

THE IAU WORKING GROUP ON STAR NAMES (WGSN): RESEARCH FINDS IN 2025

Susanne M. Hoffmann (Planet Earth),* **Khalid AlAjaji** (Saudi Arabia), **B.S. Shylaja** (India), **Yang Boshun** (China), **Danielle Adams** (USA), **Eric Mamajek** (USA), **Ian Ridpath** (UK), **Paul Baki** (Kenya), **Juan Antonio Belmonte Avilés** (Spain), **Sze-Leung Cheung** (Thailand/Hong Kong China), **Daniel Cunnama** (South Africa), **Jörg Matthias Determann** (Qatar), **M. Sadegh Faghanpour** (Iran), **Steven Gullberg** (USA), **Duane Hamacher** (Australia), **Roland Laffitte** (France), **Alejandro M. López** (Argentina), **Javier Mejuto** (Honduras), **Thierry Montmerle** (France), **Clive Ruggles** (UK), **Shi Yunli** (China), **Doris Vickers** (Austria), **Sun Xiaochun** (China), and **Hitoshi Yamaoka** (Japan).

* Corresponding author: starnames_chair@exopla.net

Abstract: The IAU-Working Group on Star Names consists of scholars with a huge diversity of cultural backgrounds. In our monthly discussions of cultural names from different places and times, this year we came across some interesting facts in intercultural comparisons. In particular, the constellation of Andromeda was depicted as the Syriac goddess Derketo in early al-Sūfī manuscripts, the 'Horse'-constellations of the Arabic, Babylonian, Greek and Indian culture are in the same area of the sky (around modern Pegasus) which invites studying possible cultural transfer. Another interesting coincidence is that the Greek asterism of the 'Manger' is at the same place as the Vedic 'Nourisher'. Furthermore, we found that one of the so-called ancient Greek globes (from Galerie Kugel in Paris) is actually Indian with Chinese and Persian influences, so likely dates to the so-called 'Greek period' in Indian art and astronomy. Technically, we announce the long-term venture of the 'All Skies Encyclopaedia' (ASE) and our 'Naked Eye Star Catalog' (NEC) which might be useful for all sorts of historical studies.

1 INTRODUCTION

The IAU Working Group on Star Names (WGSN) is in charge of assigning traditional names to stars brighter than $V = 6.5$ mag. The IAU-policy of diversity and appreciation of underrepresented cultures leads us to document many historical constellation names. In 2024, WGSN started monthly meetings to discuss the various options of selecting official names for stars from the large number of historical and Indigenous names from around the world. In April 2025, for instance, we discussed an asterism in Andromeda that has an indigenous Arabian name, an old Babylonian name, an Arabic star name that is actually a translation from an earlier Greek name, and also forms part of an early modern constellation whose name and ideological meaning (of supporting science) we want to preserve. In cases like this, the group tries to recognize all obsolete historical constellations—in some cases sparking further research on cultural exchange and its influence on the transformation of constellations. Our chair of the Arabic Subgroup, Danielle Adams, presented that on the occasion of a conference on cultural astronomy (IAUS 399,

organized by Duane Hamacher) in Melbourne in July 2025.

It has been proposed to use names of Australian Aboriginal constellations for the main stars of the modern Musca and Hydrus. On the occasion of the ICHST conference in New Zealand that some of us attended in June 2025, we collated more information on the Pleiades in different cultures.

In preparation of the discussion of the name proposal 'Shatabhisha' from the Vedic culture for a star in Aquarius, which was adopted in September 2025, WGSN found some interesting coincidences of Vedic constellations and depictions on an ancient Greek globe.

By writing up these finds and questions that were beyond our scope, we hope to inspire future research in cultural astronomy, specifically on the transfer and transformation based on cultural exchanges.

2 FINDS IN 2025

2.1 Horses in Ancient Skies

The modern constellation Pegasus is simply called ἵππος, Horse, in Ancient Greek. Aratos

(~250 BCE) states that the hoofbeat of this horse created the Hippocrene, a spring called 'fountain of the horse', below the eastern peak of Mount Helicon, north of Corinth. He implies that it could be Pegasus, but Eratosthenes (~200 BCE) also quotes nameless 'other' authors who do not believe this because the horse has no wings in the sky. Euripides (~450 BCE), for example, identifies the horse with Hippe, the daughter of the wise centaur Cheiron. When ancient Greek authors differ in their opinions as to which creature is depicted in a constellation, this typically points to a foreign origin of the image. Kidd (1997: 258) had suggested that the Greek idea of a horse is derived from Babylonian uranography by a pun or intercultural misunderstanding: The four bright stars α , β , γ Peg and α And together form the Babylonian constellation 'IKU' (The Field) and in a Mycenaean dialect, the word for 'horse' is 'iqo'. So, he suggests the homophony to have triggered a new imagined figure in Bronze Age, as the Mycenaean culture flourished between 1700 and 1100 BCE (cf. McHugh, 2016 and Kechagias and Hoffmann, 2022).

The WGSN notes that the Vedic nakshatra *Aśvini* (अश्विनी) is represented by an asterism formed by the stars β , γ and α Arietis (at least). The nakshatras are first attested in the Atharva-veda that dates between 900 and 600 BCE, but are probably older. In the sky, *Aśvini* is represented by a horse head (Figures 1a, 1b), as the word 'aśva' (अश्व) means horse (and so do all nine alternative names for this asterism: Dasra, Turaga, Turanaga, Adya, Asvi, Asva, Vaaji, Hari, Haya), and it lies next to the Greek constellation Γ ππρoς, Horse. This may or may not be connected: hints on exchanges of astronomical knowledge between the Indus Culture and Mesopotamia are given since the seventh century BCE but for earlier times (like the Bronze Age)

the sources on either culture are insufficient to deduce anything. Greek astronomical sources are even later (fourth century BCE).

Furthermore, Babylonian uranography had a constellation, The Horse, ^{mul}ANŠE.KUR.RA (𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵), (MUL.APIN I i 30) whose identification is uncertain but is usually suggested to lie in the area of Cassiopeia, Cepheus, and Draco, i.e. north of the Greek and the Vedic Horse, in the same range of right ascension. The description in MUL.APIN is given below in Table 1.

As the Babylonian Horse ^{mul}ANŠE.KUR.RA is given as 'left of' another constellation, it is not clear what exactly is meant. The mapping of the image of the daemon is rather certain concerning its identification with coordinates of stars in its breast (Deneb) and heel (λ And). If 'left' refers to the flank of the daemon figure, the Horse would be far away from the Greek and Vedic image, in Cepheus and Draco. In our opinion, Pegasus is not excluded for the identification of the Babylonian constellation but that would mean that there were two Babylonian constellations in the same space, The Horse (ANŠE.KUR.RA) and the constellation of One Field, IKU (it's a field measure, as if we would say 'one hectare').

Some scholars suggest its identification with stars in northwestern Pegasus or Cassiopeia (cf. Gössmann 1950; Kurtik 2007) where the Arabic horse-constellation al-Faras al-Kamil (الفرس الكامل), 'The Complete Horse' is located. This constellation is mentioned by al-Šūfī in the tenth century CE in text (al-Šūfī 1981: 133–134) and drawn in later illustrations (Figure 2). It is identified with faint stars northwest of the Square of Pegasus, including the bright star β Peg (Figure 2).

