical change (day/night, seasons, etc.) aligns with symbolic interpretations from other prehistoric iconographies. Its relation with a rudimentary awareness of axial precession in the Neolithic is unprovable, but plausibly intuitive over long generational observation of celestial shifts.

The idea that the central perforation likely functioned both as a symbolic pivot (marking seasonal balance) and as a practical viewing aperture (pinhole or viewing tube) is supported by analogues in prehistoric solar markers (e.g., Irish passage tombs, Nabta Playa). Even if precise alignment wasn't possible, the symbolic or observational value holds.

The use of the black disc in ritual by priest-priestess astronomers suggests it was a divinatory tool to forecast weather or seasons, guiding agricultural or calendrical decisions.

The disc of Turdaş may function as a liturgical yearbook, encoding seasonal astronomical knowledge within a portable cult object, blending empirical sky-watching with mythic cosmology. It is both a calendar and a proto astronomical chart. Its classification as a physical calendrical object is consistent with the interpretative function of other Neolithic "zodiacal" artifacts (e.g., Nebra Sky Disc, Goseck circle), albeit with different cultural contexts.

Astral Sacred Symbols on Spindle-whorls from Slatino

A spindlewhorl from an Early Copper Age settlement near Slatino (Bulgaria) exhibits incised signs encircling both its upper and lower halves[143]. Biconical in form, the artifact measures 4 cm in diameter and 2.8 cm in height, and belongs to the GradešnicaSlatino I–III culture of the fifth millennium BCE. Dubbed the "Celestial Globe" of Slatino, its rounded shape evokes the sky dome and suggests an astronomical function according to the knowledge at that time:[144] one of the earliest known depictions of constellations on a spindle-whorl, symbolically linked to the spinning sky and the world axis[145].

Vesselina Koleva, Dimiter A. Kolev, and Stefan Chohadzhiev identified two prominent signs on the whorl's upper cone, alongside a central polestar motif: part of *Ursa Major* (A–1), *Cygnus-Cepheus* (A–2), Polar star (A–3) at the center[146].

A–1 (*Ursa Major*): A trapezoid with a curvilinear appendage resembles the *Big Dipper* (Plough or Wagon), part of the *Ursa Major* asterism.

A–2 (*CygnusCepheus*): A doubleaxe form—ancient symbol of the Great Mother interpreted variously as birds, butterflies, bees, or anthropomorphic beings—depicts the Northern Cross of *Cygnus* and the lower region of *Cepheus*. *Cygnus*, straddling the Milky Way, was widely recognized by its distinctive asterism of the Northern Cross, with its brightest star, Deneb, marking the

[140] Merlini 2009, 384.

[141] Szücs-Csillik, Maxim, Lazarovici Gh. 2020; Szücs-Csillik 2021a.

[142] Szücs-Csillik, Maxim, Lazarovici Gh. 2020.

[143] The artifact is held at the Historisches Museum of Kjustendl. Inventory number: A I 0F–912.

[144] Echt 2004, 70, Fig. 52; Chohadzhiev 2006, 71; Merlini 2009, 292.

[145] Koleva, Kolev, Chohadzhiev 2002, 211; Rappenglück 2007, 164; Rappenglück 2016.

[146] Chohadzhiev 1989, 75; Koleva, Kolev, Chohadzhiev 1993.

cross's apex. In Neolithic belief, *Cygnus*, like *Lyra*, served as a celestial psychopomp, guiding souls in the guise of vulture. Early iconographic parallels can be found in Çatal Hüyük wall paintings, where vulture or labrys accompany taurine figures. Elsewhere, a double motif combining a butterfly and the *Cassiopeia* constellation adorns a Southern Italian statuette (Passo di Corvo, Foggia) dated ca. 5500 BCE[147]. Butterfly-shaped star symbols occur in 5th millennium BCE rock art at Valcamonica (Foppe di Nadro, Rock n. 27),[148] the so-called Late Neolithic 'butterfly idol'[149].

Ursa Major and *Cygnus* would indeed have been prominent in the northern sky of the fifth millennium BCE, with the Big Dipper and Northern Cross easily recognizable.

At the center, a single point marks the celestial pole. From ca. 3942 to 1793 BCE, the North Pole was aligned with *Thuban* (α Draconis), in the Constellation of *Draco*, fitting the spindle's temporal context. *Thuban* was venerated by these Copper Age communities as the fixed pivot about which the heavens appeared to rotate[150].

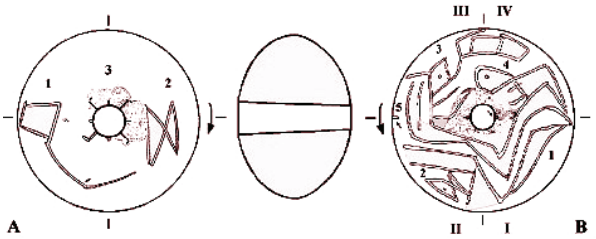

Fig. 11. The polar star Thuban (α Draconis) and a number of constellation shapes are aligned on the faces of an Early Copper Age spindle whorl from Slatino (Bulgaria). (After Merlini 2009, 293, Fig. 5.245).

On the whorl's reverse, Koleva et al. divide the surface into four sequential sections, each bearing engraved star groups:[151]

Section I: *Pisces* (B–1)is rendered as paired curving figures.

