

HOW DID THE CONSTELLATION OF THE BEAR RECEIVE ITS NAME?

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Abstract

The name *Ursa* or *Bear* for the two northern constellations is an enigma and has been discussed for the last 2000 years. This paper presents evidence from early Greek and Latin texts having to do with the naming of these constellations, when and why the name *Bear* was chosen. It is found that in early Roman texts, 1st century CE, it is clearly written that if one would like to give a constellation an animal's name, *Bear* would be appropriate as the original Greek word ἡ ἄρκτος has that meaning as well as the meaning it seems to have had from the beginning, rolling or turning, which provides the reason why it was used to refer to the circumpolar stars. The analysis is based on the available ancient texts, but is not a linguistic analysis.

Introduction

During the investigation of the astronomical knowledge of the Minoans and also of the transfer of that knowledge down to the Greeks in historical times, no later than ca. 700 BCE, a major problem arose concerning the names that we use today for two constellations, *Ursa Major* and *Ursa Minor*. *Ursa* appears for the first time in some Roman texts on astronomy and is feminine, as is the Greek word for bear, ἡ ἄρκτος (*arktos*). There are several questions to consider: 1) Was the name intentionally chosen for the constellation from the beginning? 2) Was the Greek name a misunderstanding of a word from the east, i.e., from an eastern language?¹ 3) Was the constellation *Ursa Major* originally seen as a bear? 4) Did the name *Ursa* arise when the Greek word was translated into Latin?

The first problem is to determine when the constellation was first named *Bear* and then to try and understand the reason for this. This problem has been discussed for about 2000 years now, most recently on the *Hastro-discussion* group on the Internet in the spring of 2004. I will try to explain how I understand the modern constellation *Ursa Major* to have got its name when early Greek texts were translated into Latin in the 1st century CE.

¹ Two possibilities for an eastern origin have been given. According to the first, it comes from an old Indian name meaning radiant which was then corrupted via *árcati*, *arká-*, *arcí-*, into *arktos* (see for example Scherer, 1953: 134). The second suggestion is that "ἄρκτος" is derived from the Akkadian word *ereqqu* 'wagon' (Heubeck et al, 1988, i-viii; also Szemerényi, 1962: 175-212). This suggestion is based on sound linguistic principles. The Hellenes, according to this explanation, confused the sound of the Akkadian name for *wagon* with their own word for *bear*. This is not entirely logical, as they seem already to have understood the constellation as a wagon, just as the Akkadians did.

The Proto-Indo-European background

In an article on the Indo-European background of *arktos* and *ursa* the author says in the introduction that the Proto-Indo-European root **H₂rtko-s* can "be identified as the zero-grade *H₂ret-* 'roll, turn'". In explanation of the application of this root to the animal bear he writes, "the circumpolar motion of the *Ursae* is far more appropriate than alternative explanations that focus on the mammal alone" (Huld, 1999: 117). Huld very carefully goes through different Indo-European names for the bear and finds some difficulties. At the end of the paper he discusses another proposal for the background of the word bear and says that cosmologically "there may be another reason for deriving 'bear' from the root 'turn', PIE **E₂ret-*" (Huld, 1999: 126). This means that, even if he did not conclude so, the Proto-Indo-European background for the Greek word for bear, *arktos*, seems to have its origin in the meaning roll or turn. The application to the circumpolar stars refers, of course, to their turning around the pole. Such an understanding makes the Greek texts easier to understand.

The Greek Background

The oldest Greek text giving names for constellations is in Homer's *Odyssey*. Odysseus was instructed by Calypso to keep *Arktos* on his left when he sailed to the land of the Phaeacians (Homer, *Odyssey* V: 281).² While sailing he also watched the *Pleiades*, the late-setting *Boötes* and *Orion*. Homer notes that *Arktos* also is called the *Wagon*, ἡ Ἰμμάξα in Greek. *Arktos* is said to circle or turn where it is. Homer also mentions the other constellations with the comment that *Arktos* is the only one that does not go down below the horizon; it is circumpolar (Homer, *Odyssey* V: 270-76). From the Greek name we have the Latin *Ursa*, which we use for two constellations, *Ursa Major* and *Ursa Minor*. However Homer mentions only one circumpolar constellation; he uses *Arktos* in the singular.