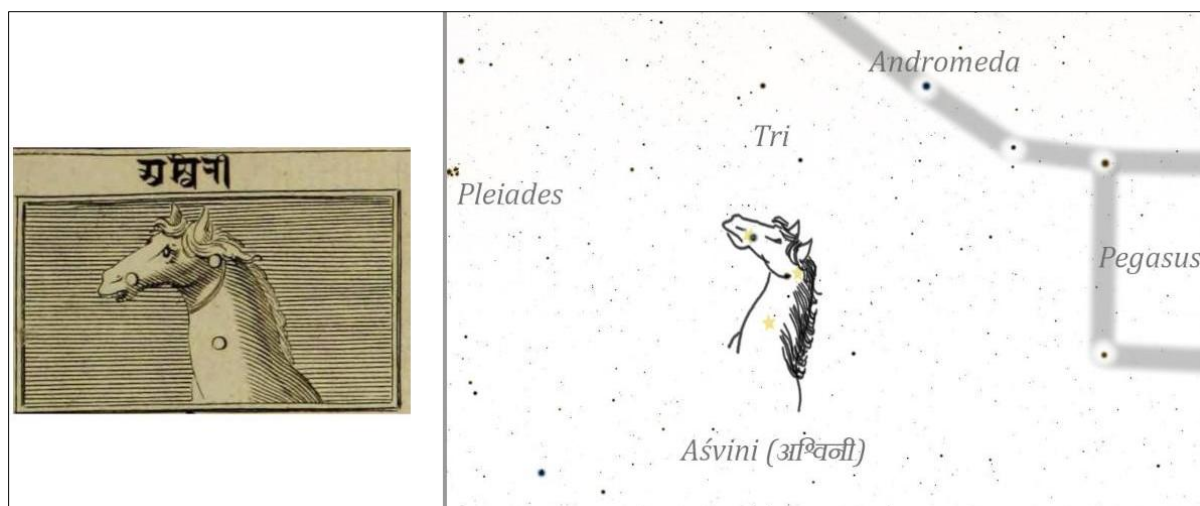


Figure 1a: The Vedic nakshatra constellation *Ashvini*, reconstructed by Jones (1790) and mapped to the stars in Aries on a Stellarium map (SMH 2025 for ASE).

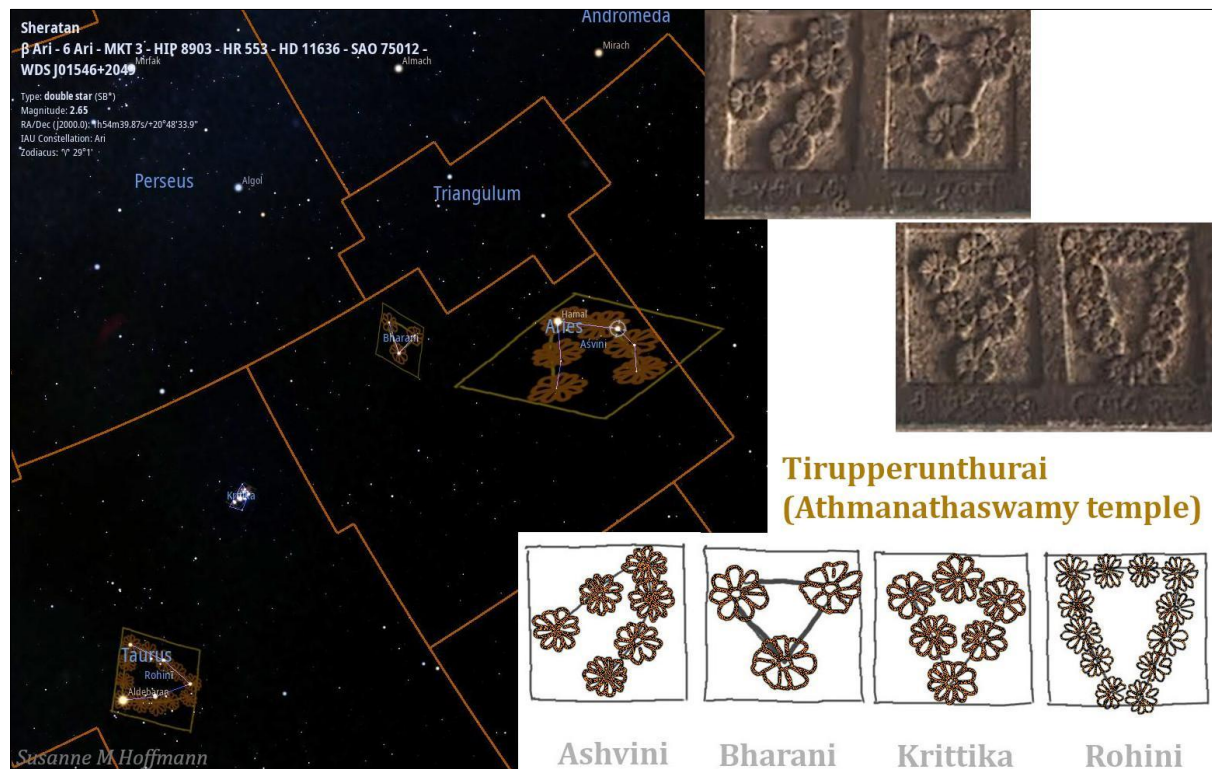


Figure 1b: The Vedic nakshatra constellation Ashvini as drawn in Tirupperunthurai at the Athmanathaswamy Temple, near Aranthangi, India, tenth century CE (drawn and mapped to Stellarium by SMH).

Table 1: Fragment of text in MUL.APIN with the original text and our translation.

Line No.	Original (Hunger and Steele 2019)	Our Translation
l i 28	DIŠ MUL UD.KA.DU ₈ .A dU.GUR	The Daemon with the Gaping Mouth, Nergal
l i 29	DIŠ MUL ša ₂ ina ZAG-šu ₂ GUB-zu MULŠAH ₄ dDa-mu	The asterism which stands on its right: the Pig, Damu
l i 30	DIŠ MUL ša ₂ ina GUB ₃ -šu ₂ GUB-zu MULANŠE.KUR.RA	The asterism which stands on its left: the Horse
l i 31	DIŠ MUL ša ₂ EGIR-šu ₂ GUB-zu MULulim SUKAL MUL.MUL	The asterism which stands behind it: the Stag, the minister of The Star Cluster

2.2 Andromeda and the Dromedary

In early 2025, the WGSN explored star names in Andromeda. Yet, the origin of the name ‘Andromeda’ for one of the IAU constellations remains unclear.

2.2.1 Who is ‘Andromeda’?

The story typically narrated is about a princess of a land called ‘Ethiopia’, but the Ancient Greek term “Αἰθίοψ” (*aithiops*, “... those with burned faces ...”) refers to all lands where people with dark skin live, everything from Nubia to India. In ancient Roman times, the legend of the princess is attested to refer to ‘Andromeda’s Rock’ in Old Jaffa in the modern metropolitan area of Tel Aviv (Josephus Flavius 1:3.419), but only 40 km further South at the Mediterranean coast, in Ashkelon, a very special love goddess was worshipped; she was a syncretism of the Egyptian Isis, the Babylonian Inanna, and the Syriac Derketo (home to the city of Bambyke, near modern Aleppo). Like Derketo’s, the cult of

the Goddess of Ashkelon was connected with water. The Greeks called her ‘Aphrodite Urania’, the Heavenly Aphrodite, who had a temple in Athens. The legend of Derketo is that she fell into a lake and a fish saved her from drowning.

Should the constellation of Andromeda represent a ‘heavenly lady’ who bears the name of a princess but actually is a goddess? The fact that the Babylonian uranography attests the constellation of the goddess Anunitu (MUL.-APIN l i 42) in the area of Andromeda (and northern Pisces) seems to support this idea, as ‘Anunitu’ is a by-name of the love-goddess Ištar and originally a local hypostasis of particular importance to the Akkadian Dynasty (around 2300 BCE). “Anunitu” literally means “... heavenly being ...”, as it contains the word “anu” (heaven/sky), but it also invites us to play with the homophony of Akkadian “nūnu”, fish. Hence, the association of the celestial goddess of love and fish seems to go back (at least) to the third millennium BCE.

