

## Research Article

# The Origins of Zodiacal Thinking: The Semantics of “Solar Waves” and Ornitho-Zoomorphic Imagery in the Religious Motifs of the Cucuteni-Trypillia Culture and Their Parallels with Göbekli Tepe

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**Abstract:** This article reconsiders traditional views on the chronological boundaries and cultural-historical centers of origin of zodiacal thinking. The aim of the study is to substantiate the hypothesis that the astral-zodiacal worldview took shape several millennia before the emergence of classical zodiacal systems, based on material from the Cucuteni-Trypillia culture (5th-3rd millennia BCE) in comparison with the monumental Pre-Pottery Neolithic site of Göbekli Tepe (10th-8th millennia BCE). Through comparative and archaeoastronomical analysis, a universal iconographic formula is identified: "solar wave–pause–zoomorphic image." It is demonstrated that protozodiacal thinking evolved from the monumental-architectural structuring of sacred space in Anatolia toward the systematization of an astral-calendrical code on the portable artifacts of the early agricultural civilization of Cucuteni-Trypillia. The study reveals the consistent orientation of these images, their connection to phytomorphic motifs of the seasonal cycle, and the gradual closure of a linear sequence into a completed “animal circle” – a prehistoric prototype of the zodiac. A comparative analysis with Pillar 43 (Enclosure D) and 2 (Enclosure A) at Göbekli Tepe reveals a structurally isomorphic coding system, attesting to a shared iconographic language between the two traditions. The scholarly novelty of this work lies in identifying the phenomenon of Cucuteni-Trypillia “protozodiacal circles” on sacred vessels, where a closed procession of animals associated with the night sky forms the earliest materially attested prototype of the “animal circle.” It is concluded that the Cucuteni-Trypillia culture represents one of the earliest and most fully documented centers of origin of zodiacal thinking – both in its material embodiment (ceramics) and in its structural principle (compositional organization) – which later gave rise to the European “zodiac” tradition.

**Keywords:** Trypillia culture; Göbekli Tepe; Nebelivka temple; zodiacal thinking; archaeoastronomy

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## 1. Introduction

The origins of astral beliefs and zodiacal thinking in humanity remain a matter of debate in contemporary archaeology, the history of religion, and cultural anthropology. Traditionally, the emergence of systematised conceptions of the starry sky and the zodiac (as visually recognisable asterisms) has been linked to the ancient Mesopotamian civilisations of the first half of the 2nd millennium BCE (Huxley, 1985), while earlier evidence of a comparable worldview has not been comprehensively taken into account. However, research on the oldest temple monuments of Eurasia – in particular, the cultic centre of Göbekli Tepe in southeastern Anatolia (10th-8th millennia BCE), the Nebelivka temple complex (4th millennium BCE), and the Cucuteni-Trypillia archaeological complex as a whole – makes it possible to substantially reconsider the established chronological boundaries for the origin of the astral-zodiacal worldview.

First, a growing body of archaeoastronomical research on the Göbekli Tepe site indicates that its Pre-Pottery Neolithic builders were skilled observers of solar, lunar, and stellar cycles; researchers suggest that individual pillars may have served calendrical and gnomonic functions (Sweatman & Tsikritsis, 2017; Sweatman, 2024; Malkhasyan, 2024; Malkhasyan, 2025). At the same time, this astronomical interpretation remains a matter of debate: a number of scholars call for methodological caution and warn against overinterpretation (Banning, 2023), a point emphasized even by researchers and interpreters of Göbekli Tepe itself, who stress the need for further comparative studies with other cultures – arguably one of the only viable paths toward a fuller understanding of the site's symbolism (Sweatman, 2024).

Second, recent research on the Cucuteni-Trypillia culture has substantially deepened our understanding of its religious symbolism, lunar-solar iconography, and settlement organization, revealing a highly developed and internally coherent cosmological system (Burdo, 2022; Prychepii, 2024; Ohlrau, 2022; Hofmann et al., 2019; Videiko, 2020). Taken together, these two independent lines of research make it possible – and timely – to reconsider whether the iconographic and architectural evidence of both traditions reflects a shared, considerably earlier stage in the development of zodiacal thinking than has previously been assumed.

Analysis of the iconographic materials of the Trypillia culture and the column reliefs of Göbekli Tepe has revealed a distinct pattern: the wavelike arc structures in ritual imagery functioned as a graphic representation of the sun's visible movement across the horizon. This hidden symbolic content acquired particular analytical clarity in the context of the study of the Nebelivka temple and its associated relics.

The interpretation proposed in this study makes it possible to take a fresh look at the nature of the zoomorphic images occupying the space between the "solar waves." If the solar arc marks the daytime, visible portion of the celestial path, then the animal images appearing after its completion are, with a high degree of probability, graphic allegories of the starry (night) sky – the view that opens up to an observer the moment the sun disappears below the horizon.

This reading uncovers the mechanism by which a dual system was encoded in the ornamentation: where the "dominion of light" ends, there – in both a literal and a figurative sense – the cult of the night begins to take effect. This hypothesis gains further credibility given that a number of the animals recorded in the interwave spaces of Trypillian ceramics and the Göbekli Tepe reliefs (bull, dog/fox, bird, goat/sheep, aurochs) are still present in the Greek and Chinese zodiacs today, either as constellations or as signs of the zodiacal circle.

Thus, the spatial principle of "wave–pause–animal" in the earliest iconographic systems of Eurasia can be interpreted as the first known method of encoding the relationship between solar observations and the starry sky. The zodiac, in its original meaning of "circle of animals," may have arisen precisely as a means of designating those constellations that appeared successively in the night sky after sunset across the different seasons of the year.

If this interpretation is correct, then the formation of humanity's zodiacal thinking as a systematic, recurring phenomenon should be dated to at least the period of the flourishing of the Trypillia culture (5th–4th millennia BCE), with its roots extending back to the Pre-Pottery Neolithic period in Anatolia.

The aim of this article is to substantiate the hypothesis that the astral-zodiacal worldview (protozodiacal thinking) emerged considerably earlier than is conventionally assumed, by identifying and analyzing the universal iconographic formula "solar wave–pause–zoomorphic image" in the ritual ceramics of the Cucuteni-Trypillia culture and comparing it with the monumental reliefs of Göbekli Tepe.

To explore the symbolic and astronomical dimensions of prehistoric iconography and their implications for the emergence of zodiacal thinking in Eurasia, the study is guided by the following research objectives:

- (1) to analyze the iconographic formula "solar wave–pause–zoomorphic image" in Cucuteni-Trypillia ritual ceramics and reveal its symbolic structure;
- (2) to establish the stable orientation of the images of "celestial dogs" and demonstrate that their direction of movement reflects the actual trajectory of a stellar cluster across the night sky;
- (3) to determine the connection between these zoomorphic images and phytomorphic motifs of the seasonal cycle;
- (4) to identify the structural principle underlying the closure of a linear sequence into a completed "animal circle" and compare it with the iconography of Pillar 43 (Enclosure D) and Pillar 2 (Enclosure A) at Göbekli Tepe;

(5) to put forward a hypothesis regarding the chronological boundaries of the origin of zodiacal thinking in Eurasia, drawing on comparative material from the Cucuteni-Trypillia culture and Göbekli Tepe.

A synchronic analysis of the iconography of Göbekli Tepe and the Cucuteni-Trypillia culture makes it possible to advance the thesis that conceptions of stellar animal allegories and their connection to the solar cycle have roots considerably deeper than is conventionally assumed. They may lay claim to the status of one of the earliest fixed astral systems of humanity – a potential embryo of what would, much later, take shape as the zodiac, or literally, the "circle of animals."

## 2. "Solar Wave-Pause-Zoomorphic Image": The Iconographic Formula of Trypillian Ceramics and Its Cosmological Semantics

As the semiotics of the Trypillian religious inventory attests, ancient farmers employed a sophisticated system of visual codes to record the passage of time. One of the most readily recognizable symbolic elements found throughout the entire corpus of Trypillian iconography is an ornamental scheme that may be conventionally termed the "solar wave" or "solar unfolding." It is precisely this structural principle, documented on a series of vessels from the Trypillia culture, that constitutes the subject of analysis in this subsection.

In the author's previous articles (Zavaliy, 2024-b), (Zavaliy, 2025-b), (Zavaliy, 2024-a), hypotheses were put forward for the first time regarding the structural and semantic kinship between the iconographic systems of two geographically and chronologically distant, yet typologically related, sacred traditions from the territories of present-day Turkey and Ukraine. In particular, it was established that wavelike ornamental structures – the so-called "solar arcs" or "solar waves" – found in Trypillian ritual ceramics served not only as markers of the cyclical movement of the sun and the changing of the seasons, but also functioned as carriers of a hidden semantic layer connected to the cult of the night and the night sky (Zavaliy, 2024-b, Pp. 885–886). This proposed approach made it possible to reinterpret a number of visual codes that had previously been understood solely as decorative or that had otherwise lacked adequate scholarly explanation.

The structural similarities between the iconographic traditions of Göbekli Tepe and the Cucuteni-Trypillia culture are illustrated in figure 1. In both cases, wavelike ornamental elements are associated with zoomorphic imagery, suggesting a comparable principle of symbolic organization. Their spatial arrangement provides a basis for further examining the relationship between solar symbolism and representations of the night sky.



**Figure 1.** Zoomorphic images positioned between arched waves in the iconographic representations of Göbekli Tepe and Trypillia.