Section II: *Taurus* (B–2) appears as a schematic bull's head with curved horns and eyes. This ecliptic constellation, likely among the oldest known from prehistory, was prominently visible in the winter night sky. Gheorghe Lazarovici and team referred to it as the "Sky Bull," symbolizing the Sun as the first of the creatures and the leader of the Zodiac year[152].

Section III: A composite figure merges *Leo* (B–3) with an ornitoanthropomorphic assemblage of *Gemini*, *Cepheus*, *Cygnus*, *Lyra*, *Aquila*, and *Sagittarius* (B–5), recalling the Babylonian gryphon motif.

Section IV: *Scorpius* (B–4) is depicted as a dragonlike form which seats on its tail and has a large head, its eyes possibly indicted by the red star Antares; the authors call it the "Sky Dragon." Gheorghe Lazarovici and team referred to it as the "Sky Dragon"[153].

The equinoctial constellations (*Pisces*, *Taurus*, *Leo*, *Scorpius*) align with known seasonal sky positions around 4500 BCE, given precessional shift.

Iharka Szücs Csillik mapped the Slatino spindle whorl motifs onto a c. 4500 BCE star chart. From top to bottom, she identified the following constellations corresponding to high-latitude visibility from the Danube region:

1. *Lyra* (with the fifth-brightest star in the night sky, Vega), positioned true north, high in the sky is indicated by the brown arrow.

2. *Coma Berenices,* depicted on the spindle as a loose point cluster without a clear "handle" or tail, is identified by the pale green arrow a little to *Lyra*'s lower left, just below *Ursa Major.*

3. *Leo* is indicated by the red arrow on the ecliptic a bit to *Virgo*'s right, above the southern horizon at equinox

4. *Gemini* indicated by the purple arrow, rises in the southeast with its two bright stars (Castor & Pollux).

Additionally, two shapes remain unassigned: *Virgo*, positioned below *Coma Berenices* toward the ecliptic, just east of *Leo*, and *Auriga*, the charioteer's pentagon with its bright star Capella, above *Gemini*, to the northeast.

Iharka SzücsCsillik, Gheorghe Lazarovici, and Zoia Maxim noted parallels between Slatino whorls and the Turdaş black disc. Shared motifs—spirals, crosses, ladders, boats, and animal forms—functioned within magicreligious rituals across the Danube Civilization[154].

In conclusion, the Slatino spindlewhorl exemplifies a portable cultic instrument integrating celestial observation with symbolic notation. Its biconical form and engraved asterisms reflect an advanced Neolithic cosmology, where skywatchers encoded seasonal and stellar phenomena into

147 Gimbutas 1991, 23, Fig. 36; Merlini 2009, 293.
148 Anati 1982, Fig. 7.
149 Sansoni 2014.
150 Chohadzhiev 1989, 75; Koleva, Kolev, Chohadzhiev 1993.
151 Koleva, Kolev, Chokhadzhiev 1993.
152 Szücs-Csillik *et alii* 2023, 38.
153 Szücs-Csillik *et alii* 2023, 38.
154 Szücs-Csillik 2021a.

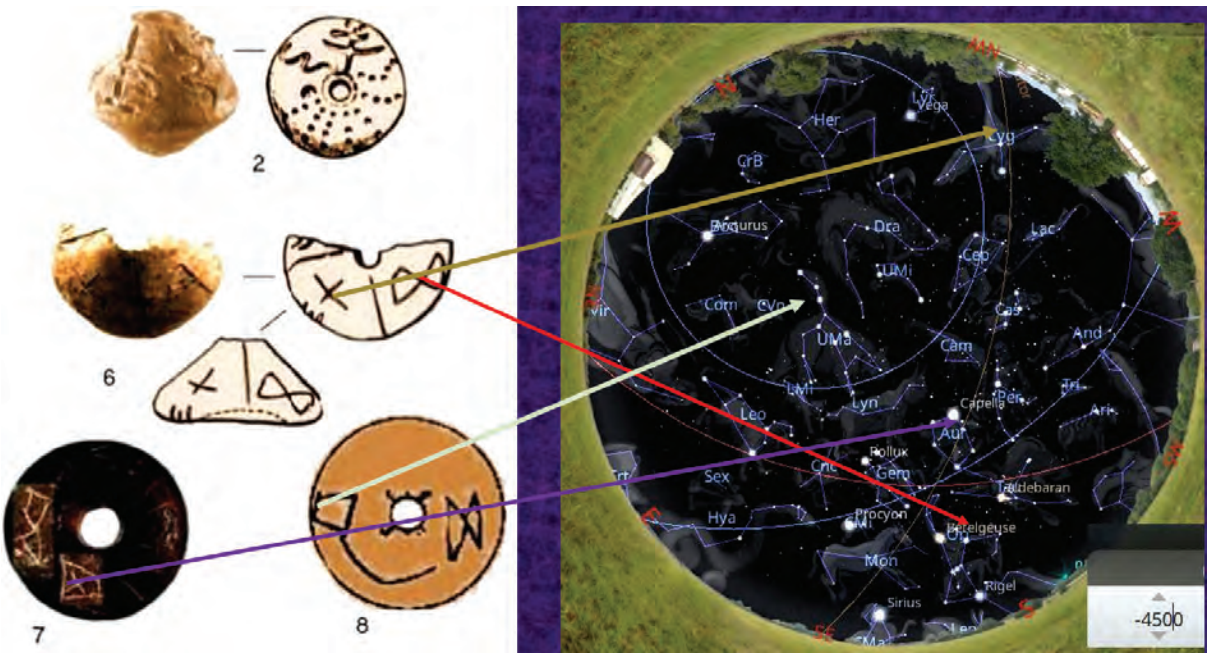

Fig. 12. Constellation patterns on spindle whorls from Slatino (Bulgaria) aligned with a c. 4500 BCE star chart. (After Szücs-Csillik 2021a).

everyday ritual objects. This whorl is not unique: several other Early Copper Age spindlewhorls from the same Slatino context display similar astral motifs, indicating a widespread ritualastronomical tradition within the community.