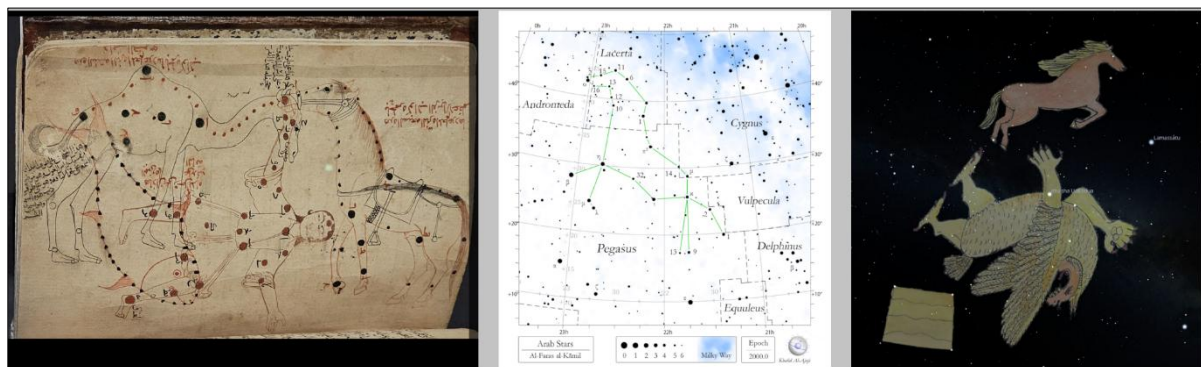


Figure 2: Historical manuscript (from “Kitāb Šuwar al-kawākib al-thābitah”, Bodleian Library MS. Huntington 212, from Mosul 1170), mapped Arabian horse by Khalid Al-Ajaji, mapped Babylonian Horse in Stellarium 25.1, painting by J. Gullberg et al. (2022).

2.2.2 Etymology of the Greek Name ‘Andromeda’

Possible derivatives are from ἀνδρίς (andris, woman) or ἀνδρός (andros, man/human), or δρομάς (dromas, running/runner). The latter is also the origin of the term ‘dromedary’ for the one-humped camels that are native to North Africa and Arabia in contrast to the two-humped camels from Central Asia (Peters and Heide 2021).

Interestingly, the Abbasid scholars writing in Arabic (Ibn Qutayba 1956: 33; al-Šūfī 1981: 77–78; al-Marzūqī) recognized the indigenous Arabian constellation of the She-Camel (al-Nāqa, الناقة) in the area of modern Cassiopeia, next to the lady that is now called ‘Andromeda’—and from the earliest drawings on, it is depicted as a one-humped camel, a dromedary (Figure 2). The earliest preserved (and, thus, most authoritative) manuscripts of al-Šūfī’s book date to the twelfth century CE. They even show the hand of the Heavenly Lady (Andromeda) at the same place as the head of the She-Camel, as if the lady feeds the dromedary.

This image, in turn, could even evoke associations of this lady with the general act of feeding camels, or even with the Biblical Rebecca, whose story is dated by some scholars to the Bronze Age. Yet, there is no textual evidence for any such connection.

Note, however, that the early Arabic drawings (including some versions of al-Šūfī) show an additional fish at the feet of Andromeda (Figure 2). It looks as if the lady rides on the fish between her legs which could also be a reference to Derketo who is taken to the lake’s shore on the back of a fish.

2.2.3 A Dromedary or a Camel?

It is an ongoing scholarly debate when camels and dromedaries were domesticated. On the one hand, there seems to be textual evidence

that the Asian two-humped camels were domesticated much earlier than the African one-humped camels (Peters and Heide, 2021); the first one being proven already in the third millennium BCE while the dromedary is attested only from around 1100 ± 100 BCE onwards. On the other hand, the so-called ‘Camel Site’ in Saudi Arabia hosts rock engravings of one-humped camels. The newest finds in archaeology date the ‘Camel Site’ to the Neolithic period before 2000 BCE (Charloux et al., 2022) instead of the earlier belief that it was made in the Nabatean time (from around the third century BCE to the second century CE). The dromedaries there are grouped in chains and even superposition, but they do not seem to carry any luggage or goods. The purpose of these depictions thus remains unclear: Should these dromedaries at the Camel Site represent domesticated exemplars, they would contradict (Peters and Heide, 2021), but if they only show wild camels, the period of the second millennium BCE marks a period when only two-humped camels were domesticated and one-humped camels were not.

The epoch around 1100 ± 100 BCE when dromedaries were certainly domesticated is also the time of the collapse of the Hittite Empire, the Trojan War, the Jewish ‘exodus’, and the occupation of Babylon by the Assyrians, followed by the establishment of a new empire and culture in Mesopotamia (with Babylon as new capital and its city god Marduk promoted to the highest god of the pantheon). This period with a lot of migration ongoing in the East Mediterranean and Western Asia is occasionally called the ‘Late Bronze Age Collapse’ by the media, although it is not really a collapse but definitely an interesting ‘time of change’. Might it be possible that the name ‘Andromeda’ of a princess in Greek mythology is somehow related to the migration of peoples and the domestication of dromedaries as a necessity (or prac-

tical advantage) for these migrations? This is certainly a topic for future investigation.

2.3 An Indian Influence on a Greek Globe?

While the WGSN thought about naming a star after the Vedic constellation Shatabhisha (शतभिषक्/ शततारका), it turned out that the history and etymology of this Vedic nakshatra in the realm of Aquarius is not well understood. The term “Shatabhisha” can be literally translated as “100 physicians”, but any religious context or mythology are missing.

Yet, we consider it interesting to mention that there might be a depiction on a Greek artifact that demonstrates exchange of Greek and Vedic astronomy. Three globes are completely preserved from Greek antiquity (Dekker, 2013): a marble globe with a diameter of 60 cm (the Farnese Atlas), and two small hand-held metal globes, one brass (the Mainz Globe) the other silver (the Kugel Globe). The tiny silver globe (6.3 cm) at the Galérie Kugel in Paris is peculiar (Cuvigny, 2004) as its drawing style in many aspects deviates from other traditions, e.g. Cetus is drawn as a real animal, a dolphin or whale instead of a sea-monster (cf. Hoffmann et al., 2022; Hoffmann; 2025b).

One of the strange items among the constellation images drawn on the globe is the figure at the position of Aquarius. It shows a naked man holding something in his hand that appears like a scarf blowing in the wind (Figure 3). The curly line that goes down (Southwards) from the hand of the man does not look like a stream of water from a Water-Pourer. It looks more like he is grasping something with his hand. That something has an eye, so it seems to be a snake or serpent (cf. Hoffmann, 2025b: 56). This turns the man at the position of Aquarius into a Serpent-Carrier, a ‘second Ophiuchus’. Ophiuchus in Greek mythology is the half-god ‘Asklepios’ (Latin: Aesculapius), the patron of the physicians and all medical professions.

The Kugel Globe is typically dated to the first or second century BCE (Cuvigny, 2004), and it is assumed that it comes from Anatolia. Yet, both statements are uncertain.

Note that the ring at the lower end of Aquarius’ snake is unexplained. Normally, the rings drawn on the Kugel Globe indicate named or unnamed asterisms in the sky, e.g. Corona Borealis, Corona Australis, the unnamed stars of Columba, the Pleiades, and a group in Cassiopeia. In a comparative study on the three Greek globes, Hoffmann (2025b) pointed out that the streams of water of The River (Eridanus) and the outlet of Aquarius usually form a vessel (or a lake/sea/ocean) for the sea-

monster seen in Cetus (Figure 4). On the Kugel Globe, Cetus is drawn directly at the colure circle and the curved lines of The River and Aquarius’ Snake are mirror-symmetrically East and West of it. Yet, this way, the outlet of Aquarius does not match the star pattern. Additionally, together with the ‘second Ophiuchus’ it testifies that the creator(s) of this image did not understand Greek uranography, but rather played with symmetries. The ring next to it seems to mirror the ring East of Eridanus (which represents the stars of Columba which were unnamed in Greek antiquity but registered in star catalogues as ‘unformed’, cf. Toomer, 1998).