*Source:* Zavaliy, 2024b.

In order to understand the nature of the "solar wave" as an archaic ornamental principle, it is necessary to consider the astronomical reality it reflects. The sun's daily path across the sky, from sunrise to sunset, traces an arc-shaped trajectory whose elevation above the horizon varies significantly with the seasons. During summer, the solar arc reaches its maximum height, while in spring and autumn it occupies an intermediate position. In winter, the sun follows a considerably lower trajectory, remaining relatively close to the horizon throughout the day. These seasonal variations in the sun's apparent path across the sky are illustrated in figure 2.

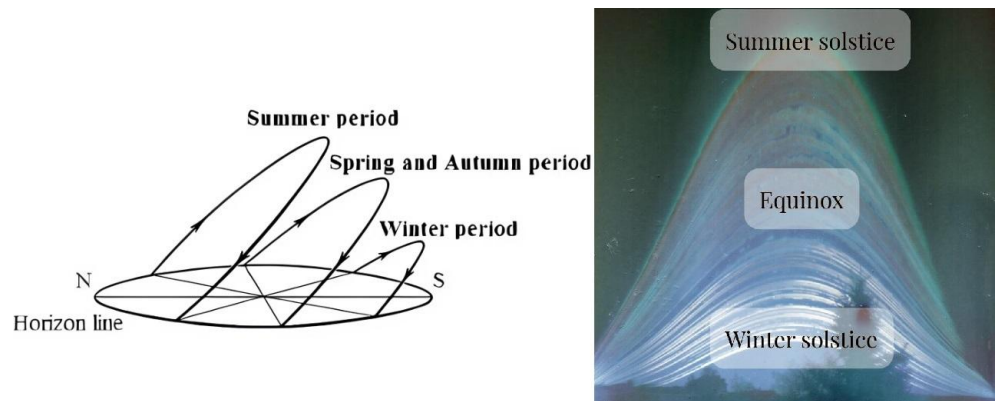


**Figure 2.** The visible path of the sun above the horizon over the course of a year.  
*Source:* Andor, 2015.

This daily and seasonal variability in the sun's trajectory, likely recorded through systematic observation by early agricultural communities, appears to have found its embodiment in the ornamental language of Trypillian ceramics.

The seasonal variations in the sun's apparent trajectory appear to be reflected in the ornamental patterns of Cucuteni-Trypillia ceramics. As illustrated in figure 3, the vessels feature recurring arc-shaped and wavelike motifs that may be interpreted as symbolic representations of the sun's movement across the sky.



**Figure 3.** Pots of the Trypillia culture featuring "solar wave," or "solar unfolding" motifs.

*Source:* Burdo, 2004.

Further examples of this ornamental tradition are presented in figure 4, demonstrating the recurrence of similar solar-wave motifs across different ceramic artifacts. Despite variations in their composition and execution, these patterns exhibit a common structural principle that suggests a consistent approach to representing cyclical celestial phenomena.



**Figure 4.** Pots of the Trypillia culture featuring "solar wave," or "solar unfolding" motifs, from museum collections in Ukraine (Trypillian Symbolism, 2026; Zavali, 2025-a, Pp. 6–7).

*Source:* Zavali, 2025a.

The parallel between the sun's passage and the ornamentation of Trypillian ceramics is evident: the craftsman was not reproducing an abstraction, but rather the order of things as they observed it. Tellingly, such motifs are almost never placed at a random location on the surface of a vessel – they are consistently positioned either in the upper portion of the pot or at the center of the composition, that is, in the zone that is most visually prominent and ritually significant.

It is fundamentally important to note that the ornamental scheme of a vessel is not merely a flat projection. Owing to the vessel's spherical shape, the image acquires a three-dimensional character corresponding to the actual three-dimensionality of the celestial vault. A top-down view (looking at the base of the vessel) resembles what an observer sees when looking upward: the solar arcs radiate outward from a central axis, marking the various angles of the sun's elevation above the horizon, depending on the season. Thus, in shaping the convex walls of a vessel, ancient craftsmen were likely consciously reproducing the very topology of the celestial vault – the concave "bowl" of the sky across which the sun moves.

This analytical perspective allows Trypillian sacred designs to be seen from a different angle, revealing a hidden geometry not accessible through ordinary "profile" viewing. It is precisely in this perspective – when the ornament is unfolded across a plane or examined "from top to bottom" – that Trypillian compositions reveal their hidden symbolism.

It is also notable that the tradition of depicting "solar paths" extended to other types of sacred ceramic art as well. These motifs occur on both ceramic models of temple structures and ark-shaped vessels. Here, the motif of three arc-shaped lines stands out clearly, visually representing the three key positions of the sun along its annual path – the summer solstice, the equinoxes, and the winter solstice.

As illustrated in figure 5, the motif of three arc-shaped lines also appears on Trypillian ritual artifacts, including a ceramic temple model from Nebelivka and an ark-shaped vessel from Talianky, suggesting a shared symbolic representation of the sun's seasonal movement.



**Figure 5.** The motif of three arc-shaped lines on Trypillian artifacts: a fragment of a ceramic temple model from the Nebelivka settlement (ca. 4000-3900 BCE) (left) and an ark-shaped vessel from the Talianky settlement (ca. 3850-3700 BCE) (right).

*Source:* Burdo, 2004.

Analysis of a facade fragment from the ceramic replica of the temple at the Nebelivka settlement shows that ancient artisans framed the central entrance to the "Temple of the Sun" with three lines, further emphasizing the rounded passageway with the "solar unfolding" sign. Here, the three lines are depicted from the perspective of a person standing on the ground and looking upward at the sun's movement across the sky.

The ark-shaped vessel from Talianky demonstrates an entirely different logic. It conveys a top-down viewing angle, similar to how this is rendered on Trypillian pots. There are also known instances of the three lines being reproduced in combination with zoomorphic elements on Trypillian pottery (ladle-shaped vessels), which themselves conceptually imitate the form of birds or animals.

As shown in figure 6, ornithomorphic and zoomorphic ritual bowls from the Cucuteni-Trypillia culture incorporate solar-wave motifs, suggesting a symbolic connection between animal imagery and the sun's movement across the sky.



**Figure 6.** Ornithomorphic and zoomorphic ritual bowls of the Trypillia culture bearing "solar wave" ornamentation on their surfaces.

*Source:* Prychepii, 2018.

The examples presented above are exceptionally illustrative of the interpretive model proposed in this article. Unlike the artifacts discussed earlier, the vessels shown in Figure 6 already encode the sun's path interwoven with animal imagery. In other words, in this case the animal no longer merely "accompanies" the solar path but literally contains it within itself, appearing as its bearer or vessel. This mode of thinking – the image of an animal or boat carrying the sun through the dark, nocturnal segment of its journey – is well known in comparative mythology and the history of religions: one need only recall the Egyptian night barque of Ra, which crosses the subterranean sky each night (Hornung, 1999), or the widespread traditions found across Eurasia of a deer, duck, or fish that "carries" the sun upon or within itself (Filippova et al., 2025; Rappenglück, 2008; Valent et al., 2021, Pp. 5–43). This point was also emphasised by Djurić (2024) who analyses in detail the ornitho- and zoomorphic images of birds and horses as symbols of the diurnal solar rotation. The Trypillian ladle-shaped bowls presented here hypothetically represent one of the earliest known variants of this cosmological image – the animal as a vessel of the sun.

This mode of representation appears to be fundamental for understanding the semantics of Trypillian sacred imagery. Obviously, in one case, the artisan reproduces the sun's external, objective movement above the cult structure. And in the other, this movement is enclosed within the form of a vessel or ark, transforming the celestial cycle into a container-object that reveals itself when viewed from above. Thus, both models – the frontal and the zenithal – are not alternatives but complementary projections of one and the same cosmological reality depicted by ancient farmers.

This observation resonates with the architectural principles of the Anatolian temple of Göbekli Tepe, where the circular structures are oriented toward key points of the solar year in accordance with a clear seasonal logic. At the same time, the three waves of varying size in the upper portion of Pillar 43 in Enclosure D correlate closely with the Trypillian religious tradition of reproducing three waves in that same rhythmic pattern. Here one can discern an archaic purpose: to situate the human being within the rhythm of the sun, to render it visible, perceptible, and comprehensible.

It is telling that a similar logic emerges in the planning structure of Trypillian protocities and settlements as well. Their concentric layout forms ring-shaped systems that, when viewed from above – that is, from the very same zenithal vantage point reproduced by the ark-shaped bowls, pots, and other portable cult objects – unfold as a kind of (likely solar) pattern, with a clear division of quarters, sectors, streets, and protourban entrances oriented to the cardinal directions (Chapman, 2017).

As illustrated in figure 7, the concentric layouts of the Trypillian settlements of Maidanetske and Nebelivka reveal a recurring circular spatial organization, suggesting a possible connection between settlement planning and the cosmological principles reflected in ritual iconography.



**Figure 7.** Geomagnetic plans of Trypillian protocities structured according to the principle of three concentric circles. The megastructures (temples), oriented toward sunrise, are highlighted in green: the Trypillian protocity of Maidanetske (area of 200 hectares, approximately 3900-3600 BCE) (left) and the Trypillian protocity of Nebelivka (area of 275 hectares, approximately 4000–3750 BCE) (right).

*Source:* Arponen et al., 2024; Chapman et al., 2014.