The Lozna potshard: An Astral Calendar with Celestial Symbols

An amphora fragment from Tărtăria de la Lozna (Botoşani County, northern Romania), belonging to the Cucuteni AB/B phase (ca. 4000–3700 cal BCE),[155] bears incised astral signs that suggest its use as a ritual calendar[156]. Although large portions of the vessel and its imagery are lost, remaining motifs permit a provisional reconstruction of an autumnal celestial message[157].

Gheorghe Lazarovici and Magda Lazarovici identified two principal markings (1 and 2) arranged in sequence to encode the migration narrative of September:

Mark 1 (reversed peacock): A pair of stars and a stylized bird figure (the "regal bird") represent avian migration.

Mark 2 (W-shaped): The constellation *Cassiopeia*, which circa 4000 BCE appeared at approximately 45° inclination on both dawn and dusk horizons during the autumnal equinox, signaling the departure of migratory birds.

The encoded autumnal message tells about the fact that, in September, the tilting of the constellation *Cassiopeia* by 45° at sunrise/sunset signals the time of migration (departure) of birds[158].

Linked by an intervening anthropomorphic archer (14–15) and a traversing arrow (10), these signs form a dynamic tableau in cartoon cognitive style: a human figure (15) wields a bow (14) and releases a long, thin, sharp arrow (10) skyward toward *Cassiopeia* (Wsign, 2) that symbolizes the Heaven. The arrow's flight is framed by the reversed peacock motif (1). Nearby, a solar disk (16) and paired star signs denote the Sun's path along the ecliptic[159].

Subsequent marks (3–9) cannot be reliably interpreted due to insufficient context[160].

Later, Lazarovici and colleagues established a correspondence between the engraved symbols on the potshard and some constellations[161]. The solar disk likely represents the Sun's path (the ecliptic). Pointing toward *Cassiopeia*, the flying arrow indicates a direction from *Sagittarius* to *Cassiopeia*. The central marks adjacent to the arrow and solar disk correspond to constellations encircling *Sagittarius*: on the left, equatorial figures *Andromeda-Pegasus*,

155 Merlini 2009, 465.
156 Lazarovici Gh., Lazarovici C.-M. 2019b, 84.
157 Szücs-Csillik, Lazarovici Gh., Loznă 2023.
158 The continuity of *Cassiopeia* symbolism in later cultures is attested by the Bronze Age sanctuary at Tiszaug-Kéménytettÿ in Hungary, associated with the Nagyvárad culture (ca. 1600 BCE). Lazarovici Gh., Lazarovici C.-M., Merlini 2011, Fig. 247, 273.
159 Merlini 2009, 667–668; Lazarovici Gh., Lazarovici C.-M. 2019b, 84.
160 Lazarovici Gh., Lazarovici C.-M. 2019b, 84.
161 Szücs-Csillik, Lazarovici Gh. 2023b.

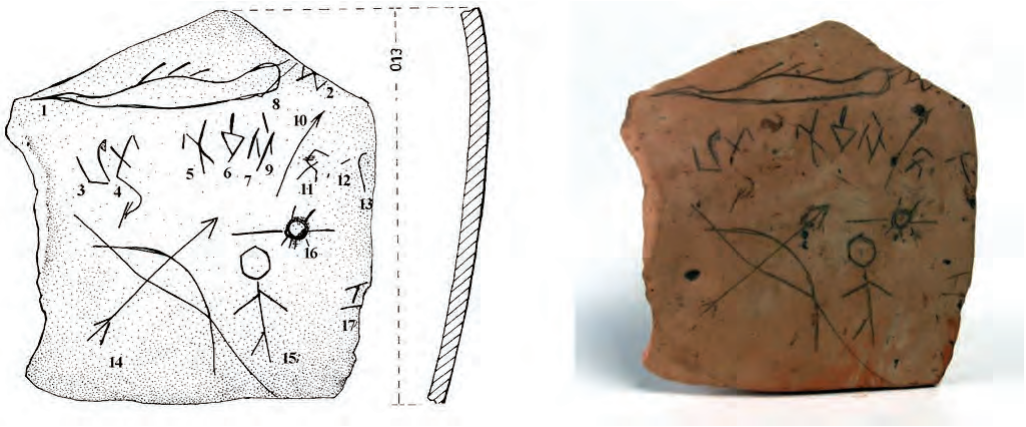

Fig. 13. Symbols and signs detected by Gheorghe Lazarovici on a potshard from Tărtăria de la Lozna (Romania). (After Lazarovici Gh., Lazarovici C.-M. 2019b, 84, Fig. 18).