The name *Wagon* designates a four-wheeled vehicle usually drawn by oxen. It is clear from these early texts that it would be the name for a wagon pulled by one or several oxen. Both Greek names for the constellation, *Wagon* and *Arktos*, are feminine and are used only in the singular by early authors such as Homer. However later, for example by the authors Aratos and Nonnos, they are in the plural and thus designate two constellations (Aratos, line 27, Nonnos *Dionysiaca*, XLVII: 251). Close to these two constellations we have *Boötes*, the ox driver, sometimes translated as the ploughman. On our modern star map, however, he has no

² Classical authors are cited according to the standard reference system to book and line. The editions used here are mentioned in the bibliography under ancient authors, but most editions of these classical authors use the same notation for book and line.

oxen to drive. *Boötes* is used from the beginning of Greek literature, but later, for example by Eudoxos and Aratos, he is also called ἄρκτοφύλαξ, translated as the *Bear watcher* (Aratos, line 92). Close to the pole, between *Ursa Major* and *Ursa Minor*, we have *Draco*, but it is not mentioned in the Greek texts until after 500 BCE and so it is left out of this discussion.

The major problem we face is to understand what Homer meant by *Arktos*. Did he mean our *Big Dipper* or something else? Did he understand *Ursa Minor* as a separate constellation; and did he understand it as a bear? The name of the nearby constellation, *Boötes*, the ox-driver, is strange as it is close to the *Bears* but far away from *Taurus*. *Bear* also goes against the custom of naming constellations after well-known things in daily life such as bull, raven, marten, dolphin, crater, etc. Almost all constellations have such names. As a Greek origin of most western names for constellations seems most probable, the name *Bear* is strange as bears are very rare in early Greek iconography. It has been shown that figurines found on peak sanctuaries in Crete depict heavenly bodies, comets, constellations etc. These figurines are dated to ca. 2000 BCE and indicate that our western names for constellations were set at least by that time (Blomberg, in press, 2000, 2002, 2002B) in Crete. There is no such early evidence for an astronomical iconography in the Greek mainland. It seems probably to me that the Greeks took over the Minoan figures for their constellations. No bears have been found among the figurines in Crete, and bears have not lived in Crete. Therefore it does not seem likely that the Greeks got the figure bear as a constellation from the Minoans. For further discussion of the iconography of constellations from Minoan and Mycenaean times see Kyriakidis 2005.

What is really said in the early texts?

The oldest Greek texts do not mention the constellation we call *Ursa Minor*, and there seems to have been only one recognized constellation in the North. Many scholars have commented upon this and have said that Homer did not know the constellation we call *Ursa Minor*, as he did not mention it (See e.g. Martin, 1998, comment to Aratos' line 27). The background is that Homer mentions several constellations including *Arktos*, and then says that she is the only one that does not go down below the horizon and that she rotates. The word used by Homer is στρέφω, a word having several meanings, but mainly to rotate, to circle, even to circle around its own axis. The lines *Odyssey* V: 270-276 can be understood to mean 'arktos circles round its own axis' or 'it circles like any other constellation but does not go down below the horizon'. However, it seems to me that Homer meant that it rotates where it is, thus its axis is the same as that of the northern celestial axis. The Greek word used means to rotate around itself, not really something that rotates as most constellations do, but rather as the circumpolar stars do. Homer's description can of course mean that *Arktos* was the only one amongst the constellations mentioned that does not go down into the ocean, but it may also mean that it was the only then named constellation that was circumpolar.

The constellation *Ursa Minor* is not mentioned in astronomical texts before Thales (6th century BCE), who is said to have introduced it to facilitate navigation.³ Aratos said that the ancient Greeks sailed using *Ursa Major* while the Phoenicians navigated using *Ursa Minor* (lines 37-39). It is not known when sailing began in the Mediterranean, but it was well before Mycenaean times. We know that the Minoans sailed over great distances, as imported items from the east are found on Crete in archaeological contexts from that time. However, as the early Greeks and Phoenicians are said to have used different constellations for navigation, this implies that the ancient Greeks did not learn about the heavenly bodies from the Phoenicians – which is the general opinion in the literature – as *Ursa Minor* is a better constellation for determining North. The early Greeks thus seem to have developed their own star map.

How is ἄρκτος used and translated by Greek and Roman authors?