Thus, the Trypillian sacred tradition emerges not as a collection of disparate images, but as a coherent cosmological system that manifests itself simultaneously across several dimensions: in the form and ornamentation of sacred ceramics and figurines, in the structure of ritual buildings (temples), and in the planning of residential space. Each of these levels constitutes a projection of one and the same celestial reality – and all of them are interconnected not merely metaphorically, but structurally, through a shared religious language of symbols.

Yet each of the projections examined here – ornamental, architectural, and planimetric – captures only one, "diurnal," portion of the cosmological cycle, defined by the movement of the solar arc itself. A logical extension of this observation raises the question: what exactly fills the space that opens up immediately after the completion of a "wave" – the space of the pause that arises, each time, between two adjacent arcs? It is precisely within this pause, as will be shown below, that another class of images consistently appears – depictions of animals whose semantics carry the researcher beyond the bounds of solar, daytime reckoning and point instead toward the theme of the night sky and the stars.

Analysis of the ornitho-zoomorphic images found on Cucuteni-Trypillia vessels reveals a second, hidden level of the sacred system – the level of the night sky. The animal images recorded in the upper zone of the vessels, between the rim line (the "neck") and the "solar waves," occupy a clearly defined, semantically charged position: they are situated precisely at the point where the movement of the solar arc comes to an end. In other words, these images are inscribed within that notional time band marking the boundary – the transitional zone between light and darkness, between the daytime and the nighttime sky.

This positional pattern is central to the interpretation proposed here. If the wavelike arcs encode the sun's visible trajectory, then the space between them, or beyond their bounds, logically corresponds to the time when the sun is absent from the sky. It is precisely in these "interwave" zones that images appear which were likely among the first attempts to visualize the night sky and which stand as prototypes of future constellations and primordial zodiacal systems. Moreover, the systematic recurrence of such motifs across monuments from different periods and regions of the Cucuteni-Trypillia cultural community rules out coincidence and speaks in favor of an established, consciously reproduced canon.

Figure 8 shows that the Cucuteni-Trypillia amphora from Varvarivka VIII features zoomorphic images positioned in the upper register between the solar waves, suggesting a possible symbolic association between animal imagery and the night sky.



**Figure 8.** A Cucuteni-Trypillia amphora from the Varvarivka VIII settlement, featuring a group of animals (deer, dogs, or wolves) in the upper register, within the "interwave" zones (ca. 3900–3400 BCE).

*Source:* National Museum of History of Moldova.

Trypillian ceramics feature representations of "flying dogs" positioned in the upper registers between solar waves, suggesting a possible association between zoomorphic imagery and the movement of celestial bodies across the night sky (figure 9).



**Figure 9.** Trypillian ceramics featuring "flying dogs" in the upper registers between the "solar waves".

*Source:* Kyiv Regional Museum)

At the same time, figure 10 presents further examples of "flying dog" motifs on Trypillian pottery and ceramic fragments, highlighting the recurrence of this zoomorphic imagery and its potential symbolic association with celestial movement.



**Figure 10.** "Flying dogs" from a Trypillian pot and ceramic fragments.

Source: (Unique Trypillian artifacts, 2016; Trypillia Culture. First open; Videiko, 2014, P.

46)

Particular attention is drawn to the Cucuteni-Trypillia amphora from the Varvarivka VIII settlement, where the animal images are literally connected to the "interwave" zone by a hatched line. This emphasis, or projection, makes visible the conscious intent of the creator of this ancient worldview to fix, on the "ceramic canvas," the semantic affiliation of the animal with a particular spatio-temporal register – one lying beyond the bounds of the solar arc. The hatched line functions here as a kind of marker linking the animal to this specific symbolic model of the universe.

A similar graphic logic can be traced in the iconography of the "flying dogs." The dynamic pose of the animals, their orientation along the horizontal axis of the vessel, and their clear spatial placement within the upper register – between the "neck" of the vessel and the "solar waves" – make it possible to consider this image in the context of movement across the night sky. A dog or wolf "flying" through the interwave space may be not merely a zoomorphic allegory, but a potential astral marker – a graphic designation of a constellation or a stellar reference point visible during those intervals of time when the sun lies below the horizon.

This observation takes on particular significance in a comparative-astronomical context. The constellation of Canis Major (containing Sirius, the brightest star in the night sky) played a key role in the astronomical and calendrical systems of many ancient peoples: it was the heliacal rising of Sirius that served as the astronomical marker of the new year in ancient Egypt and as a signal of the Nile's flooding. The presence of a comparable image – a "dog in the night sky" – in Cucuteni-Trypillia iconography of the 4th millennium BCE allows for the hypothesis that the semantics of this motif may have carried an astral dimension long before similar manifestations appeared in later civilizations.

Equally telling is the image of the deer found on the amphora from Varvarivka VIII. In the comparative mythology of Eurasia, the deer is one of the most widespread "celestial guides" – an animal associated with the movement of the sun or moon in various shamanic and agricultural traditions stretching from Siberia to Scandinavia (Mykhailova, 2008). The presence of this image in the interwave zone of Cucuteni-Trypillia pottery, alongside the dog/wolf, suggests the possible existence of an entire register of astral animals semantically assigned to the night sky as a distinct ontological realm.

There was also a tradition of depicting celestial dogs and other probable ornitho-zoomorphic stellar allegories above the solar wave, alongside it, or even entirely without it. Against this background, a frontal model stands out clearly, in which the "solar wave" appears not inverted but facing the viewer, serving as the linear foundation of the composition within whose space the "celestial animals" were placed. Nevertheless, these images were consistently located in the upper registers of the pots – the semantic zone that, in Trypillian cosmology, traditionally represented the celestial realm.

As illustrated in figure 11, the placement of zoomorphic imagery above the solar wave in the upper register of a Trypillian vessel provides further evidence of the spatial relationship between animal motifs and solar symbolism, potentially reflecting a broader cosmological interpretation.



**Figure 11.** A Trypillian pot bearing a zoomorphic image in the upper register above a notional solar wave (ca. 3800 BCE)

*Source:* Kovács & Aparaschivei, 2025; Ohlrau, 2022.

Figure 12 demonstrates that Trypillian vessels feature zoomorphic images arranged in the upper registers, demonstrating variations in their spatial relationship to solar-wave motifs and suggesting different approaches to representing celestial symbolism.



**Figure 12.** Trypillian pots featuring zoomorphic images in the upper register: the zenithal model of iconography (above) and the frontal model (below).

*Source:* Burdo, 2004; Novokhatko, 2004.

As illustrated in figure 13, a Trypillian vessel features a frontal iconographic composition with a probable stellar representation of an aurochs positioned in the interwave space, further suggesting a symbolic connection between zoomorphic imagery and the celestial realm.



**Figure 13.** A Trypillian pot featuring the frontal model of iconographic composition, with a probable stellar allegory of an aurochs in the interwave space (ca. 3900–3400 BCE) (Vas bitronconic).

*Source:*

Analysis of the iconographic features of the "celestial animals" provides grounds for assuming the existence of several traditions within Trypillian sacred plastic art. In particular, some of these traditions involved reproducing the images without any specific "solar signs," yet consistently within the upper zone of the vessel – the zone that represented the celestial realm.

Thus, the expanded corpus of iconographic sources from various regions of the Cucuteni-Trypillia cultural area consistently attests to the stability of the spatial formula: "solar sign (wave or spiral)–boundary register–animal." This regularity, traceable despite certain differences in technique of execution, geographic distribution, and the chronological range of the monuments, supports the thesis that this compositional arrangement was deliberate rather than accidental.

At the close of this subsection, it is worth noting that the organization of the iconographic formula "solar wave–pause–zoomorphic image," consistently repeated around the entire circumference of the vessel in the upper register, reveals its full meaning in motion. When a pot is rotated on its axis, or when a viewer walks around it, the rhythmic sequence of "wave–interval–animal" becomes a closed, continuously reproduced circle: each turn of the solar arc gives way to a pause in which the image of the night sky is concealed, after which the cycle repeats once more. This rotational configuration – in essence, a circular model of "day (wave) → night (interval) → star-animal" – makes visible the very principle underlying the diurnal movement of the celestial sphere. Read in this way, the ancient pot appears not merely as a bearer of discrete sacred signs, but as a functional model of the cosmic cycle: the physical act of rotating the vessel in the viewer's hands re-enacts, and perhaps deliberately simulates, the daily circuit of the heavenly bodies.

### 3. The Stable Orientation of the "Celestial Dogs": Direction of Movement as a Reflection of the Actual Trajectory of a Stellar Cluster

The positional regularity discussed in the previous subsections – the placement of zoomorphic images in the upper register, beneath the rim of the vessels and within the interwave spaces – is not the only argument in favor of the proposed astral interpretation. No less telling is another factor that has thus far escaped researchers' attention: the recurring orientation of the animal images themselves relative to the plane of the artifact. In the overwhelming majority of the examples analyzed, the animal is depicted not in a static, frontal pose, but in motion: elongated along the horizontal axis and with its body turned to the right.

This detail takes on fundamental significance within the context of an astronomical interpretation of these compositions. The point is that the visible trajectory of any celestial body (a star, planet, or constellation) is not curved to the same degree at every point in the sky. The closer a celestial body is to the horizon – that is, at the moments of its rising or setting – the closer its visible trajectory appears to horizontal for an observer on Earth. Conversely, the higher it climbs toward the zenith or the circumpolar region, the more pronounced the arc-like curvature of its path becomes. Since the zoomorphic images on Cucuteni-Trypillia ceramics are positioned precisely in the boundary, "near-rim" zone of the vessel – that is, symbolically, in the portion of the composition closest to the notional "horizon" of the vessel-as-sky – it is entirely logical that, here, they take on a horizontal rather than an arc-like orientation of movement.