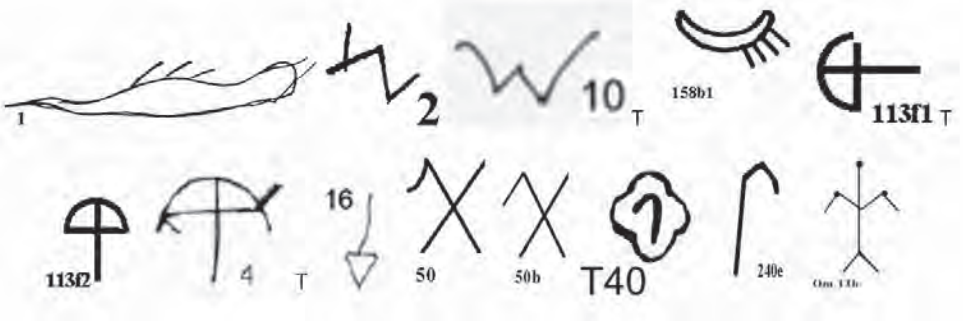

Fig. 14. Symbols and signs from the Lozna potshard (Romania) as recorded in Gheorghe Lazarovici's database. (After Lazarovici Gh., Lazarovici C.-M. 2019b, Fig. 84, 18c).

and *Scorpius*; in the center and on the right, ecliptic constellations *Aquarius*, *Capricornus*, *Ophiuchus* (SerpentBearer), and *Serpens*[162].

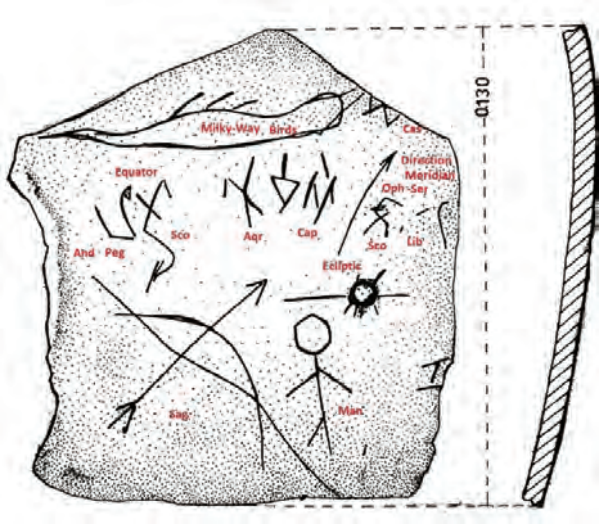

Fig. 15. Identification of constellation patterns on a potshard from Tărtăria de la Lozna (Romania), revealing the "heavenly paths" running from Sagittarius to Cassiopeia. (After Szücs-Csillik, Lazarovici Gh., 2023b).

In Neolithic mythologies worldwide, the *Milky Way* often appeared as a single bird or flock[163]. Along this celestial highway, lay the Summer Triangle—*Aquila* (Eagle), *Cygnus* (Swan), and *Lyra* (Fallen Eagle)—all personified as avian psychopomps[164]. Thus, the bird motif on the Lozna potshard evokes the *Milky Way*, while the Wsign highlights *Cassiopeia* upon that bright band[165].

The conclusion was that the Lozna amphora fragment functions as a compact celestial map, depicting a key segment of the *Milky Way*—heavenly paths from *Sagittarius* to *Cassiopeia*—encoding the seasonal migration of birds at the autumnal equinox. The engraved symbols also function as an astral calendar linked to the Neolithic agrarian year.

Due to the precession of the equinoxes, these heavenly paths not only mark ritual time but also serve as a precessional timestamp, pinpointing the moment when the object was inscribed,[166] within

[162] Szücs-Csillik, Lazarovici Gh. 2023a.

[163] Szücs-Csillik, Bădocan, Maxim 2023; Szücs-Csillik, Lazarovici Gh. 2023a.

[164] Szücs-Csillik, Bădocan, Maxim 2023.

[165] Szücs-Csillik et alii 2023, 36.

[166] Szücs-Csillik *et alii* 2023, 36; Szücs-Csillik, Lazarovici Gh., Lozną 2023; Szücs-Csillik, Lazarovici Gh. 2023b.

the Middle/Late Copper Age Cucuteni AB/B cultural framework[167].

Cassiopeia as a Crowbar to investigate the Astronomical Basis of Written Technology

Gheorghe Lazarovici conducted indepth studies of the "M" and "W" signs, often interpreting them as astronomical representations of the constellation *Cassiopeia*. In the Danube Civilization, rigorous observations of bright starcluster motions—including heliacal risings—were essential for timing agricultural tasks. The distinctive shape of *Cassiopeia* comprises five bright stars visible as "M" for six months, then, through diurnal rotation, appeared as a "W" for the next six months[168].

Lazarovici associated the "M" form with solar and masculine symbolism, and the "W" form with lunar and feminine connotations[169]. Moreover, *Cassiopeia* intersects the *Milky Way*'s central band, hosting open clusters, luminous disc stars, and nebulae—further enhancing its mnemonic utility.