An early suggestion for understanding *Arktos* is presented by Strabo (1st century BCE-1st century CE) in his *Geography*, where he comments on the navigation instructions that Odysseus received and he explains *Arktos* as being the circumpolar stars or the Arctic Circle as defined by the early Greeks, i.e., the circumpolar stars as seen from the position of the observer (Strabo, 1.1.6). Thus the Arctic Circle for the Greeks changed locally as its position in the sky changed with the latitude. Other early authors sharing this view were, according to Strabo, Herakleitos (6-5 century CE) and Krates (1st century BCE). These three authors are especially interesting as they lived in the Greek tradition and wrote in the Greek language. In the case of Herakleitos, he was close to the time when the *Odyssey* was written down in the form that has reached us. The Greek word for the Arctic Circle was ἡ ἄρκτικός which can mean near the *Bear*, arctic, northern etc. This interpretation was totally accepted by the English scholar Robert Brown who translated Aratos in the 19th century and had difficulties with the constellation *Arktos* (Brown, 1899-1900; 250-51; Brown, 1885). *Arktos* as originally referring to all the circumpolar stars seems to be the most logical explanation, as there are several cases in early Greek literature where arktos is used to mean north. Herodotus, for example, says that a place is said to face north – ἄρκτον (Herodotus, 1.148). This very early understanding of *Arktos* as the circumpolar stars makes it easy to understand why two names were used by several early authors, one for the circumpolar stars collectively, *Arktos*, and another for *Wagon*, which today in English is called the *Big Dipper*.

The difficulty with understanding *Arktos* is also found in Manilius' *Astronomica*, written about 14 CE. He uses the Latinized word arctos several times and with several meanings. Its primary meaning is the northern area, for example when he says that arctos is where heaven reaches

³ Scherer (1953: 138): Thales (Heath, T., 1921: 138) advised the Greeks to sail by the *Little Bear*, as the Phoenicians did, in preference to their own practice of sailing by the *Great Bear*. This instruction was probably noted in the handbook under the title *Nautical Astronomy*, attributed by some to Thales and others to Phocus of Samos.

its culmination (Manilius, 1.275). At that time the *Wagon* or *Ursa Major* was not very close to the North; as *Draco* was closer he must be referring to the North and not to *Ursa Major*. There are several passages with the meaning North in Manilius (1.314; 1.610; 1.584; 5.19). But he used *arctos* even when he referred to the stars south of the southern arctic circle (1.590) and even when he talked about the axis of the earth that runs between the north and south poles, he used the expression “*binas arctos*” meaning the two *arctos*, *arctos* still in the singular, strangely enough (1.283).

At the same time we find that he used *Ursa*, bear, for the constellation *Ursa Major*, as he says that the solstitial Colure “passes through the forefeet and neck of that *Ursa* which with the setting Sun seven stars bring first to view as it offers its lights to the blackness of night” (Manilius, 1.619). The *Big Dipper* or the *Wagon*, he calls *Helice* (1.218), and once *Major Helice* (1.296), in order to differentiate it from *Ursa Minor*, which he called *Cynosura* (1.299).⁴

It is thus clear that Manilius had identified a constellation in the North, which he translated into Latin as *Ursa*, our *Ursa Major*, but for the Northern and Southern stars in general he used *arctos*, a transliteration from Greek.

Germanicus Caesar, either the emperor Tiberius or his nephew Germanicus, translated Aratos’ *Phainomena* in the 1st century CE. In order to avoid the problem of the meaning of *arktos* he used mostly the expression “*Arctos* which the Romans call the Bears”. At the same time he says that they are also called ploughs because they are shaped as such. However he continued, “if you prefer to call them animals, these gleaming animals face away from each other”. It seems that the popular identification at his time was as ploughs, but some people wanted to understand them as animals (lines 25–26). The *Big Dipper* he calls *Helice* and talks about its tail; he thus sees *Helice* as an animal (line 60). But four lines later he is back to using *Arctos*. There may be a difference in *Helice* and *Arctos*; *Helice* could be the *Big Dipper* and *Arctos Ursa Major*. *Helice* appears also later (line 141) where it is described as an animal with an animal’s tail, but not specifically a bear. *Bear* is also present in his text in the name *Ursa Major*.