It is telling that this pattern also aligns with actual astronomical parameters. The star Sirius ( $\alpha$  Canis Majoris) has a significant southern declination – approximately  $-16^{\circ}42'$ . For an observer at the latitude of the Trypillian cultural area (roughly  $48-49^{\circ}$  N), this means that at culmination Sirius rises only about  $24-25^{\circ}$  above the horizon, meaning that throughout its entire period of visibility it moves across a relatively low portion of the sky along the southern horizon (Davis, 1977). Unlike circumpolar constellations (such as the Big Dipper), which trace an almost complete circle around the celestial pole over the course of a night at Eastern European latitudes, Sirius and the constellation Canis Major move along a low arc stretched close to the horizon – a path an observer could genuinely perceive as a horizontal, "running" or "flying" stellar image.

The Trypillians' choice of precisely this horizontal, "running" pose to depict an animal semantically linked to the night sky may thus reflect not an arbitrary artistic decision, but the result of direct, sustained observation of the actual behavior of a specific stellar object or cluster. In other words, by placing the animal in horizontal motion immediately below the rim of the vessel, the artisans of Trypillian ornamentation were evidently seeking to reproduce not merely an abstract "creature of the night sky," but specifically the character of its celestial movement – low, shallow, and parallel to the horizon, precisely as the constellation Canis Major moves along the southern horizon at the mid-latitudes of Europe.

A comparative analysis of the "celestial dog" images across various vessels and fragments of Trypillian ceramics further reveals a consistent pattern: despite these artifacts originating from different settlements, chronological horizons, and, evidently, different workshops, the animal image is invariably oriented in the same direction – head to the right. Among the materials presented, the sole exception is the Cucuteni-Trypillia amphora from the Varvarivka VIII settlement, where one of the five animal images is instead turned with its head to the left.

The persistence of this rightward orientation holds even in fragmentary material, where only an isolated shard of a rim or a body section survives from the original composition. What we are dealing with, then, is a canonized, deliberately reproduced symbolic code that evidently carries its own semantic weight.

An objective explanation for this phenomenon lies in the pattern that emerges from directly comparing the ornament with the actual astronomical phenomenon it most likely recorded. If Trypillian artisans were reproducing these zoomorphic images as an allegory of the night sky, then the direction of their movement on the ceramics (left to right) corresponds exactly to the visible trajectory of celestial bodies as seen by an observer in the Northern Hemisphere facing south – the direction in which the sun reaches its highest point (upper culmination) during the day. Illustrative in this context is Figure 11, presented above, in which a zoomorphic image (probably a dog or wolf) is positioned directly above the apex of the red linear ornaments typical of the Trypillian iconography of "solar path" symbols. This composition demonstrates that the attention of the Trypillian artist was directed southward, toward the point where the "solar path" reaches its culmination, and where, at night during a particular season of the year, the constellation Canis Major begins its movement from left to right.

Figure 14 presents a comparison between the sun's apparent trajectory across the sky and the arc-shaped ornaments on Trypillian ceramics, highlighting their visual similarities and supporting the proposed interpretation of these motifs as symbolic representations of solar movement.

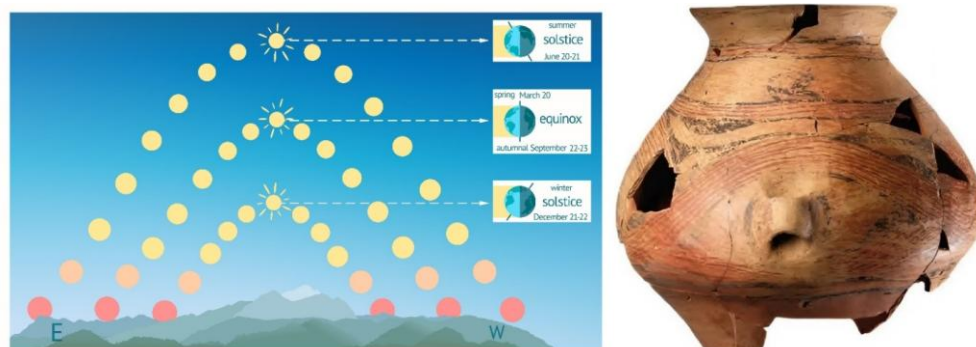


**Figure 14.** A comparison of the linear ornaments on Trypillian ceramics with actual astronomical phenomena: a graphic diagram of the sun's visible trajectory across the sky for the Northern Hemisphere (left); a Trypillian vessel bearing arc-shaped red lines that likely imitate solar trajectories (right).

*Source:* Stargazing, 2021; Mega-sites, 2023

In this way, a uniform iconographic device could have been encoded, since it corresponded most precisely to the observed reality of the visible movement of the starry sky above the horizon.

The identified pattern regarding the direction of movement of the "celestial dog" does not exhaust the full astronomical content potentially encoded in the iconography of Trypillian ceramics. No less telling is the very posture of the animal – specifically, the angle of inclination of its elongated body relative to the horizontal.

For an observer within the Trypillian cultural area (approximately 48–49° N), the constellation Canis Major, on the southern night sky, appears somewhat "reared up" – tilted upward relative to the horizon line. This tilt is conveyed in the ornamentation of the vessels through a specific angle in the positioning of the animal's body, one that precisely reproduces the actual astronomical configuration of the constellation at the moment of its culmination. For example, it is worth comparing the imagery on a pot discovered during the excavation of the Nebelivka temple complex of the Trypillian civilization with the astronomical reality that unfolded above the southern night horizon of the Trypillian ecumene.

As illustrated in figure 15, the comparison between the astronomical configuration of the Canis Major constellation and the Trypillian "flying dog" motif reveals similarities in their orientation and positioning, suggesting a possible connection between zoomorphic ornamentation and observations of the night sky.



**Figure 15.** A visual comparison of the astronomical configuration of the Canis Major constellation in the southern sky at European mid-latitudes with the Trypillian "flying dog" ornament

*Source:* (Videiko, 2022, P. 213; The Nebelivka, 2022)

This comparison confirms that the well-known pot from the Nebelivka temple bears an ornament reproducing an identical angle of inclination and geometry of movement for the zoomorphic image relative to the horizontal registers of the vessel.

A rearing stellar dog is also known from an image on a Trypillian pot in the collection of the Oleksandr Feldman Charitable Foundation. Here, in the upper portion of the vessel, immediately below the rim, a rearing dog is depicted. This artifact draws attention not only for the animal's dynamic posture, but also for a distinctive decorative element – the dog's outline is traced with a row of small white dots, evenly spaced along the contour of the image. This device may have served to make the depicted constellation more vivid and specific.

Figure 16 illustrates that a Trypillian vessel features a rearing dog outlined with small white dots, a distinctive decorative element that may reinforce the proposed interpretation of the image as a symbolic representation of a stellar constellation.



**Figure 16.** A Trypillian pot from the collection of the Oleksandr Feldman Charitable Foundation.

*Source:* Photo by O. Zavalii from the "Unconquered Nation" exhibition (Kyiv, 2022).

Within the context of the iconographic patterns already established, the appearance of compositions consistent with the "stellar tilt" of a specific constellation becomes a significant argument in favor of the deliberate, rather than accidental, character of this recorded canon. This indicates that Trypillian artisans were reproducing a specific, observed picture of the night sky, complete with the spatial features determined by geographic latitude.

#### **4. Phytomorphic Elements in the Iconography of "Celestial Animals" as Probable Temporal Markers of the Cucuteni-Trypillia People and Symbols of Cosmological Order**

A distinctive place in the iconography of the Trypillia cultural heritage is occupied by a canon in which animal figures are combined with plant elements – most notably, a grain ear or stalk of cereal in the form of a tail. This iconographic construction reflects a deep semantic connection between the celestial and agrarian dimensions of the world, characteristic of the agricultural Trypillian civilization.

From an astronomical standpoint, the rising of Sirius – the brightest star in the night sky, identified with the "Celestial Dog" – displayed pronounced seasonality at the latitudes of the Trypillian cultural area (48–49° N) during the 4th–3rd millennia BCE. Accounting for the precession of the Earth's axis, this star was best observed during the autumn–winter period. In March–April it could be seen in the evening hours, after which it entered a period of astronomical invisibility from May through July. In August, the heliacal rising of the "Celestial Dog" occurred at dawn – approximately August 9, according to calculations for the Staropetrivske kurgan (Ukraine), located at 48°13' N, as of 1400 BCE (Vodolazhskaya et al., 2015, P. 44–45). Based on tentative estimates using the standard IAU precession model (taking into account the star's proper motion), the date of the heliacal rising of Sirius for the

period of the Trypillian flouruit could shift by approximately 9 days or so relative to calculations for 1400 BCE. However, this does not alter the seasonal character of the phenomenon.

Trypillian ceramics feature variants of a "celestial animal" with a grain-ear-shaped tail, suggesting a possible symbolic connection between zoomorphic imagery, astronomical phenomena, and the agricultural cycle (figure 17).



**Figure 17.** Iconographic variants of a "celestial animal" with a grain-ear tail on a Trypillian pot and a pot fragment.