Due to Earth's axial precession, the Neolithic North Pole pointed toward Thuban (α Draconis), not Polaris, altering *Cassiopeia*'s sky position relative to today. Iharka SzücsCsillik charted *Cassiopeia*'s annual motion circa 4000 BCE, noting that it was not circumpolar at midnorthern latitudes as today: it rose and set nightly and varied in form both diurnally and seasonally[170]. Hence, *Cassiopeia* cycled through four primary shapes—"M," "W," "∑," and Ƹ—as it rose, culminated, and set over one night and as Earth revolved around the Sun over a year[171]. In essence, the "M" gradually morphed into a "W" in sixhour or sixmonth intervals. Consequently, *Cassiopeia*'s dual shapes demarcated key markers of seasonal change—solstices and equinoxes—for Neolithic sky-watchers[172].

In 4500 BCE, at midnight around the spring equinox (c. April 25), the Sun sat between *Gemini* and *Taurus*, and the *Milky Way* spanned from *Sagittarius* to *Cassiopeia*, which rose over the horizon and at sunrise shone as a "W". During the spring months, *Cassiopeia* never appeared in its "M" orientation; instead, it rose and set in its "W" form. This "W" configuration at sunrise was visible throughout the year's first half.

At summer solstice (c. July 30), the Sun lay in *Virgo*, while *Cassiopeia* shifted from invisible to "M," observable through the second half of the year.

Sign "W" rose in the second half of the year, from October, marking the cold season. Around the fall equinox (c. October 25) the Sun crossed between *Sagittarius* and *Scorpius* and the *Milky Way* arched from *Auriga* to *Cygnus*. *Cassiopeia* formed a ∑ at sunset, cycling through all four shapes by October.

At winter solstice (c. January 30), with the Sun in *Pisces*, *Cassiopeia* (both "M" and "W") remained visible all night, its "W" at sunset heralding the cold season[173].

Therefore, *Cassiopeia*'s unique location, systematic positional changes, and regular varying of easily recognizable shapes made it a cornerstone of the Neolithic agrarian calendar[174]. From these astronomical observations, Lazarovici explored *Cassiopeia*'s symbolic and mythological roles in Neolithic and Copper Age spiritual iconography, linking astral symbolism and early Danubian protoscript signs with later cosmic mythologies, suggesting a continuity of cosmic imagery from Neolithic cult objects to classical star lore.

Cosmologically, the often inclined "M" and "W" motifs appear—single or doubled—across numerous Neolithic and Copper Age cult objects

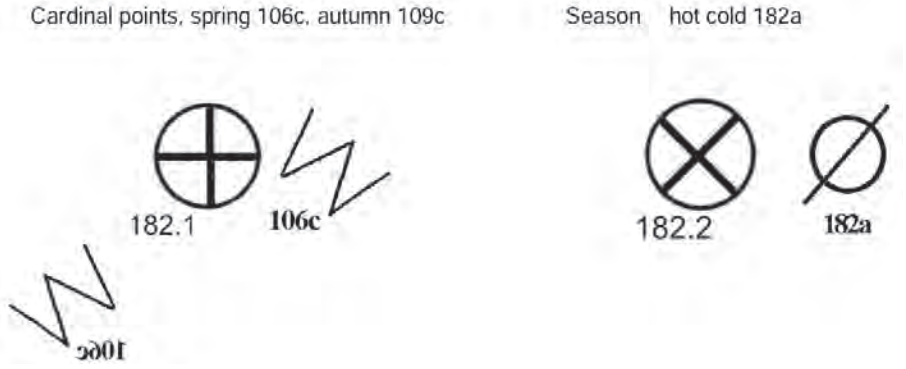

Fig. 16. Pictograms and ideograms depicting seasonal changes from Gheorghe Lazarovici's astro-sacral database. (After Lazarovici Gh., Lazarovici C.-M. 2019b, 78, Fig. 14b).

[167] Lazarovici C.-M. 2009b.
[168] Lazarovici Gh. 2002; Szücs-Csillik, Lazarovici Gh. 2023a.
[169] Lazarovici Gh. 2002.
[170] Szücs-Csillik *et alii* 2023, 39; Szücs-Csillik, Lazarovici Gh. 2023a; Szücs-Csillik, Lazarovici Gh. 2023b.
[171] Szücs-Csillik, Lazarovici Gh. 2023a.
[172] Szücs-Csillik, Lazarovici Gh. 2023a.
[173] Szücs-Csillik, Maxim 2021b; Szücs-Csillik, Lazarovici Gh. 2023a.
[174] Szücs-Csillik, Lazarovici Gh. 2023a.