However, it may or may not be a coincidence that the Vedic constellation in the *Shatabhisha nakshatra* is represented as a ring structure of exactly 100 dots (stars) in Jones (1790)—see Figure 5.



Figure 3: Aquarius on the Kugel Globe.

Note that Indian influence on the Kugel Globe drawings might be emphasized by the impression that the drawing of the Great Bear on this globe resembles a tiger rather than a bear, and tigers are also first mentioned in the Atharvaveda (Dvivedī, 1999), the earliest Vedic text with systematic astronomy for religious purposes. Furthermore, the lady at the position of the zodiac constellation Virgo on the Kugel Globe wears a sari (Indian dress) and not a Greek dress like the other ladies at the positions of Cassiopeia and Andromeda (Figure 6). This is particularly striking as the goddess in Virgo in all Mesopotamian and Graeco-Roman sources characteristically carries a barley stalk, which is missing on the Kugel Globe. However, note that this woman’s hairstyle rather looks like a Chinese ‘maiden bun’ (double), occasionally

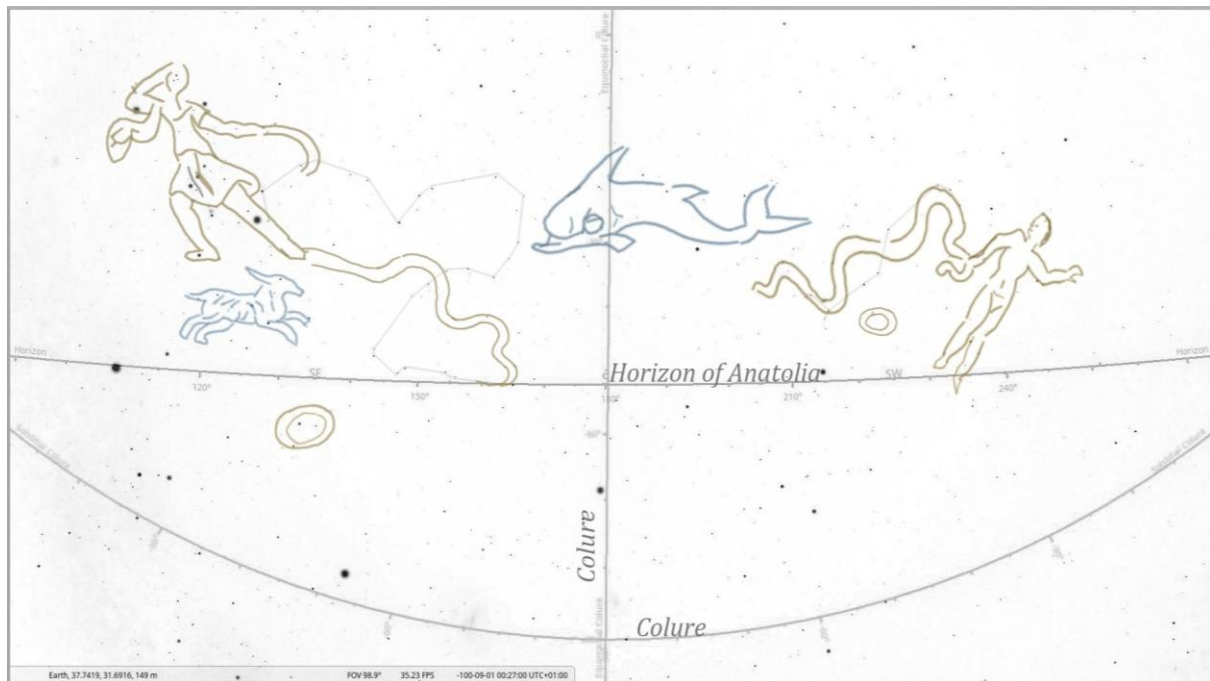


Figure 4: Images of Ori, Eri, Lep, Col, Cet, Aqr from the Kugel Globe mapped with Stellarium. The images drawn on this tiny globe typically don't match the starry sky.

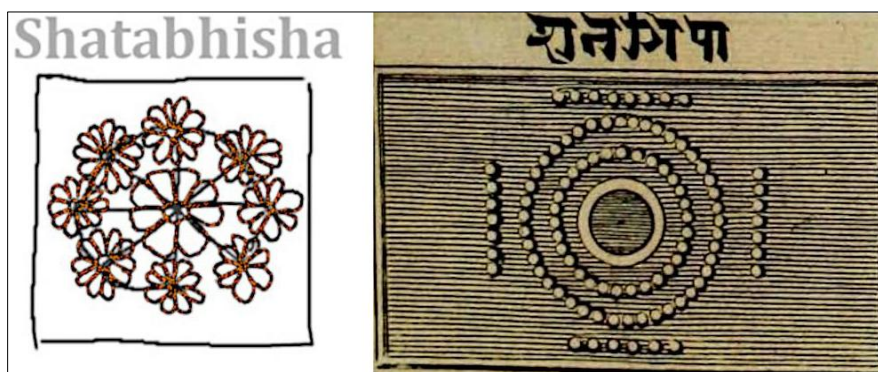


Figure 5: *Shatabhisha* as engraved in *Tirupperunthurai* (the Athmanathaswamy Temple) near Aranthangi, India, tenth century CE, drawing by SMH (left) and as reconstructed by Jones, 1790 (right).



Figure 6: Three views of the Kugel Globe (left to right: top, Virgo, Andromeda).

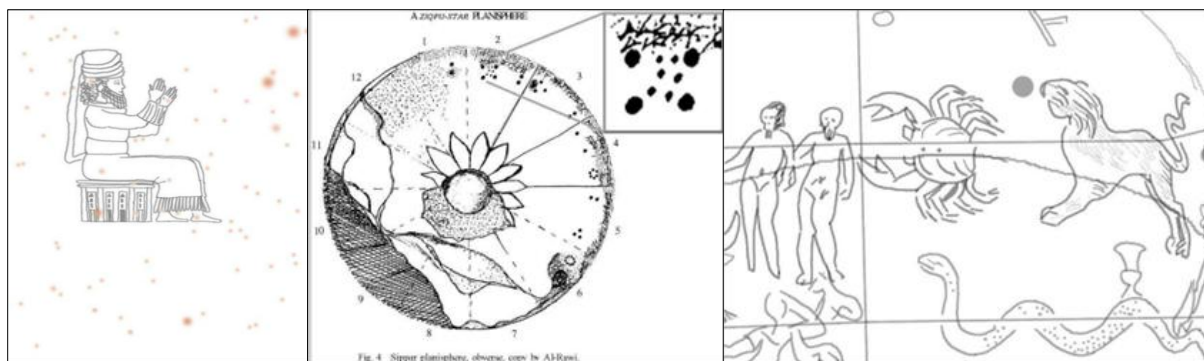


Figure 7 (left to right): Anu's temple as 'Seat of Anu' constellation (Hoffmann, 2021: 180) in Cancer; clay tablet depiction of the star pattern reproduced by al-Rawi (2001); detail of the Kugel Globe (Hoffmann, 2025b), where two of the dots on the crab's shell definitely represent stars, but for some other dots this is uncertain.

attested from the fourth century CE onwards for goddesses like *Luoshenfu Tu*. All this raises a number of questions concerning the geographical origin and date of the Kugel Globe: was it perhaps made in India with influences of Greek and Chinese art styles, and then shipped to Asia Minor where Cuvigny (2004) thinks it stems from?