*Source:* Novokhatko, 2004.

The variability in the iconographic tradition of "celestial animals" – with and without a grain-ear tail – may thus record fundamentally different temporal states of one and the same celestial object across the different seasons of the year. In other words, when a celestial event and an agrarian reality coincided in time, the Trypillians likely recorded this coincidence through ornamentation, organically merging zoomorphic and phytomorphic images into a single iconographic formula.

It is worth returning once again to the Cucuteni-Trypillia amphora (Figure 8), where, within the "animal circle," images of dogs or wolves with a grain-ear tail alternate with those bearing a natural tail – which may indicate a deliberate representation of two temporal phases: a period of flourishing plant life (sprouting, full-headed grain) and a period of its decline or dormancy.

It is also fundamentally significant that the tail – rather than the head, body, or legs of the animal – was chosen as the anatomical detail to which the plant element is "attached." Notably, the animal may be depicted physically holding this part of its body either lowered or raised upward. It is precisely this distinction that we observe when analyzing the iconography of this type.

From both an astronomical and an agrarian standpoint, this has a logical explanation: a zoomorphic image with its tail reared upward may denote sprouting and the phase of active spring growth. By contrast, a tail lowered downward, laden with a full ear of grain, likely marks the period of the ripening of the grain, the harvest, and the completion of the vegetative cycle.

As illustrated in figure 18, a Trypillian vessel fragment depicts an animal with a lowered, grain-ear-shaped tail alongside a crescent moon, suggesting a possible symbolic relationship between celestial phenomena and the seasonal agricultural cycle.



**Figure 18.** A fragment of a Trypillian vessel bearing an image of an animal with a lowered, grain-ear tail combined with a crescent moon.

*Source:* Burdo, 2004.

Thus, the dynamics of the tail's position on the sacred zoomorphic image may directly reflect the annual cycle of movement of the corresponding constellation across the night sky. In this model, a raised tail correlates with the period of visibility of the Canis Major constellation in March–April, while a lowered, grain-ear tail may mark August and the heliacal rising of this stellar object.

It is telling that a similar semantic construction – a star as harbinger of the harvest – is not unique to the Cucuteni-Trypillia tradition. As already noted above, in ancient Egyptian culture the heliacal rising of Sirius (the Egyptian Sopdet) signaled the beginning of the Nile's flooding and, simultaneously, the start of the agricultural season. In the ancient Greek tradition, Hesiod, in his *Works and Days*, directly linked the rising of Sirius to the season of harvest and grape-gathering (Hesiod, 1914; Chernovol, 2023).

Accordingly, the Cucuteni-Trypillia iconographic formula of the "animal with a grain-ear" fits within the broader context of astral-agrarian synchronizations, in which the appearance of a particular star served as a natural calendar for an agricultural community.

At the same time, our study reveals a notable expansion of the zoomorphic repertoire in Trypillian iconography that warrants separate comment. Alongside the dominant image of the dog (wolf), other animals combined with phytomorphic elements are also documented – in particular, images resembling a goat, an aurochs, and a fox (Burdo, 2004; Novokhatko, 2004). Nevertheless, as the iconographic material of the Trypillian archaeological complex attests, it is the dog that remains the most frequently reproduced motif.

In the author's view, this dominance is entirely logical. First, Sirius, as the brightest star in the night sky, is the most conspicuous and most easily identifiable astronomical object accessible to observation with the naked eye. Second, the temporal coincidence of its heliacal rising with the start of the harvest, as well as the spring awakening of the land, which coincided with the constellation's appearance, gave this astral image a distinct agrarian association. Third – and this is perhaps the most significant point – the dog, in archaic cultures, appears as a guide animal, a guardian of the boundary between the visible and invisible worlds (Eliade, 2020). The "astral dog," which disappeared from the sky for several months and returned at dawn precisely when the grain ripened, corresponded perfectly to this semantic role: it guarded the transition between celestial seasons in much the same way that a real dog guarded a settlement and its crops from unwelcome intruders (Husiev, 2021).

Thus, the diversity of zoomorphic motifs combined with phytomorphic elements does not contradict the proposed astral-agrarian model but, on the contrary, enriches and broadens its interpretive scope. It is evident that the complex Trypillian iconographic system was not confined solely to the image of the "celestial dog": it encompassed an entire complex of astral symbols, each carrying its own semantic content and its own ideological function.

Analysis of Trypillian ornamentation featuring the "celestial dog" motif further reveals derivative syncretic images within this same cosmological system, likewise combined with phytomorphic signs, but of a different order. A distinctive place within this system is occupied

by an image that synthesizes elements of the dog (wolf) with the key sacred symbol of the Trypillian civilization – the Sacred (or World) Tree.

As illustrated in figure 19, the painted decoration of a Trypillian ritual structure combines the Sacred Tree motif with zoomorphic imagery and a circular symbol, suggesting a possible symbolic relationship between animal representations and broader cosmological concepts.



**Figure 19.** Fragment of the painted decoration of a model of a Trypillian ritual structure featuring the symbol of the tree combined with zoomorphic imagery and a circle.

*Source:* Prychepii, 2018.

Figure 20 proves that the combination of the Sacred Tree and a dog (wolf) within a single ornamental composition on a Trypillian vessel suggests a symbolic connection between zoomorphic imagery and the cosmological significance of the World Tree.



**Figure 20.** The Sacred Tree combined with a dog (wolf) in a single ornamental composition on a Trypillian vessel (first half of the 4th millennium BCE).

*Source:* Burdo, 2004.

The synthesis of a zoomorphic image with the concept of the World Tree prototype elevates Trypillian iconography to a higher level of cosmological generalization. If the grain-ear tail denotes the temporal spectrum (specific phases of vegetation and the star's rising), then the combination of the dog with the Sacred Tree symbolizes the spatial and vertical dimensions of the universe. Within this sacred geometry, the dog functions not merely as guardian of temporal boundaries (the seasons), but as protector of the cosmic center itself – the vertical axis (axis mundi).

It is of fundamental importance that both signs are situated within the same register of the vessel: this attests to their cosmological equivalence, since they do not belong to different iconographic tiers but instead form a single compositional and semantic whole.

In this instance, however, the phytomorphic element is no longer merely an attribute of the animal, but an independent image that likely surpasses the zoomorphic image or images in sanctity. Indeed, the plant sign is often positioned at the spatial center of the scene, while the animals flank it symmetrically – that is, they literally "revolve" around it, like "bodies around a pole." The animal, even a "celestial" one, appears and disappears, subject to the law of precession and the seasonal cycle, whereas the Tree remains constant. This is precisely why, within the hierarchy of Trypillian sacred images, the phytomorphic sign embodying the axis mundi occupies an ontologically higher position: it is the very condition for the existence of everything else – both the celestial animals and the time that they measure out.

Compositionally, what we encounter here is the scheme, universal to ancient agricultural and pastoral cultures, of the "Tree of Life flanked by two guardian beasts." This symmetrical arrangement is well known in the iconography of the Near East, the Caucasus, and Steppe Eurasia, where a central treelike or pillarlike symbol is flanked by paired zoomorphic or ornithomorphic figures.

This scheme is likewise one of the most persistent in early European iconography (paired lions flanking a sacred tree, the heraldic symmetry of guardian beasts, and the like). The Trypillian material provides grounds for regarding it not as a borrowing, but as an independent manifestation of a universal cosmological intuition within European civilization.

Thus, in the syncretic image of "dog and World Tree," we are dealing with a fundamentally different semantic construction compared to the formula of the "animal with a grain-ear tail." Whereas the latter fixes the coincidence of the astral and agrarian cycles at a specific point in time – a kind of "snapshot" of celestial-terrestrial synchronism – the former expresses the very architecture of the cosmos: an immovable sacred center and eternal motion around it. One iconographic formula describes time; the other describes space and the order that gives rise to that time.

The phytomorphic elements in the iconography of the "celestial animals" on Trypillian ceramics thus function as a dual semantic code: they operate both as temporal markers of astral-agrarian cycles and as structure-generating symbols of the cosmic order. In this way, what emerges before us is a full-fledged iconographic language, capable of conveying astronomical, agrarian, calendrical, and cosmological content simultaneously, through the means of ornamental composition.

## **5. From a Linear Sequence to the "Animal Circle": The Closure of the Zodiacal Formula in Trypillia and Its Parallels with Göbekli Tepe**

This subsection raises the question: can the Trypillian ornamental motifs arranged in a circle on ceramic objects be regarded as a potential embryo of what would, much later, take shape as the zodiac (literally translated from Greek as "circle of animals")?

A compelling, and indeed quite literal, answer to this question is provided by a distinct category of Trypillian cult vessels – the so-called ark-shaped bowls. In these objects, the principle of "solar wave–pause–animal," examined above with reference to pots viewed from the side and from the zenith, is carried to its logical conclusion: the animal images on these artifacts no longer simply alternate with pauses along the neck of the vessel, but instead form a continuous, closed frieze. This frieze encircles the entire interior surface of the bowl and reveals itself to the observer only from a zenithal vantage point – looking down from above, into the depths of the bowl.

An illustrative example of this type is an ark-shaped bowl from the late stage of the Trypillia culture (Stage CII, approximately 3500/3400–2750 BCE) from the "PLATAR" collection (figure 21).



**Figure 21.** A Trypillian cult ark-shaped bowl bearing ornitho-zoomorphic images arranged in a circle around its interior surface. "PLATAR" collection  
*Source:* Novokhatko, 2004.