Interesting in this context is also the other name for *Boötes*, Ἄρκτοφύλαξ, which normally is translated as the *Bear Watcher*. The name can very well come from the fact that the constellation indicates the Arctic Circle, as it is partly circumpolar and partly not. According to Aratos, *Boötes*’ left hand never sets (Aratos, lines 712–723), and it would have made the circumpolar stars fairly easy to identify to a navigator. During Middle Minoan times, ca. 2000 BCE, the bright star *Arcturus*, positioned in the southern extremity of *Boötes*, rose and set at about 38 degrees off true north

as seen from Petsophas, the hilltop on eastern Crete that is identified as a place used for studying the sky (Henriksson & Blomberg, 1996). Earlier, and in the more northerly part of Greece where Homer is said to have come from, the star *Arcturus* was itself circumpolar about 2000 BCE. That is, the constellation *Boötes* and its brightest star *Arcturus* could have been used for identifying the limits of the circumpolar stars. *Arcturus* also means North-watcher, a combination of ἄρκτος and ὄρωρς.

Let us return to the *Big Dipper*. It was understood as a wagon in most cultures near Greece, and in most of them as a wagon drawn by one or several oxen. The Latin name for the *Big Dipper*, *Septemtriones*, means the seven ploughing oxen and the old *Thesaurus Graecae Linguae* from the first half of the 19th century gives the Greek translation as ἄμαξα. There are also several Scholia (see e.g. Scholia Vetera, 27, lines 77ff) that indicate a wagon with oxen. It is clear that the Romans took their astronomy from the Greeks, and thus we can say, as many scholars have, that it is clear that the Greeks saw the *Big Dipper* as one or several oxen with a wagon. This understanding is shared by Gundel (1922: 55), who states that the Greeks and Romans saw seven oxen before Homer. He says that it is after Homer’s time that the *Bear* becomes a constellation (1922: 56). He gives no sources for this statement, however.

Conclusion

We have seen that the Greek word *arktos* has several meanings, amongst which the most commonly used by the early Greeks are North, northern, the northern region of the sky, as well as the animal bear. We saw also that the several meanings are due to the Indo-European origins of the word *arktos*, which gave rise to different meanings. Calypso used this word with the meaning North when she gave sailing instructions to Odysseus.

The early Roman authors introduced the word *arctos* into Latin for the northern stars and constellations. At the same time they offered the other meaning of *arktos* (bear), *ursa* in Latin, for those who preferred to see the constellation as an animal. The main seven stars in the constellation *Ursa Major* were understood as a wagon in Greek classical times, but merely as the seven stars by the Romans.

Thus *Ursa* was most likely introduced in Roman times in order to have a name for those stars forming *Ursa Major* today and to provide an animal name for the constellation. *Bear* seems to have been chosen as the name for the constellation as it is one of the meanings of the Greek word *arktos*.

Bibliography

Ancient authors

- Aratos: Kidd, D., *Aratus Phaenomena*, (Cambridge Classical Texts and Commentaries, 34) Cambridge 1997.
Eudoxos: Lasserre, F. (ed.) 1966, *Die Fragmente des Eudoxos von Knidos*, (Texte und Kommentare. Eine altertumswissenschaftliche Reihe, Band 4) Berlin.

⁴ Kidd, in his comments to Aratos, says that Κυνόσουρα must have been the original Greek name for *Ursa Minor* but does not discuss its age nor why he says so (Kidd 1997:188). This name is not mentioned in the texts before Aratos. Eudoxos, and Thales used Ἄρκτος Μικρά, the *Small Arctos*, which indicates that Κυνόσουρα could not have been the old name amongst the Greek philosophers but could very well have been a popular name (comp. Eudoxus fr 1:13).