The Kneeling Man (Hercules) on the Kugel Globe is not drawn athletically (which resembles rather Indian than Greek style). Cassiopeia's hair is made in the same (Chinese) style as Virgo. However, Lyra is drawn as a lyre based on a turtle shell, as the Greek legend tells. Yet, the man at Orion's position is not a hunter and does not protect himself; he just pulled out his sword, seemingly practicing for a fight (respectfully bowing to an imaginary opponent) rather than fighting. His sword, by the way, is a Persian 'crooked sword', much more curved than typical Indian or Chinese weapons. Thus, we suggest a more detailed study of this object (Kugel Globe) in order to determine the date and the time of this cultural mixture. The original claims by Cuvigny (2004) seem to be based solely on the simultaneous finding of the object at art markets in Paris with two other silver objects that are clearly Greek. For the globe, in contrast, we find this doubtful.

2.4 The Manger in Cancer

Cancer, the Crab, is a rather faint constellation. Its most recognizable feature is the quadrilateral in the center that surrounds an open star cluster M44 (Latin name 'Praesepe', the Manger). The ancient Greek image of the Crab as described by Eratosthenes in the third century BCE (Pamias and Zucker, 2013: 34–38) shows "... two bright stars on its shell: these are the Asses. The nebulous cluster is the Manger." (Figure 7). McHugh (2016) tries to explain this ridiculous image of a manger with two asses on top of a crab with a Babylonian pun but he fails. The cuneiform characters that he gives are not

right (Kechagias and Hoffmann, 2022). So, the question of the origin of this weird image remains open.

In the Vedic tradition, the central region of Cancer (with δ Cnc as the main star, *yogatārā*, योगतारा) is called 'Pushya', 'The Nourisher', which points to the same function as the name 'manger' in Greek. Indian star catalogs describe the appearance of the asterism with the term *meghavat* (from मेघ, *megha*, cloud) which refers to the open star cluster M44. As the Greek image fits neither their mythology, nor religion, nor their cultural calendar, it is suspected to be borrowed from another culture. The Babylonian one is excluded, as the name and image of asses with a manger did not exist there: In Babylonian uranography this area is named 'The Crab, The Seat of Anu', with Anu the God of the Sky. So, it suggests that the Indian and Greek names go back to the same source, or that one of them (perhaps the Greek one) took over this idea from the other.

2.5 The Pleiades

In English, the nickname of the Pleiades star cluster (M45) is the Seven Sisters, which aligns with a Greek myth of seven daughters of the nymph Pleione. Yet the Greek term for the star cluster, Pleias, Πλειάς, originally was not connected with maidens or the number seven. In Classical Greek, πλειάς simply means 'full' or 'many', likely referring to the cluster's densely packed appearance in the sky. Eratosthenes (~200 BCE) states that they are "... also called 'Heptaster' (The Seven Stars) ..." but wonders why "... we cannot see seven, but only six." (Pamias and Zucker, 2013: 72). He then continues with a mythological explanation that one of the women cannot be seen because she united herself with a mortal while her sisters married gods. The name variant 'Heptaster' is a reminiscence of a misunderstanding of a Babylonian text (cf. Kechagias and Hoffmann, 2022).

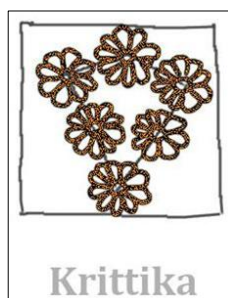


Figure 8: Engraving of Krittika in Tirupperunthurai (at the Athmanathaswamy Temple) near Aranthangi, India, tenth century CE, (drawing: S.M. Hoffmann).

Ancient Greek folk etymology, however, associated Πλειάς (Pleias) with the verb πλέω (pleō, 'to sail') and its participle πλεῖον (pleion), producing the idea of the Pleias as the 'Sailing Asterism'. This nautical interpretation fits well with practical experience: in the Aegean, the safe sailing season ran from the cluster's heliacal rising in May to its opposition (or 'acronychal rising') in November.

At some point, myth grew to match the etymology. The nymph Pleione, her name reshaped to echo 'sailing', was imagined as the mother of seven daughters, the Pleiades, whose names are recorded in Aratus' didactic poem of the third century BCE which was widely known and recited in schools and theatres like modern planetarium narratives. Yet this mythological framework may have been mnemonic rather than original, and was possibly influenced by contact with Indian star lore, where the cluster associated with seven damsels holds deep religious significance.

The Vedic name Kṛttikā, कृत्तिका, associated with the Pleiades, refers to the mythological story of seven damsels nourishing Lord Siva's baby. These seven are worshipped as Sapta Matrīkas (sapta = seven, matrī = mother); their idols can be found in many temples (Figure 8). So, the Greek idea of seven sisters might have been inspired by the Vedic religious image.

At least the idea of Seven Sisters cannot be directly derived from the Babylonian religious

ideas. In Mesopotamian uranographies, the seven gods associated with this star cluster in Sumerian times are male. The Babylonian astronomical compendium MUL.APIN literally states in line I ii 44 (Hunger and Steele, 2019):

DIŠ MUL.MUL d7.BI DINGIR^{meš} GAL^{meš}

The Star Cluster, The Seven, the great gods.

The Mesopotamian name for it is simply a plural of the word 'star' (mul) which can be translated as 'the stars' or 'the star cluster'. The rest of the line gives The Divine Seven, a group of seven male gods depicted as weapons described as being able to speak. Based on McHugh's (2016) suggestion of puns as origins of some weird image compositions in constellations, Kechagias and Hoffmann (2022) suggested that the line in MUL.APIN had a Sumerian origin and was misread in later times (when people spoke Akkadian, Aramaic or Greek in everyday life). This hypothesis derives from the fact that there were no commas in cuneiform texts and there is no verb in the above quoted phrase. So, the middle entity 'the seven' in line could be misread: for a native speaker, it is clear by the determinative 'd' (dingir, god) that the number seven refers to the gods, so there are seven gods and not necessarily seven stars, but a foreigner could confuse this.

Yet the preserved historical depictions in clay (see Figure 9 for relevant detail on tablet VAT 7851, published in Hoffmann, 2025a) and in Vedic temples display a unit of six (stars) in the Pleiades and not seven. Note that both images represented in Figure 9 seem to be drawn in a way that matches the view in the sky: clay tablet VAT 7851 is the only one of this type that shows the constellations *not* mirrored (as on globes). In the Greek *Almagest*, only four are mentioned in the star catalogue (Toomer, 1998), but this is because the stars are only anchors for a 'nebulous mass' that Ptolemy describes in



Figure 9 (Left): A Late Babylonian depiction of Taurus with the Pleiades as 'bristles' (mul-zappu) on the Bull's hump (VAT 7851, drawing after Hoffmann, 2025a); there are six plus two small bristles indicating six stars and two fainter ones. Right: The Vedic temple depiction illustrates Kṛttika with six stars (Jones, 1790), although religiously connected to seven damsels.



Figure 10: The Pleiades depicted in the streets of New Zealand around the ‘Matariki’ festival: all versions in a non-academic context show nine stars.

Table 2: Named stars of the Pleiades sorted by brightness (Simbad data).

No.	Name	HIP	V _{mag}	G _{mag}	Reference (Simbad data)
1	Alcyone	HIP 17702	2.84	2.88	2007ApJS..172..663S
2	Atlas	HIP 17847	3.62	3.68	2023A&A...678A..75Z
3	Electra	HIP 17499	3.71	3.8	2023A&A...678A..75Z
4	Maia	HIP 17573	3.85	3.9	2023A&A...678A..75Z
5	Merope	HIP 17608	~	4.16	2023A&A...678A..75Z
6	Taygeta	HIP 17531	4.3	4.4	2023A&A...678A..75Z
7	Pleione	HIP 17851	~	5.08	2023A&A...678A..75Z
8	Celaeno	HIP 17489	5.42	5.47	2023A&A...678A..75Z
9	HR 1172	HIP 17776	5.42	5.48	2023A&A...678A..75Z
10	18 Tau	HIP 17527	5.61	5.68	2023A&A...678A..75Z
11	Asterope	HIP 17579	5.71	5.74	2023A&A...678A..75Z

the area: Ptolemy’s star catalog is not an observational record but an instruction for globe makers (cf. Hoffmann, 2025b, Hoffmann and Yang, 2025), in this case: an instruction to draw a nebulous mass containing these four coordinates; so the actual number of stars remains open (‘densely packed’).