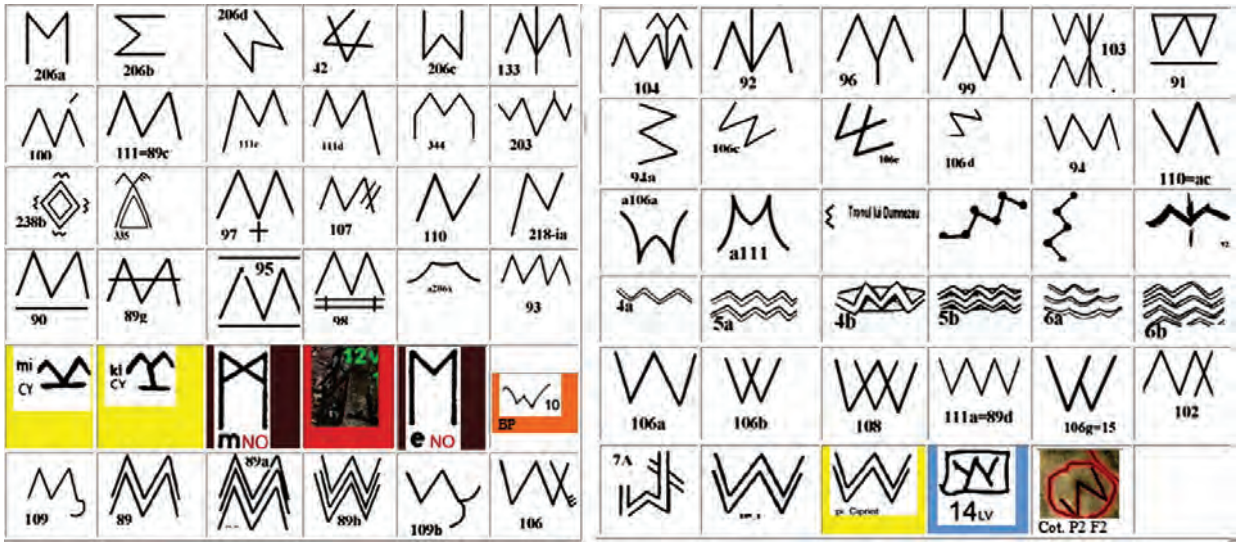

Fig. 17. Lazarovici's inventory of M and W symbols across artefacts of the Danube Civilization. (After Szücs-Csillik, Lazarovici Gh., Maxim 2024a).

in Southeastern and Central Europe: on cult vessels,[175] ritual tattoo tools,[176] blessed loaves,[177] garments, figurines,[178] sanctuary walls and doors[179]. Often positioned atop libationvessel lids,[180] around vessel rims,[181] framing humanheaded pots,[182] or on the body of vessels,[183] M and/or Wforms conveyed esoteric messages accessible only to initiates[184]. *Cassiopeia*'s paramount importance extended to firepreservation rituals in cult places of the Danube Civilization, underscoring its centrality[185].

The "M" and "W" astral motifs recur on diverse ritual objects, both within the Danube Civilization and in neighboring regions.

We have already mentioned the occurrence of the "M" and "W" shapes of *Cassiopeia* on the Mostonga *Spondylus* shell, the Tărtăria round tablet, and the Lozna potshard.

Discovered in the Deer house at Parţa, a unique twospout amphora features a human head with a gaping mouth supported by upraised hands forming a palmed megaphone. Ritual practitioners poured consecrated liquid through this aperture as offerings to deities[186]. Due to these distinctive features, the artifact is known in archaeology by nicknames such as "the weeper," "the screaming man, "the yelling one", or "the wailing person"[187].

Fig. 18. Danube Civilization ritual artefacts bearing M/W as cultic symbols and magic signs. (After Szücs-Csillik, Lazarovici Gh., 2023a, Fig. 11.b).

[175] Lazarovici Gh., Maxim 1995b, Fig. 249.2.
[176] Lazarovici Gh. 1979, Pl. IV/G8; Fig. 3.
[177] Lazarovici Gh. 2002.
[178] Lazarovici Gh., Maxim 1995b, Fig. 297.7.
[179] Lazarovici Gh., Maxim 1995b; Merlini 2009, 603.
[180] Lazarovici Gh., Drașovean, Maxim 1995b, Fig. 249.1.
[181] Lazarovici Gh. 2002, Fig. 9.
[182] Lazarovici Gh., Drașovean, Maxim 1995b, Fig. 294.3.4.5.9.
[183] Lazarovici Gh., Maxim 1995b, Fig. 249.10; Lazarovici Gh. 1982; Id. 2000a; Id. 2000b; Id. 2003; Lazarovici Gh. *et alii* 2002a; Szücs-Csillik, Lazarovici Gh. 2023a. For example, a bird-decorated vessel from Parţa features a repeating chain of M and W shapes encircling the body of the vessel. These motifs join and intertwine in a rhythm evocative of the natural cycles—just as day interlaces with night, and the months and seasons of the year recur. At the tips of the principal M-shaped symbol are two stylized birds, positioned as if marking the crest of the cycle's turning point. See Lazarovici Gh. 2002.
[184] Gimbutas 1974 [1982]; Id. 1989; Lazarovici C.-M. 2003; Lazarovici C.-M. 2005; Lazarovici C.-M. 2008; Maxim *et alii* 2009.
[185] Lazarovici C.-M. 2005, 1–10. Lazarovici Gh., Drașovean & Maxim 2001, I.1, 275, 279, 1.2, 115.
[186] Lazarovici Gh., Drașovean, Maxim 2001.
[187] Lazarovici Gh. 1982; Merlini 2009, 288–289.

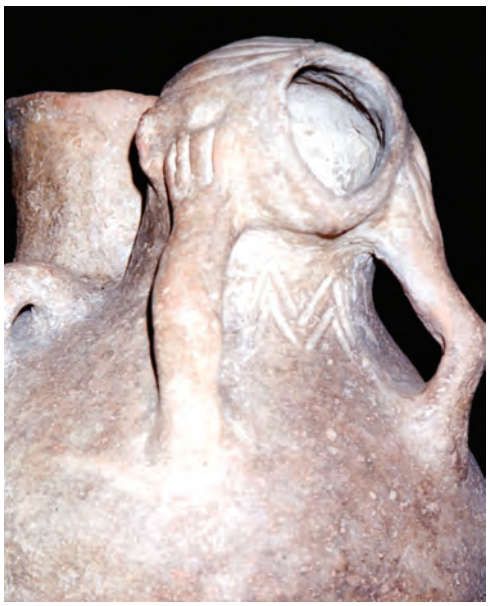

Fig. 19. An anthropomorphic vessel inscribed with a double M/W motif was discovered at Parța (Romania) and served in ceremonial contexts involving sacred-liquid offerings. (After Merlini 2009, 288, Fig. 5.238).