On the interior surface of the vessel shown here, a group of animals is rendered in dark brown paint: cattle, an aurochs (?) or other horned ungulate (both with and without a grain-ear tail), as well as a dog and a bird. On the bottom of the vessel, researchers have documented a scratched schematic image of a plant (Novokhatko, 2004), likely a tree.

The composition is arranged so that the entire bestiary appears before the viewer simultaneously – a single, unbroken band moving rightward along the walls of the bowl around the static symbol of the tree (barely visible, yet still discernible, in the photograph above). This provides direct confirmation of the compositional scheme already identified in this study through the "Sacred Tree between guardian animals" motif: the phytomorphic sign occupies the central, axial position (axis mundi), while the zoomorphic, potentially astral images are arranged around its periphery.

The only difference lies in the scale at which the same principle is realized: whereas on the pots and the model of the ritual structure the Tree was flanked by two animals, on the ark-shaped bowl the central plant sign is now surrounded by an entire closed "circle of animals."

Along the rim of the vessel, a rising and falling wave is also depicted, one clearly associated with the sun's ascent and descent above the horizon. This rhythmic, wavelike meander likely marks the sinusoidal pattern of the sun's daily and annual path. The combination of this upper solar-wave register with the dynamic band of animals reveals a coherent model of the Trypillian cosmos.

If the horizontal movement of the bestiary around the central tree-axis (axis mundi) reproduces the rotation of the starry sky and its constellations, then the wave along the rim synchronizes this stellar rotation with the solar cycle. The composition on the ark-shaped bowl thus emerges as a full-fledged projection of the celestial sphere onto the plane of sacred ceramics, uniting three foundational dimensions of zodiacal thinking: an immovable center (the vertical axis of the World Tree prototype), a solar rhythm (the waves), and a rotation of astral symbols (the animal circle).

A similarly developed type of composition, in which the zoomorphic motif varies through the alternation of different ornitho- and zoomorphic images within a single ornamental band, has also been documented on ceramics from the Trypillian settlement of Krutoborodyntsi I (Stage CI, approximately 3900–3500/3400 BCE) (Novokhatko, 2004).

In the upper portion of a large biconical vessel, a rhythmic procession of animals unfolds, moving from left to right, positioned within the "interwave" zones: a billy goat, a

nanny goat, a deer, and a wolf (or dog). In the space between figures – between the images of the goat and the dog/wolf – the scene is further completed with an image of the moon.

The presence of this lunar symbol among the animals carries particular weight, as it powerfully attests that the bestiary was indeed conceived against the backdrop of a celestial body visible only at night. This same logic is confirmed by the analysis of Figure 18, where the animal with the lowered, grain-ear tail is combined with a crescent moon.

Trypillian motifs are also known in which the crescent moon appears in the upper register as an independent element, rhythmically repeated around the circle of the composition, or else alternating with zoomorphic images. This not only demonstrates that the Trypillian ornamental system operated with a broad and varied set of graphic codes for representing different components of the celestial sphere, but also constitutes strong evidence that ancient farmers understood these zoomorphic figures precisely as attributes of, or counterparts to, the night, starry sky.

As illustrated in figure 22, the upper registers of Trypillian vessels feature symbolic motifs associated with the night sky, suggesting a possible representation of lunar and stellar cycles within a broader cosmological system.



**Figure 22.** Symbolism of the night sky in the upper registers of Trypillian pots.  
*Source:* Burdo, 2004; Novokhatko, 2004.

In the artifacts presented here, an image emerges that corresponds precisely to a phased lunar-stellar rhythm, or to a constant "nocturnal backdrop," against which the cyclical procession of astral figures unfolds.

The chronological position of the cult ark-shaped bowl and the vessel from Krutoborodyntsi I also deserves separate attention. Both artifacts belong to the late stage of the Trypillia culture (Stage CI–CII), meaning they are later than most of the monuments analyzed above (Trypillia BI–BII (4400/4300–4200/4100 BCE) and Trypillia BII (4200/4100–3900 BCE)) (Videiko, 2015, P. 449). This provides grounds to suppose that the iconographic formula "solar wave–pause–animal" evolved over time toward an increasingly complete, multi-figure procession of animals. Such a procession spans the entire band of the vessel and, by its very form, already resembles a closed circle. What we likely see here is the natural culmination of the centuries-long development of a single symbolic tradition.

The examples of Trypillian cult artifacts analyzed in this subsection demonstrate a fundamentally different, more complex type of composition, in which a group of distinct ornitho- and zoomorphic images is combined within a single ornamental band. It is precisely this coexistence of different animal figures within one continuous circle that constitutes the key structural feature distinguishing a genuinely "zodiacal" type of composition – the very principle underlying every historical zodiacal system.

Thus, a well-grounded answer can be given to the question posed at the start of this subsection: compositions such as the ark-shaped bowl from the "PLATAR" collection and the vessel from the Trypillian settlement of Krutoborodyntsi I allow us to speak of the existence, by no later than the end of the 4th millennium BCE, of a coherent iconographic model of a protozodiacal type. This model combines structural features (a closed circle), semantic features (the sequential alternation of several different animals), and functional features (a calendrical role) – all characteristic of later historical zodiacs.

This does not mean that the Trypillians possessed a zodiac in the classical sense, with fixed constellations and an ecliptic. However, the very structural logic encoding the body of artifacts examined here is, in essence, one of the earliest currently known prototypes of the principle of organizing the sky that, millennia later, would form the foundation of the classical zodiacal systems of Mesopotamia, Greece, and China.

In this sense, the Trypillian "animal circle" can rightfully be regarded as one of the earliest known prototypes of the zodiac available to humanity – not a metaphorical one, but a literal one, embodied in the simplest possible form: the closed circle of a vessel, around which animals move eternally, as if across the vault of the sky. Seen in this light, the Trypillia culture emerges not as a peripheral, localized episode in the history of humanity's astral beliefs, but as one of the earliest and most fully documented centers in which the very thinking and phenomenon that the later European tradition would call the "zodiac" first took shape – both materially (in the form of ceramics) and structurally (in the principle of composition).

It is of fundamental importance that the Trypillian system of encoding sacred imagery examined above is structurally isomorphic to that observed in the iconography of Göbekli Tepe.

As already noted, a series of scholarly works have proposed that the monumental column iconography of the Anatolian temple is not an isolated, localized phenomenon of the Pre-Pottery Neolithic, but rather the earliest known form in which the very same structural principle for encoding the celestial cycle was recorded – a principle that later reappeared in the ornamentation and plastic art of Trypillian ceramics, and even in the spatial organization of the Nebelivka temple of the Trypillia culture, the oldest temple on the European continent.

The material examined in the preceding subsections of this article makes it possible not only to confirm but also to substantially elaborate this hypothesis, by applying the formula of "solar wave–pause–animal," already tested on Trypillian sources, directly to the iconography of Pillar 43 in Enclosure D – one of the most iconographically rich monuments of the Anatolian complex.

Pillar 43 from Enclosure D, better known in the scholarly literature as the "Vulture Stone," has traditionally drawn researchers' attention primarily because of the animal figures depicted on it. As early as 2010, Vachagan Vahradyan proposed a connection between these images and constellations (Vahradyan, 2010, P. 161–177). His proposed correspondence, however, contained a number of inconsistencies.

Sweatman and Tsikritsis (2017), proceeding from the identification of the scorpion with the constellation Scorpius, associated the vulture image with the constellation Sagittarius and the summer solstice, and linked the stele's composition as a whole to a hypothesis of a catastrophic comet or meteorite event around 10,950 BCE. This work provoked considerable scholarly controversy.

Within the scope of the present study, however, what is of key importance is not so much the astronomical identification of individual animals, but rather another, less discussed detail of the composition in the upper register of Pillar 43 – a rhythmically repeated wavelike arc line that is, structurally and compositionally, a direct analogue of the Trypillian "solar wave" with its pauses.

The three wavelike structures in the upper register of Pillar 43, Enclosure D, correspond well to the three key positions of the sun over the course of the year: the maximally elevated summer arc, the intermediate spring-autumn trajectory, and the low winter path – that is, precisely the same three-part seasonal logic already demonstrated above using Trypillian material. Following this same interpretive logic, the zoomorphic images placed between these waves can be read not as an arbitrary decorative arrangement, but as an allegorical designation of the night, starry sky, which "fills" the pause between the completion of one solar arc (season of the year) and the beginning of the next.

In this sense, the compositional structure of Pillar 43 in Enclosure D at Göbekli Tepe reproduces the very same tripartite formula of "wave–pause–animal" traced throughout this study.

It is telling that the bestiaries of both traditions show a marked correspondence: both on Trypillian ceramics and in the upper register of the stone stele, recurring images include the bull/aurochs, birds (ornithomorphic motifs), and representatives of the canine family. In the Göbekli Tepe iconography, this latter image resembles a fox more than a dog – a difference that may be explained by the particularities of the local fauna. It is quite remarkable that the three interwave animal images from Pillar 43 are re-produced in exactly the same sequence on another stele from the archaeological complex – Pillar 2 from Enclosure A.

As shown in figure 23, the comparison of Pillar 43 (Enclosure D) and Pillar 2 (Enclosure A) at Göbekli Tepe reveals a corresponding sequence of zoomorphic images, including a bull/aurochs, a canine figure, and a bird, suggesting a shared structural principle in their iconographic organization.