The other frequently discussed question is why the cluster is connected to the number seven although only six stars (or a patch) are easily visible. Astrophysically, the cluster consists of some thousand members (Heyl et al., 2022). The core region consists of six stars brighter than 4.5 mag (in V band) which were named Alcyone, Atlas, Electra, Maia, Merope, and Taygeta by our Working Group (see Table 2). The two stars HIP 17776 (HR 1172), and HIP 17527 (18 Tau), are visually a bit farther away, West and South of the group, so that they are as yet unnamed. Then follows Asterope with 5.71 mag in V-band. Hence, under clear skies, as many as eleven stars should be visible of which nine form a compound. Indeed, the Māori tradition characterises the Pleiades with nine stars (Figure 10), and the Mesopotamian with six plus two small (fainter) ones.

In conclusion, no culture has actually ever seen seven stars in Pleiades, but many (not all) have connected seven deities to them.

3 NOTES ON NEW NAMES

In the previous year, 2024, WGSN had already started monthly virtual meetings for the successive discussion of name proposals. At the end of the year, we had already released 19 new star names: in most cases based on the idea to find the oldest name of a modern constellation. With this attempt, we add some more finds:

3.1 Preserving Original Names

Hoerikwaggo (α Mensae, HR 2261, HD 43834, HIP 29271, GJ 231)

The brightest star in the constellation Mensa (V = 5.08), and a very nearby (10 pc) G-type main sequence star. The constellation Mensa was originally Mons Mensae (Table Mountain), the site of Nicolas-Louis de Lacaille’s observatory in Cape Town, South Africa. The local indigenous Khoekhoe name for the mountain was *Huri̯oaxa* (‘Sea-Mountain’), which was transliterated into Afrikaans as *Hoerikwaggo*. Adopted by the IAU WGSN on 12 December 2024.

Lang (α Tucanae, HR 8502, HD 211416, HIP 110130)

Exster (α Tucanae B)

A dual name was given to this spectroscopic binary of period ~ 11.5 years, with ‘Lang’ as A (the K giant) and ‘Exster’ as B for the fainter companion of unknown spectral type. *Lang* is a Malayan term for a bird in Indonesia, *Exster* is Dutch for a magpie. Both terms were used by de Houtman in his initial definition of the constellation (1603): ‘*Indiaenschen Exster*’, also called ‘*Lang*’.

Rhombus (α Reticuli, HR 1336, HD 27256, HIP 19780)

The brightest star ($V = 3.33$) in the constellation Reticulum. *Rhombus* refers to a previous constellation that pre-dated Reticulum, and is attributed to the German astronomer Isaac Habrecht II (1589–1633). *Rhombus* was printed on Habrecht’s 1621 globe and 1628 *Planiglobium Coeleste et Terrestre*. Adopted by the IAU WGSN on 19 September 2024.

Stellio (α Lacertae, HR 8585, HD 213558, HIP 111169)

The brightest star ($V = 3.76$) in the constellation Lacerta, the lizard. Johannes Hevelius (1690) introduced the constellation as *Lacerta sive Stellio* in his atlas *Firmamentum Sobiescianum*, where *Stellio* refers to the starred agama lizard (*Laudakia stellio*). Adopted by the IAU WGSN on 29 August 2024.

Uridim (α Lupi, HR 5469, HD 129056, HIP 71860)

The brightest star ($V = 2.30$) in the constellation Lupus. The creature of the beast now called Lupus, the Wolf, was called ‘The Mad Dog’ in Mesopotamia, possibly ‘mad’ due to rabies. It was also be called ‘The Rabid Dog’ (Wu, 2001). The term in Sumerian is UR.IDIM, two cuneiform signs, the first of which (UR) designates all canid and feline animals. The wolf in cuneiform would be written UR.BAR.RA in Sumerian and *barbaru* in Akkadian, and UR.IDIM designates a rabid dog.

3.2 Tracing Popular Names

The WGSN tracked down the origin of two modern names commonly applied to the variable stars Y Canum Venaticorum (La Superba) and T Coronae Borealis (the Blaze Star).

The origin of the name La Superba is widely attributed to the Italian spectroscopist Angelo Secchi who included Y CVn in a table of stars with spectra that he classified as Type IV, now known as carbon stars (Secchi, 1868). He

described the star’s spectrum as ‘superba’, but it seems that this word was simply his comment on its magnificent appearance, and not meant as a proper name. It was the Irish astronomer John Birmingham who first used La Superba (with capitals) as a proper name in a monograph on red stars delivered to the Royal Irish Academy in 1876 (Birmingham, 1879). Birmingham had presumably picked up the description ‘superba’ from Secchi’s table of 1868 and turned it into a name.

There has been much interest recently in the recurrent nova T Coronae Borealis (T CrB) because of the possibility that it might be about to undergo another outburst. Its first known outburst was observed in 1866 by John Birmingham (the same man who named La Superba) when it rose from magnitude 10 to 2. A second major brightening occurred in 1946, leading to the suggestion that it has a cycle of 80 years or so. The WGSN found that the first recorded use of the name Blaze Star for T CrB was in a lecture by the British spectroscopist William Allen Miller at a meeting of the British Association in 1869, and published in the *English Mechanic*. The name was popularized by R.A. Proctor (1872) and later his daughter Mary Proctor (1897).

Howell et al. (2025) detected a stellar companion to Betelgeuse (α Orionis), the closest M-supergiant to the Sun. The name Betelgeuse derives from the Arabic *yad al-Jawzā*, meaning ‘the Hand of al-Jawzā’, with al-Jawzā being the proper name of an old Arabian female figure in the sky. The stars representing the complete figure of al-Jawzā were largely consistent with those of Greek Orion. Given that the stellar companion goes around (orbits) the Hand of al-Jawzā, the discoverers suggested that it be named Siwarha (سوارها), meaning ‘Her Bracelet’, an object that goes around one’s hand. The inclusion of the feminine pronoun *-hā* in this proposed name was specifically intended to acknowledge this Arabian female figure. In September 2025, the WGSN recognized and appreciated the cultural thought and research that went into choosing this name and approved Siwarha for Betelgeuse B (α Orionis B).

4 TECHNICAL UPDATES

4.1 All Skies Encyclopaedia

Accompanying the group discussions and decisions, in 2024, we started creating a dictionary for the public documentation of the names that we discuss. In this dictionary, the All Skies Encyclopaedia (see Figure 11), all names are well-documented with etymology, transformation, cultural transfer and visual representation. This applies to names that are adopted in the