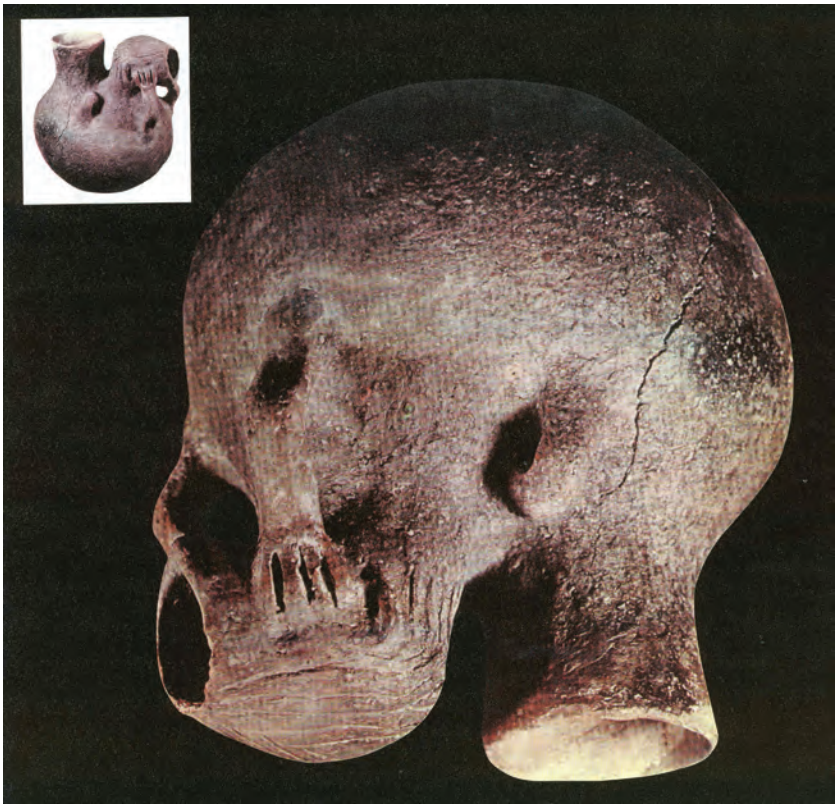

Fig. 20. Viewed upside down, the Parța vessel inscribed with twin M/W symbols becomes a skull silhouette complete with maternal anatomical features. (After Merlini 2009, 288, Fig. 5.239).

The head's crown of the vessel is carved with multiple chevrons (Vs), and the throat bears a doubleM motif that, when tilted, reverses into a double "W"—symbolizing the passage from masculine (insemination) to feminine (being inseminated), in Lazarovici's interpretation. He suggested the amphora was used to sprinkle holy water or even semen on fields during libations[188]. Marija Gimbutas instead identified the anthropomorphic vessel as the representation of "the Goddess from whose mouth nourishing liquid flows," reading the MW sign as her sacred monogram[189]. Standing approximately 16 cm tall with no flat base, the amphora transforms into a skull with pregnant anatomy when inverted, encapsulating themes of death and regeneration central to Neolithic cults[190].

On ritual artifacts of the Danube Civilization, "M" and "W" shapes derived from the constellation *Cassiopeia* are sometimes interwoven with spiral or meandric motifs, reflecting a broader cosmological iconography. Such inclined "M" and "W" symbols frame a cosmic spiral motif on a spherical, double-handled clay jar with a trichrome design, recovered at Dimini (Thessaly, Greece)[191]. This vessel is dated to the Late Neolithic I, according to Greek chronology (c. 5300–4800 cal BCE). Here, *Cassiopeia* appears to wheel around a central spiral of three concentric coils, suspended above a semicircular form and balanced between two additional semicircles.

This unique design is further enriched by overlaid woven-band motifs perhaps inspired by textile strips produced through tablet weaving[192]. They comprise seven white curved lines above, nine curved lines at the center, and five below. The deliberate sequence of three, five, seven, and nine is not incidental, but reflects numerological significance, symbolizing the first four odd numbers. Beyond numerology, the central spiral, flanked by *Cassiopeia*'s principal forms, represents a stylistic innovation that encodes symbolic meanings associated with

188 Lazarovici Gh., Drașovean, Maxim 2001 I, 280; 406.
189 Gimbutas 1989: 65, Fig. 103.
190 Merlini 2009, 288–289.
191 The artifact is held at the National Archaeological Museum of Athens. Inventory number 5922.
192 Sarri, Mokdad 2019, 88.

the eternal cycle of life. More broadly, the spiral may be interpreted as an allusion to the spiraling or whirling motion of the cosmos[193].

Fig. 21. Cassiopeia*, rendered as inclined M and W shapes, encircles a cosmic spiral motif on a globular vase from Dimini (Thessaly, Greece). (After* Merlini 2009, 603, Fig. 9.102).