- Germanicus Caesar: Gain, D.B., 1976, *Aratos, The Aratos ascribed to Germanicus Ceasar*, edited with an introduction, translation & commentary by D.B Gain, London
- Herodotus: Loeb Classical Library, vol. 117, transl. By A.D. Godley, London 1990.
- Homer: Murray, A.T., *The Odyssey*, (Loeb classical library, vols. 104,105), Cambridge and London. 1984
- Homer: Heubeck, A., West, S., Hainsworth, J.B., 1988, *A commentary on Homer's Odyssey*, vol. 1, (Introduction and Books i-viii), Oxford.
- Manilius: *Astronomica*, (Loeb classical library, vol 469, transl. By G.P. Goold) London and Cambridge, 1977.
- Nonnos Panopolitanus: *Dionysiaca*. Vol. XLVII, Paris 2000.
- Strabo :*The geography of Strabo*, transl. By H.L. Jones, Loeb Classical Library, London 1969
- Thales: Heath, T., *A history of Greek mathematics*, vol. I, *From Thales to Euclid*, Oxford 1921, reprinted 1965
- Modern authors**
- Allen, R. H., 1963: *Star-names and their meaning*, New York 1899, second reprint 1936, also published under the title *Star names, their lore and meaning*, New York.
- Blomberg, P. E. in press: "A reinterpretation of the figurines from Petsophas and Traostalos" to appear in the Proceedings from the 9th Cretological conference held at Elounda.
- Blomberg, P. E. in press: "Did Boötes drive a wagon with oxen on the Minoan star map?" Paper delivered at the conference Cultural context from the astronomical data and the echoes of cosmic catastrophic events, SEAC 2002, Tartu, 27
- Blomberg P. E., 2000: "An astronomical interpretation of finds from Minoan Crete", *Oxford VI and SEAC 99 "Astronomy and cultural diversity" Proceedings of the international conference Oxford VI and SEAC 99" held at Museo de la Cienci y el Cosmos, LaLaguna, Junio 1999*, LaLaguna, pp. 311-318.
- Blomberg, P. E. 2002: "An attempt to reconstruct the Minoan star map" *Astronomy of ancient societies, Proceedings of the Conference "Astronomy of ancient civilization" of the European Society for Astronomy (SEAC) associated with the joint European and National Astronomical Meeting (JENAM) Moscow, May 23-27, 2000*, Moscow, pp. 93-99, a Russian translation pp. 99-101
- Blomberg, P. E. 2002b: "The early Hellenic sky map reconstructed from archaeoastronomical and textual studies", to appear in *The preceedings of the EAA conference in Thessaloniki September 2002*, (BAR).
- Brown R., 1899-1900: *Researches into the origin of the primitive constellations of the Greeks, Phoenicians and Babylonians*, 2 vol.
- Brown, R., 1885: *The Phainomena or 'Heavenly Display' of Aratos, done into English verse*, London
- Godley, A.D.: *Herodotos* (Loeb Classical Library, vol. 117, transl. By A.D. Godley), London 1990.
- Goold, G.P., 1977: *Manilius: Astronomica*, (Loeb classical library, vol 469, transl. By G.P. Goold) London and Cambridge, US,
- Gundel, W.: *Sterne und Sternbilder im Glauben des Altertums und der neuzeit*, reprinted from the 1922 edition with an appendix by H.G. Gundel, Hildesheim and New York 1981
- Heath, T., 1921: *A history of Greek mathematics*, vol. I, *From Thales to Euclid*, Oxford, reprinted 1965
- Henriksson, G. & Blomberg, M.: 1996, "Evidence for Minoan astronomical observations from the peak sanctuaries on Petsophas and Traostalos", *OpAth*, 21, 99-114
- Heubeck, A., West, S., Hainsworth, J.B.: 1988, *A commentary on Homer's Odyssey*, vol. 1, (Introduction and Books i-viii), Oxford.
- Huld, M. E.: "PIE 'bear' Ursus arktos, Ursa Major, and Ursa Minor" in *Proceedings of the tenth annual UCLA Indo-European Conference, Los Angeles May 21-23, 1998*, ed.: K. Jones-Bley et al., (Journal of Indo-European studies monograph series no. 32) Washington DC, 1999
- Jones, H.L.: 1969, *The geography of Strabo*, (transl. By H.L. Jones, Loeb Classical Library), London
- Kidd, D.: 1997 *Aratus Phaenomena*, (Cambridge Classical Texts and Commentaries, 34) Cambridge
- Kyriakidis, E.: 2005, "Unidentified floating objects on Minoan seals" *AJA* 109(2005)137-154.
- Martin, J.: 1998, *Aratos Phénomènes*, (Collection des Universités de France) Paris
- Murray, A.T.: *The Odyssey*, (Loeb classical library, vols. 104,105), Cambridge and London. 1984
- Scherer, A., 1953: *Gestirnnamen bei den indogermanischen Völkern*, (Forschungen zum Wortschatz der indogermanischen Sprachen 1), Heidelberg.
- Szemerényi, O., 1962: *Innsbrucker Beiträge zur Kulturwissenschaft*, Sonderheft 15, pp. 175-212