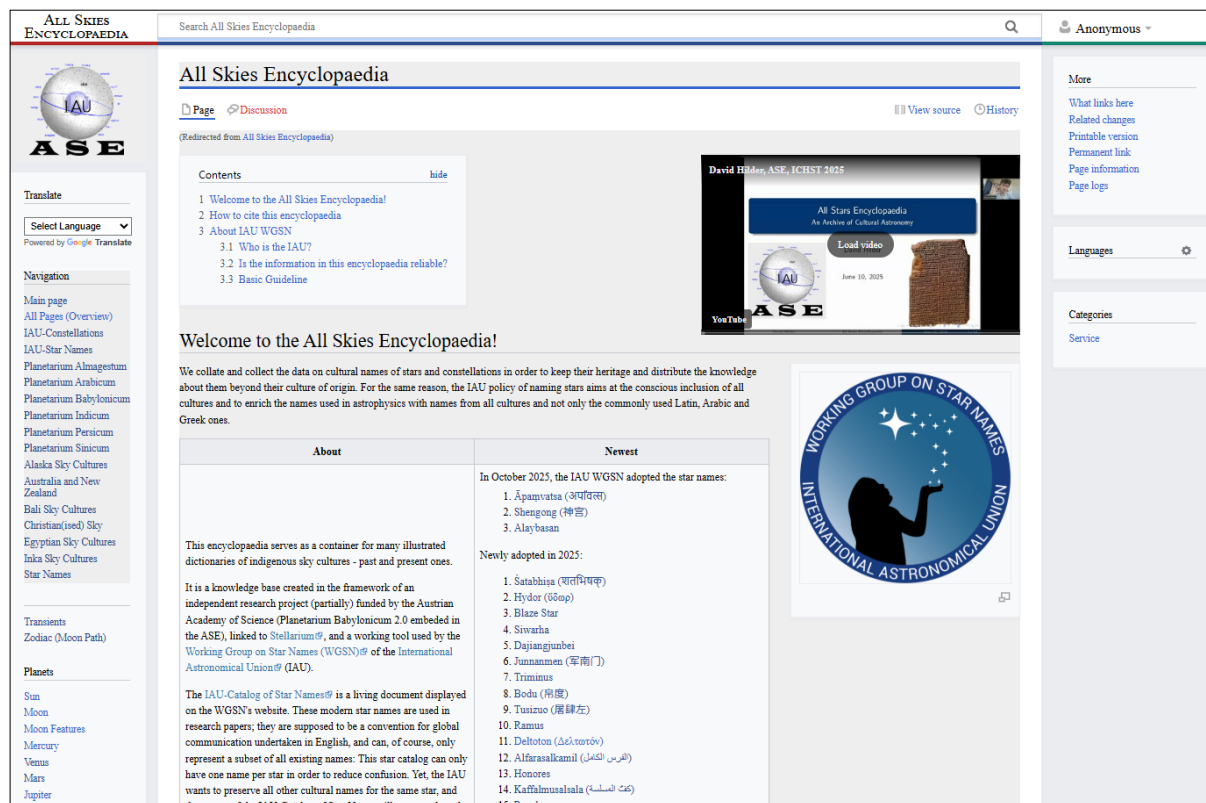


Figure 11: Screenshot of the title page of the All Skies Encyclopaedia with an introductory talk by a student from New Zealand and a list of recently adopted star names (<https://ase.exopla.net>).

IAU's *Catalog of Star Names* (CSN) and those that are not adopted, including an explanation for why they were not adopted. For instance, the name *Telescopium Herschelii* will not be adopted because 'Telescopium' is an IAU constellation, and 'Herschelii' refers to a person, which does not comply with the rules of naming stars. Likewise, the Chinese term 'Xuanyuan' was discussed but not adopted, because it refers to a legendary 'Yellow Emperor' figure for which the only adequate star to bear the name would be Regulus (which is named already).

The Encyclopaedia hosts all these names, and follows well-reflected conventions concerning categories, fields of knowledge, choice of words to fit globally (cf. Hoffmann, forthcoming). For instance, we agreed to write them in the nominative case, although historical texts may differ. Epistemologically, it makes a huge difference if the historical astronomer pointed to the sky and said "there is God XY" or "there is the image of God XY" (see the 1929 oil painting "La Trahison des Images" ("The Treachery of Images") by the Belgian surrealist artist René Magritte). The wording in the genitive case is already attested in antiquity: e.g. Ptolemy always speaks about the "constellation of ...", with the name in the genitive case in his head-lines (much less sloppy than we do it today). In Babylonian culture, we know that deities had

two visual representations: the statue in the temple, and the asterism in the sky. This does not necessarily mean that the asterism literally *is* the deity. However, this nuance might have led to transformations or changes in cases of cultural transfer, in particular when visual representations of deities of any culture were taken over, misunderstood and reinterpreted by other cultures (cf. Kechagias and Hoffmann 2022; McHugh 2016).

4.2 The Naked Eye Star Catalog (NEC)

The basic criterion for cultural names has always been the visibility of the object with the human eye. Historians of science in the past century typically used the so-called (Yale) *Bright Star Catalog*, or *BSC* (Schlesinger, 1930 to Hoffleit, 1990), for all computations (cf. Grasshoff, 1990; Toomer, 1998; and others). However, there have always been known problems such as (a) that this catalog also includes some novae that were visible only once in eruption and are otherwise invisible and need to be deleted for historical considerations (Hoffmann, 2017, 51–52), and (b) inconsistencies in listing binary stars: some are listed as one dot in the sky, others as two (like ξ Sco) so that the *BSC* suggests the wrong brightness. This problem is mostly solved in the HIPPARCOS star catalog, which in turn brings up other issues, but it ex-

tends far beyond the visibility limit of the human eye and must be truncated for use in historical studies. Furthermore, there are some (globular) star clusters that are not included in the *BSC* but appear as ‘fuzzy stars’ to a naked-eye observer.

To cope with all these problems, we have created our own star catalogue by (1) extracting all objects brighter than $V = 6.5$ mag from the SIMBAD database. This solves the problem of binaries that are correctly listed either in the *BSC* or in the HIPPARCOS star catalog (but not in both). Yet it results in stars like α Crucis listed three times in our catalog: as component A, component B, and the visible dots of integrated brightness of these two. For naming bright stars, this might be advantageous, as the WGSN could give this star a double name (see above example ‘Lang-Exster’ for α Tucanae).

However, some of the bright stars, surprisingly, do not have an entry for the V-band (e.g. γ Trianguli was missing). Therefore, (2) we also extracted all stars with a G-band magnitude ≤ 6.5 mag and (where possible) added the V-magnitude manually. The list is sorted by right ascension as the primary, and declination as secondary, criterion. Two stars were added later and, thus, do not fit the order. As of November 2025, the *NEC* includes exactly 9301 objects.

The extracted catalog was, then (3), manually reworked, e.g. human readable designations (e.g. Bayer) and constellation names were added (the assignment to the IAU-constellation areas is helpful for our work). For our purposes of public outreach, where we started creating ‘profile cards’ for the stars displaying their surface temperature, distance in light years, and other data, we also added columns in our star catalog. These physical data are preliminarily incomplete, and will be added to later.

The *Naked Eye Star Catalogue* (NEC) is currently downloadable from the WGSN website (<https://exopla.net>), but will be made public in the CDS VizieR catalog of catalogs. The current incompleteness calls for future releases with more and updated data. On our website,

we now provide four catalogs. These are two ‘name catalogs’: the IAU *Catalog of Star Names* (CSN) and the IAU *Catalog of Exoplanet Names* (CEN); and two ‘star catalogs’: the *Naked Eye Star Catalog* (NEC) and the catalog of stars fainter than 6.5 mag that were named by the IAU, e.g. in naming campaigns (e.g. the WGSN-Faints).

5 ACKNOWLEDGEMENT

Our warm thanks go to the Editors of *JAHH* for accepting this report.

We are highly thankful to the library of the Indian Institute of Astrophysics for providing us with the old reference of Jones (1790). Gratefully, we made use of detailed photographs by the Galerie Kugel (Paris), a private collection of Nicolas and Alexis Kugel. Also, we acknowledge the wonderful drawings and paintings by Kay Elzner in Hoffmann (2021) that we reproduced here in our own version. We make frequent use of the star database Simbad from the Centre des Données Stellaires (CDS), Wenger (2000) and Stellarium for cultural astronomy (Zotti et al., 2021).

6 AUTHORS’ CONTRIBUTIONS

All members of WGSN are co-authors. S. Hoffmann, as the Chair of the WGSN, managed the Working Group and took the initiative for writing this up. Al-Ajaji contributed the important depiction of the al-Šūfī manuscript; B.S. Shylaja the Indian information; and Yang Boshun confirmed the information on historical attestation of the crucial hair style. D. Adams contributed information on Indigenous Arabian constellations and, as the Chair of the Arabic Subgroup, organized some more meetings on the topic; E. Mamajek and I. Ridpath contributed etymology sections. All other members helped actively with the writing, and participated in oral discussions at monthly meetings.