In Sanctuary 21 at Çatal Hüyük (Konya Plain, Central-Southern Turkey, ancient Anatolia), (ca. 6500 BCE)[194] a zigzag on a bull's muzzle adopts an "M/W" configuration alongside celestial symbols—the "divine eye," vulture of death, and skull offerings—indicating early astral sign usage beyond the Danube sphere[195].

Conclusions

Research by Gheorghe Lazarovici and team reveals that Neolithic settlements along the Danube River and its tributaries shared not only sociocommercial exchanges, but also a unified astrosacral iconography. Common motifs—including Sun, Moon, and prominent starcluster shapes (e.g., northern constellations along the ecliptic) and the Milky Way—functioned as symbols, pictograms, ideograms, and logograms within the Danube Communication System[196]. These celestial bodies underpinned agrarian timekeeping: observed through their apparent motions, they governed the ritual calendar and agricultural cycle[197]. They were main deities. Successful harvest and supplies depended on the understanding of the rules of their celestial motions.

Constellation patterns, easily rendered yet imbued with esoteric power, served as mnemonic devices for initiates to synchronize with the celestial rules expressed by these celestial symbols. Gheorghe Lazarovici described the astro-symbols as arcane codes of nature, magic runes used in rituals. To facilitate their identification, groups of bright stars were named after familiar beings (hunter, herdsman, bear, bird, snake, dog, plough, etc.) and inscribed on cave walls, stones, and ritual artifacts to perpetuate celestial knowledge across generations[198]. Over time, these astral motifs became visual archetypes that evolved into a protowriting system—the Danube Script—comprising abbreviated symbols derived from constellation outlines[199]. Archaeological finds bearing these inscriptions functioned as instruments for measuring astronomical phenomena (e.g., solar azimuths at sunrise or sunset), thus establishing calendar dates.

This sacred script, rooted in an astromythological framework, likely predated the Sumerian writing tradition by up to two millennia. Whereas Sumerian cuneiform primarily recorded administrative and commercial data, the Danube Script appears to have served ritual purposes[200]. This aligns with broader theories (e.g., Marshack, Gimbutas) that posit writing's origins in calendrical and ritual notation systems entwined with lunarsolar time reckoning[201].

Future research has to explore the extent to which constellation silhouettes provided the graphic basis for Danube signs, and whether a Neolithic and Copper Age equivalent of a "divine word processor" (akin to Thoth in ancient Egypt) existed—an astral deity overseeing timekeeping and script. Such investigations could illuminate semantic links between sky and script and clarify the cosmological foundations of early writing[202].

One might begin by considering that, as in ancient Mesopotamia, the communities of the Danube Civilization regarded the night sky as a living manuscript. They interpreted stellar motions, constellation patterns (especially those structuring seasonal time), solar trajectories, lunar phases, and eclipses as a "writing of heaven" or "writing of the night sky", believed to transmit guidance and warnings.

193 Merlini 2009, 603.

194 Çatal Hüyük had a highly advanced culture, indicated by the level of its farming and the commercial exploitation of the region's supply of obsidian. Merlini 2025b, 85.

195 Lazarovici Gh., Drașovean, Maxim 2001.

196 Szücs-Csillik, Lazarovici Gh. 2023a.

197 Rappenglück 2012; Szücs-Csillik, Bădocan, Maxim 2023.

198 Szücs-Csillik, Maxim 2014.

199 Szücs-Csillik, Maxim, Lazarovici Gh. 2020, 448.

200 Gimbutas 1989; Merlini 2004; Szücs-Csillik, Lazarovici Gh., Maxim 2004; Merlini 2006; Merlini 2009; Joan 2018; Szücs-Csillik, Lazarovici, Maxim 2018; Szücs-Csillik, Lazarovici Gh., Maxim 2019; Szücs-Csillik, Maxim, Lazarovici Gh. 2019a; Id. 2020; Szücs-Csillik 2021a; Szücs-Csillik 2021b; Szücs-Csillik, Maxim 2021a.; Szücs-Csillik, Lazarovici Gh., Maxim 2024b .

201 Gimbutas 1974; Gimbutas 1989; Gimbutas 1991; Marshack 1991a; Marshack 1991b, 25–61.

202 Krupp 2003, 86–87.

In the absence of technological means to regulate their environment, the communities of the Danube Civilization were entirely dependent on natural cycles for survival. Astronomical observation and related myths about cosmic entities served both predictive and mnemonic functions, framing natural events critical to the group's subsistence, such as the availability of specific food sources or shifts in weather conditions. Unsurprisingly, their interest in the stars was directed less toward extraordinary phenomena, such as supernovae or comets, and more toward the consistent rhythms and cyclical patterns of the cosmos.

Equally vital to survival was the cultivation of communal identity. Astronomical knowledge encoded in signs of a script—as well as in mythic storytelling, ritual songs, and dances—was transmitted from generation to generation, reinforcing traditional beliefs, taboos, and behavioral codes. These elements defined the community's identity within the *Sky–Earth* arena and preserved intergenerational continuity.

According to Gheorghe Lazarovici, the inseparable connection between worship and astronomy reflects the cumulative wisdom of generations of sky watchers who associated celestial rhythms with agricultural rites. In the final phase of his life, he emphasized the *cosmic dance* as a metaphor for the harmonious interplay between Heaven and Earth in Neolithic and Copper Age cosmology[203].

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