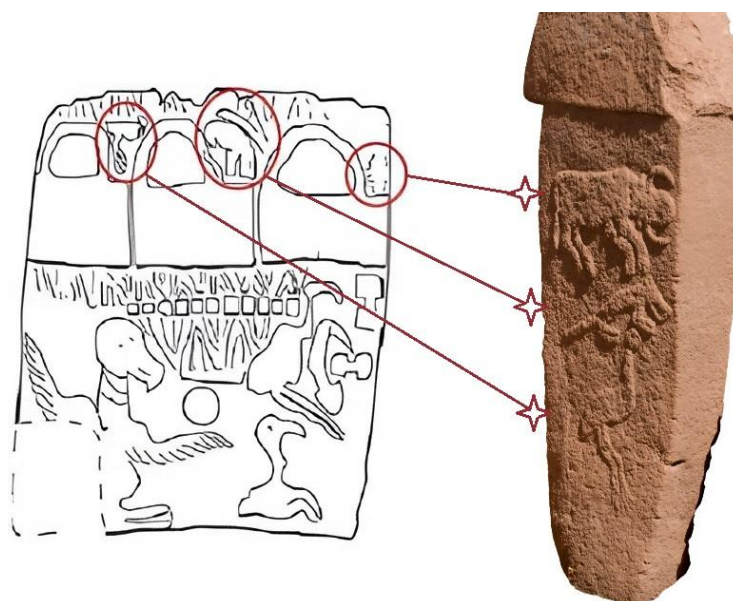


**Figure 23.** Iconographic correlation and structural correspondence between the zoomorphic images in the upper register of Pillar 43 (Enclosure D) and the vertical zoomorphic triad of Pillar 2 (Enclosure A) at Göbekli Tepe.

Source:

This comparison makes the correspondence clear: the three images inscribed on Pillar 43 within the pauses between the wavelike arcs of the upper register – the bull/aurochs, a representative of the canine family, and an ornithomorphic figure – are reproduced in the very same vertical sequence on Pillar 2 in Enclosure A. This stele, discovered during an early stage of excavation and described in detail both by K. Schmidt and by later researchers of the complex, consistently appears in the scholarly literature as one of the most recognizable reliefs at Göbekli Tepe – bearing a vertical trio of "aurochs–fox–crane" carved one above the other.

It is telling that such a repeatedly reproduced element, one that moreover dates to different periods in the complex's history, is difficult to explain as a situational or arbitrary choice on the part of the temple's builders. In all likelihood, this is a fixed, canonical element of a shared symbolic language at Göbekli Tepe, one reproduced according to an established pattern – much as, in Trypillia, this very same tripartite formula of "wave–pause–animal," with a similar set of zoomorphic figures, was reproduced on vessels from different settlements over the course of several millennia.

The triad "aurochs–fox–bird," recorded within the interwave intervals, may have functioned as a condensed formula for the full annual (or precessional) cycle, extracted from the broader mythological context. The reconstruction proposed here allows these zoomorphic markers to be tentatively assigned to specific seasonal intervals:

1. The "Fox" period (summer–autumn; approximately June 20 – September 20): fills the interval between the largest arc (summer solstice) and the middle one (autumn equinox). The night sky during this period may have been dominated by a stellar configuration associated with a member of the canine family.
2. The "Bird" period (autumn–winter; approximately September 20 – December 20): corresponds to the segment between the middle wave and the smallest arc (winter solstice). During this time, an allegorical bird figure may have marked out the stellar space.
3. The "Aurochs" period (winter–spring–summer; approximately the interval from the winter to the summer solstice): given the logic of the bucranium's placement before the largest solar wave on Pillar 43, the stellar embodiment of the bull may have appeared, or been marked by, its heliacal risings across the interval between December 20 and June 20.

It is necessary, however, to clearly delineate the boundaries of this reconstruction. It is not the aim of this article to identify the specific constellations that guided the builders of Göbekli Tepe in choosing these particular zoomorphic images, rather than others, to

designate the corresponding regions of the sky. Such a task would require a separate, purely astronomical investigation, one that accounts for the precession of the Earth's axis for the period when the complex was built and reconstructs the appearance of the night sky at that time using specialized software – a task that clearly lies beyond the scope of our comparative-religious-studies inquiry. What is presented here is the structural logic by which the iconographic programs of the stone stelae may have been organized – a logic that, in light of comparative analysis, proves quite similar to the sacred tradition of the Trypillia culture.

With regard to the aforementioned Pillar 2 from Enclosure A, it is also worth emphasizing that all of the animal images are oriented left to right, and that the fox figure is somewhat reared up – similar to what is observed in the Trypillia culture in the example of the "rearing dog." It is precisely this pattern that carries a universal astronomical character for the Northern Hemisphere, if these bas-reliefs are understood as stellar allegories connected to what would later become known as the constellation Canis Major.

Regardless of which specific zoomorphic marker is under discussion – aurochs, dog, or bird – for an observer oriented toward the southern sector of the sky (the direction in which the upper culmination of the sun and of the constellations in question occurs), the visible daily movement of absolutely all celestial bodies proceeds in the same direction: from east to west. Accordingly, the rightward-facing orientation of the animal figures on the Göbekli Tepe stelae is governed by the very same astronomical kinematics as the canonical orientation of the animals on Trypillian ceramics. This convergence between Anatolian monumental sculpture of the Pre-Pottery Neolithic and the Trypillian Chalcolithic ornamental canon constitutes yet another significant piece of evidence for the shared cognitive foundation underlying both traditions. The logic proposed here makes it possible to elaborate in greater detail on the unfolding of the "animal circle" as an embryo of zodiacal thinking, as illustrated by the examples of the Trypillian cult bowl and Pillar 2 from Enclosure A at Göbekli Tepe.



**Figure 24.** The closed, ring-shaped animal composition of the Trypillian cult ark-shaped bowl (below), set against the monumental-canonical sequence of zoomorphic symbols on Pillar 2 of Enclosure A / Pillar 43 of Enclosure D at Göbekli Tepe (above).

The comparison presented in figure 24 makes visible what had, until now, remained only a logical conclusion drawn from the analysis conducted here: one and the same tripartite animal sequence – "aurochs–fox/dog–bird" – which on Pillar 43 appears unfolded along a linear register, and on Pillar 2 is condensed into a simple vertical row, is, in its underlying structure, nothing other than an opened-out, "unrolled" variant of that very same closed animal circle already presented in a fully explicit, ring-shaped form on the Trypillian ark-shaped bowl, arranged around the vertical axis of the World Tree prototype.

It is also important to emphasize that the entire Trypillian zoomorphic sequence begins precisely with the image of two aurochs bearing differently shaped tails. This is by no means accidental. The Trypillian agricultural new year was closely tied to the spring awakening of nature – approximately around the time of the equinox. It was during this very same period, in the Trypillian era at European latitudes, that the stellar Bull appeared in the sky (the heliacal rising of the constellation Taurus occurred) (Chmykhov, 1994; Kirleis et al., 2024). Accordingly, the beginning of the calendrical cycle was most likely marked precisely by this symbol.

In light of this, the morphological differences between the two aurochs – one depicted with a tail in the form of a plant, the other without – receive a clear, logical explanation. This dual image likely marked the boundary between winter and spring: the transition from winter

dormancy to spring awakening. It is logical to assume that this iconographic choice also determined the compositional starting point of the sequence, beginning precisely with this element on the vessel, as the point of departure for the new agricultural year. As summer approached, however, the constellation would have been lost in the evening twilight (heliacal setting), giving way to new stellar markers.

Continuing rightward around the circle of the sequence – the direction toward which the entire bestiary is oriented – a dog is depicted next. This image correlates well with the summer period, as discussed in detail above. It is also known that in Ancient Rome, the heliacal rising of Sirius, part of the constellation Canis Major, heralded the onset of the hottest time of year. During this period of heat, the Roman senate would declare a recess in its proceedings – the origin of the word "canicula" (from the Latin *canicula*, literally "little dog"), the source of the modern term "canicule" or "dog days" (Chernovol, 2023).

After the dog, two aurochs appear once again, but this time with their tails, in both cases, joined to a phytomorphic symbol. As a result of astronomical precession, the constellation Taurus would reappear in the sky toward the end of summer, and the grain-ear tails correspond perfectly to this harvest season. The heliacal risings and settings of the Pleiades/Taurus are a well-known astronomical marker used for calendrical calculations of sowing and harvest by the Greeks, Sumerians, Egyptians, and other agricultural cultures (Magli, 2019).

It is telling that, just as in the Anatolian complex, it is the image of a bird that concludes the Trypillian zoomorphic sequence. It logically closes the circle, associating the corresponding season with a stellar allegory: following the ornithomorphic figure, the next element of the cycle is once again the pair of aurochs, marking a return to the starting point – the spring awakening of nature. Herein lies the fundamental distinction between the linear reading of Pillar 43 in Enclosure D and Pillar 2 in Enclosure A, on the one hand, and the circular reading of the Trypillian ark-shaped bowl, on the other.

Thus, the sequence "aurochs–dog–aurochs–bird," reproduced on the Trypillian cult bowl, corresponds closely to the "aurochs–fox–bird" found in the monumental sculpture at Göbekli Tepe. The shift from a linear to a circular recording of the same content most likely represents a natural, gradual development of a single symbolic system – one whose earliest currently known stage is documented at Göbekli Tepe, and whose developed, geometrically complete form is found in Trypillia.