The authors thank Rob van Gent (Netherlands) for his advice; he has been a member of the WGSN and frequently contributes important material to our discussions.

7 REFERENCES

- Aratus, and Kidd, D., 1997. *Aratus: Phaenomena*. Cambridge, Cambridge University Press.
- Birmingham, J., 1879. The red stars. *The Transactions of the Royal Irish Academy*, 26, 249–354.
- Charloux, G., Guagnin, M., Petraglia, M., and AlSharekh, A., 2022. A rock art tradition of life-sized, naturalistic engravings of camels in Northern Arabia: new insights on the mobility of Neolithic populations in the Nafud Desert. *Antiquity*, 96(389), 1301–1309.
- Cuvigny, H., 2004. Une sphère céleste antique en argent ciselé. In Harrauer, H., and Pintaui, R.(eds.), *Gedenkschrift Ulrike Horak*. Florence (Papyrologica Florentina 34). Pp. 345–381.
- Dekker, E., 2013. *Illustrating the Phaenomena*. Oxford, Oxford University Press.
- Dikshit, S.B. (English transl., Vaidya, R.V.), 1981. *Bharatiya Jyotish Sastra (History of Indian Astronomy History. Part 2: History of Astronomy During the Siddhantic and Modern Periods*. Delhi, Controller of Publications.

- Dvivedī, K., 1999. *A Cultural Study of the Atharvaveda*. Santiniketan, Vishvabharati Research Institute.
- Gössmann, F., 1950. *Planetarium Babylonicum, Pāpstl.* Rome, Bibelinstitut.
- Grasshoff, G., 1990. *The History of Ptolemy's Star Catalogue*, New York, Springer.
- Gullberg, J., Hoffmann, S.M., and Gullberg, S.R., 2022. Painting Babylonian: new constellations in Stellarium. In Hoffmann and Wolfschmidt, 171–191.
- Hevelius, J., 1690. *Firmamentum Sobiescianum sive Uranographia*. Gdansk, Johannis Zachariae Stollii.
- Heyl, J., Caiazzo, I., and Richer, H.B., 2022. Reconstructing the Pleiades with Gaia EDR3. *The Astrophysical Journal*, 926(2), id.132, 13 pp.
- Hoffleit, D., and Jaschek, C. (eds.), 1991. *The Bright Star Catalogue*. New Haven, Yale University Observatory.
- Hoffmann, S.M., 2017. *Hipparchs Himmelsglobus*. Wiesbaden, Springer.
- Hoffmann, S.M., 2021. *Wie der Löwe an den Himmel kam, illustriert von Kay Elzner*. Stuttgart, Franckh Kosmos.
- Hoffmann, S.M., Vickers, D. and Geymeier, M., 2022. Constellation Cetus: whale or monster? In Hoffmann and Wolfschmidt, 287–340.
- Hoffmann, S.M., and Wolfschmidt, G. (eds.), 2022. *Astronomy in Culture – Cultures of Astronomy*. Hamburg, Tredition.
- Hoffmann, S.M., 2025a. Image analysis of VAT 7851. *Archiv für Orientforschung*, 56, 45–53.
- Hoffmann, S.M., 2025b. Some results on the ancient globes. *Globe Studies – The Journal of the International Coronelli Society*, 69, 41–69.
- Hoffmann, S.M., and Yang, B., 2025. Data analytics for tracing methods of ancient astronomy. In Thuillard, M., (ed.), *Probing the Past with Data Analytics and AI*. New Jersey, World Scientific. Pp. 201–221
- Hoffmann, S.M. and B.S. Shylaja (forthcoming). Nakshatras in the first millennium BCE.
- Horowitz, W., and Al-Rawi, F.N.H., 2001. Tablets from the Sippar Library IX. A Ziqpu-Star Planisphere. *Iraq*, LXIII, 171–181.
- Howell, S.B., Ciardi, D.R., Clark, C.C., Hope, D.A., Littlefield, C., and Furlan, E., 2025. The probable direct-imaging detection of the stellar companion to Betelgeuse. *The Astrophysical Journal Letters*, 988(2), L47.
- Hunger, H., and Steele, J.M., 2019. *The Babylonian Astronomical Compendium MUL.APIN*. New York, Routledge (doi:10.15184/aqy.2022.95).
- Ibn Qutayba al-Dīnawarī, Abū Muḥammad ‘Abd Allāh b. Muslim. 1956. *Kitāb al-anwā’ (fi mawāsīm al-‘Arab)*. Hyderabad, Maṭba‘at Majlis Dā‘irat al-Ma‘ārif al-‘Uthmānīyah.
- Jones, W., 1790. On the antiquity of the Indian Zodiac. *Asiatick Researches*, 2, 289–306.
- Kechagias, A.-E., and Hoffmann, S.M., 2022. Intercultural misunderstandings as possible source of ancient constellations. In Hoffmann and Wolfschmidt, 205–235
- Kurtik, G., 2007. *Звездное небо Древней Месопотамии. Шумеро-аккадские названия созвездий и других светил [The Star Heaven of Ancient Mesopotamia: Sumero-Akkadian Names of Constellations and Other Heavenly Bodies]*. St. Petersburg, Aletejja.
- al-Marzūqī, Abū ‘Alī Aḥmad b. Muḥammad b. al-Ḥasan (died 1030), 2002. *Al-Azminah wa- al-Amkinah (Times and Places)*. Beirut, World of Books). الإمام أبو علي أحمد بن محمد بن الحسن المرزوقي (توفي سنة 421 هـ)، الأزمنة والأمكنة، تحقيق د محمد نايف الدليمي، عالم الكتب، بيروت، لبنان، 1422 هـ.
- McHugh, J., 2016. ‘How cuneiform puns inspired some of the bizarre Greek constellations and asterisms. *Archaeoastronomy and Ancient Technologies*, 4(2), 69–100.
- Miller, W.A., 1869. Experimental illustrations of the modes of determining the composition of the Sun and other heavenly bodies by the spectrum. *English Mechanic*, 9, 515
- Peters, J., and Heide, M., 2021. *Camels in the Biblical World*. Winona Lake, Eisenbraun.
- Pamias, J., and Zucker, A., 2013. *Ératosthènes de Cyrène: Catastérismes* (translated). Paris, Les Belles Lettres.
- Proctor, R.A., 1872. The star depths. *The Mechanics’ Magazine*, 96, 378–379.
- Proctor, M., 1897. Heavens for June. *Popular Astronomy*, 5, 104.
- Schlesinger, F., (ed.), 1930. *Catalogue of Bright Stars*. New Haven, The Tuttle, Morehouse & Taylor Company.
- Secchi, P.A., 1868. *Sugli spettri prismatici delle stelle fisse, Memoria Seconda*. Rome, Tipografia delle Belle Arti.
- al-Šūfī, Abū al-Ḥusayn ‘Abd al-Raḥmān b. ‘Umar, 1981. *Kitāb šuwar al-kawākib al-thamāniya wa al-arba‘in*. Beirut, Dār al-Āfāq al-Jadīda.
- Toomer, G.J., 1998. *Ptolemy's Almagest* (English translation). Princeton, Princeton University Press.
- Wenger, M., 2000. The SIMBAD astronomical database. The CDS reference database for astronomical objects. *Astronomy and Astrophysics Supplement Series*, 143, EDP, 9–22 (doi:10.1051/aas:2000332).
- Wu Yuhong, 2001. Rabies and rabid dogs in Sumerian and Akkadian literature. *Journal of the American Oriental Society*, 121(1), 32–43.
- Zotti, G., Hoffmann, S.M., Wolf, A., Chéreau, F., and Chéreau, G., 2021. The simulated sky: Stellarium for cultural astronomy research. *Journal of Skyscape Archaeology*, 6(2), 221–258 (DOI: 10.1558/jsa.17822).