It is essential to emphasize that this isomorphism should not be interpreted as the result of direct genetic transmission or immediate chronological borrowing. What is at issue here is the operation of a deep archetypal layer – a shared cognitive-cosmological language belonging to the ancient agricultural and pastoral communities of Eurasia. This language likely originated in the Pre-Pottery Neolithic of the Near East and, evolving through the neolithization of Europe, found its fullest embodiment and flourishing in the sacred ceramics, monumental temple structures (such as the Nebelivka complex), and the concentric planning structure of the protocities of the Trypillia civilization.

In any case, the established structural identity between the iconographic "grammar" of Göbekli Tepe and that of Trypillia provides grounds for regarding both traditions not as two disconnected, parallel episodes in the history of humanity's astral beliefs, but as two chronologically and geographically distant, yet typologically related, manifestations of one of the earliest ways in which humankind made sense of the sky.

## 6. The Origins of Zodiacal Thinking: On the Question of Chronological Boundaries

The analysis presented above makes it possible to propose a new chronological and conceptual model for the emergence of zodiacal thinking. The traditional scholarly position links the origins of this system to the Mesopotamian astronomical tradition of the 2nd millennium BCE, when the first written evidence of the systematic observation of ecliptic constellations appears (a development that eventually led to the formation of the regular twelve-sign zodiac in the 5th century BCE) (Steele, 2018, P. 97). The material from Göbekli Tepe and the Cucuteni-Trypillia culture, however, indicates that the cognitive foundation of this system – the conception of animals as markers of regions of the night sky associated with seasonal phases – existed considerably earlier.

The cognitive and iconographic isomorphism identified in this study between the artifacts of Göbekli Tepe and those of the Cucuteni-Trypillia complex provides grounds for reconsidering the origins of zodiacal knowledge. The material presented here attests to the

existence of a long-standing, distinctly canonized, and structurally coherent Eurasian tradition of recording celestial cycles, one that preceded the Mesopotamian system by at least several millennia.

The Trypillian tradition of the "animal circle," documented on ceramics, dates to the period of approximately 5400–2750 BCE. The linear, "unrolled" prototype of this very same structure, found on the monuments of Enclosures D and A at Göbekli Tepe, reaches back even further, to approximately 9500–8000 BCE. If this comparison is accepted as well founded, it implies more than a twofold – and in some respects even a threefold – increase in the currently accepted age of the cognitive-symbolic system under consideration.

Here, however, terminological precision is required, without which the thesis outlined above risks becoming an excessive generalization. A distinction must be drawn between the zodiac in its narrow, institutional sense – a fixed set of twelve equal sectors of the ecliptic bearing established names, serving as a mathematical apparatus for calculating and pre-dicting the positions of the sun, moon, and planets – and zodiacal thinking in the broader sense: the very mental operation of cyclically correlating the sun's annual path with an ordered sequence of animal images arranged in a circle around an unchanging center. This article does not claim that the inhabitants of Göbekli Tepe or the Trypillian farmers possessed a zodiac in the first sense. What it claims instead is this: the mental operation itself – the ordering of the year through a sequence of animals arranged in a circle or in a line – is attested in the material culture at least two millennia earlier than the moment of its first institutionalized written record.

It is worth noting that within the broader scholarly discourse on the deep prehistory of astral symbolism, considerably more radical, yet far less well-established, hypotheses also exist. In particular, Rappenglück (1999) has repeatedly interpreted the so-called "Shaft Scene" at Lascaux (c. 17,000 BCE) as depicting a bull alongside a representation of the Pleiades. This hypothesis has not gained acceptance among specialists in Paleolithic art and is regarded within the field with considerable reservation. This article does not rely on reconstructions of this kind and mentions them only to situate the material examined here within the broader spectrum of scholarly debate: by comparison, the correspondence drawn between Göbekli Tepe and Trypillia rests on a far more reliably documented, relatively later (though equally prehistoric) evidentiary base.

In summary, this article proposes that the prehistory of zodiacal thinking be understood as a sequence of at least three documented milestones within one and the same cognitive-symbolic continuum: a linear, open form (Göbekli Tepe); a developed, closed circular form (Trypillia-Cucuteni); and, ultimately, an institutionalized, mathematically formalized form (Babylon). The central thesis of this article is not to overturn the established history of the zodiac's origins, but to refine its leading edge: the chronological starting point of zodiacal thinking as a mental practice should be pushed back at least to the moment the images on the stelae of Göbekli Tepe were carved – unless still older monuments or artifacts come to light that record the same, a similar, or even a different proven symbolic formula predating the construction of the Anatolian complex. The final refinement of this boundary is a task not so much for comparative religious studies as for further archaeological and archaeoastronomical research.

## 8. Conclusions

The analysis conducted in this article provides grounds for a substantial revision of established conceptions regarding the chronological boundaries and cultural-historical centers in which zodiacal thinking took shape. A comparison of Trypillian sacred ceramics, temple architecture, and protocity planning with the monumental sculpture of Göbekli Tepe attests to the existence of a unified Eurasian tradition of recording celestial cycles – a tradition that preceded the Mesopotamian system by at least several millennia.

The comparative analysis made it possible to identify a stable iconographic formula – "solar wave–pause–zoomorphic image" – consistently reproduced across monuments of the Trypillia-Cucuteni cultural area from different periods and regions. It has been demonstrated that this formula is not an arbitrary decorative device: it reveals the mechanism by which a dualistic cosmological system was encoded, one in which light and darkness are subject to a clear cosmic order. Where the visible path of the celestial body (the solar arc) ends, the cult of the night begins to operate, marked by the appearance of animal images. The consistent orientation of these animals, the angle of inclination of their bodies, and their placement within the upper, near-rim register of the vessels align with the actual astronomical parameters

of the visible movement of con-stellations at Trypillian latitudes. This provides grounds for interpreting these images as deliberately encoded astral-calendrical information.

It has also been established that the phytomorphic elements in the iconography of the "celestial animals" – most notably the grain-ear tail – served the function of temporal markers, recording the coincidence between the heliacal rising of a given celestial body and key phases of the agricultural calendar. This makes it possible to affirm the dual, as-tral-agrarian nature of the Trypillian religious-symbolic language.

Of particular significance is the type of composition identified on Trypillian ark-shaped bowls and pots (notably from the "PLATAR" collection and the Krutoboro-dyntsi I site), in which a sequence of different animals is closed into a continuous frieze around a fixed center – the prototype of the World Tree (the axis of the universe). Given the combination of structural (a closed circle), semantic (the ordered alternation of several animal figures), and functional (a calendrical role) features, this composition corresponds to the basic organizing principle of historical zodiacal systems. This provides grounds for classifying it as the oldest currently known, materially documented prototype of the "animal circle."

The integration of the Sacred Tree symbol (axis mundi) into this system demonstrates that the zoomorphic images were subordinate to a higher hierarchy within the cosmic order, forming a universal scheme of eternal rotation around a fixed sacred center.

A comparative analysis with Pillar 43 (Enclosure D) and 2 (Enclosure A) at Göbekli Tepe has revealed a structural isomorphism between the two traditions: the identical tripartite sequence "aurochs–dog/fox–bird," which in the Trypillia culture appears closed into a circle, is documented at Göbekli Tepe in an open, linear form. This provides grounds for regarding these traditions not as two isolated episodes in the history of astral beliefs, but as chronologically distant stages in the development of a single cognitive-symbolic language – one that originated in the Pre-Pottery Neolithic of Anatolia and reached a developed, geometrically complete form in the Trypillia civilization.

On this basis, it is proposed that the prehistory of zodiacal thinking be understood as a sequence of at least three milestones within a single cognitive-symbolic continuum:

- A linear, open form (Göbekli Tepe, 10th–8th millennia BCE);
- A developed, closed (circular) form (Trypillia-Cucuteni, 5th–3rd millennia BCE);
- An institutionalized, mathematically formalized system (Babylon, second half of the 1st millennium BCE).

Accordingly, the emergence of zodiacal thinking as a mental practice – as distinct from the zodiac as an institutionalized mathematical apparatus for calculating the ecliptic – should be dated to at least the 10th millennium BCE.

The scholarly novelty of this study lies in identifying the phenomenon of Trypillian "protozodiacal circles" on sacred pottery and incorporating this material into a comparative analysis alongside the iconography of Göbekli Tepe within a single structural model. This provides grounds for regarding the Trypillia culture as one of the earliest and most fully documented centers in the formation of the astral-zodiacal worldview – both in its material embodiment (ceramics) and in its principles of compositional structure, which later formed the foundation of the European zodiacal tradition.

At the same time, it is important to emphasize the limits of the interpretation proposed here: the article does not claim that the bearers of the traditions under study possessed a zodiac in the narrow, institutional sense. What is at issue is the recording, in material culture, of the mental operation itself – the cyclical correlation of the solar year with an ordered sequence of allegorical animal images of the night sky arranged around an unchanging center.

Prospects for further research are linked, above all, to the application of specialized archaeoastronomical modeling, which, by accounting for the precession of the Earth's axis, would make it possible to reconstruct the appearance of the night sky during the period when Göbekli Tepe was built and during the flourishing of the Trypillia culture. Another important line of inquiry concerns clarifying the possible routes and mechanisms by which the identified symbolic formula spread across Eurasia – from the Pre-Pottery Neolithic of Anatolia to the early agricultural communities of Trypillia-Cucuteni.

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