



A study of catasterisms in the 'phaenomena' of Aratus

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Abstract

We provide a fresh analysis of the constellations in Aratos' *Phaenomena*, by using the astronomical program *CyberSky* (by Stephen Schimpf) to check each reference of constellations within the poem for validity in 2800 BCE and 300 BCE (the latter accounting for the broader period of time covering Eudoxus of Cnidus and Aratus of Soli). In each case, the latitude of observation was chosen to be 36° North, in agreement with the area of the sky that is not covered in the descriptions of Aratus (and contains the unseen constellations for a particular latitude). Each constellation was traced back to its Greek mythological origin through the various writers of antiquity. Our results are collected in a table of the constellations mentioned by Aratus in his epic poem, with respect to the ancient authors who have mentioned each constellation, shaping its myth, the locations on the earth each constellation is associated with and the most likely date of observation, according to Aratus' description, and taking into account precession and the proper motion of stars.

Keywords: Aratus, constellations, catasterism, astronomy, Eratosthenes, Hyginus.

Introduction

In 276/275 BCE the poet Aratus of Soli was tasked by king Antigonos Gonatas of Macedonia to write an epic poem about the constellations, based on the astronomical work *Phaenomena* of Eudoxus (around 370 BCE). The result, *Phaenomena kai Diosemeia*, became the third most popular poetic text in antiquity, after Homer's *Iliad* and *Odyssey*, and was widely commented upon by a plethora of later astronomers, including Hipparchus. The most important issue raised by the poem's commentators was that it con-

tained a multitude of astronomical errors that were attributed to either oversights on the part of Eudoxus or misunderstandings on the part of Aratus.

Some of these errors were explained by the discovery of the phenomenon of precession. Recently (Ovenden, 1966; Roy, 1984; Rogers, 1998b) the other discrepancies were explained away by theorizing that the initial observations, on which Eudoxus based his work, were made in 2600 (±800) BCE. These observations are predominantly in the tropics and the equator, where the constellations are split between the two

dates of observation. More recently, this approach has been undertaken for individual stars that designate those three circles (Henriksson & Blomberg, 2000), again with mixed results, although there appears to be a clear majority of star positions that correspond to the Minoan Age. Moreover, in the mythologies linked with constellations, we can also find, in spite of honour, love, or piety, some stories linked with agrarian works and navigation.

Discussion

It is indeed true that many references in the Greek texts seem to concern navigators; and if Aratus and then Eudoxus used the technique of *ecphrasis* in their descriptions, it is perhaps not only for teaching purposes but most of all to adhere to the logic of a celestial globe. For example, by reading this sentence of Aratus about Hydra, we can see the logic of reading on a celestial globe:

"Its head reaches the middle of the Crab, and its folds go under Lion's corpse, but its tail is hanged under Centaur. In the middle of its folds, the crater is laying, and to its extreme part, we can see crow's picture which seems hitting Hydra with his beak."

Could this celestial globe, depicting a sky seen 2000/2800 years BCE, already represent the signs of the zodiac, when the development of the latter is generally accepted to have occurred in the 6th century BCE? What is more, did the figures on the celestial globe which represent personages of Greek mythology, already exist during this period?

Phoenician and Minoan navigators had their mythologies linked to some catasterisms. The most probable hypothesis is that Minoans had transposed their local mythologies into the catasterism myths (predominance of Zeus, his childhood in Crete, story of Taurus with Europe, Argo ship, etc.). Indeed the catasterisms linked with Cretan civilisation are the most numerous and the most ancient quoted by Greek scholars. Then the transmission of this knowledge could have been presumably from Mesopotamia to Greece. Indeed, we can see obvious correlations between constellations visible in 2800 BCE and

those both visible in 300 BCE and 2800 BCE and Mesopotamian constellations quoted in MUL.APIN. Tablets or Three Stars each Tablets (Rogers, 1998a). Phoenicians who practised divination, could have transformed agrarian astronomy (used by Mesopotamians) into astronomy applied to navigation. Some of our catasterisms are linked with Phoenicia and the town of Tyre. Europa, for example, used to live in Tyre. We can also find a reference to Derketo, a Phoenician goddess.

It is obvious that catasterisms were used for remembering more easily the significations of constellations used for agrarian, directional and religious purposes.

Then, they were also used for the unity of the calendar in the numerous regions of Greece.

So the actual names of our constellations are inherited from the Ancient Greeks, who themselves may have inherited them from Mesopotamia, before changing their names. This travel to Greece may have been done by the way of seamen, probably Phoenician and Minoan. But this is just a large drawing of the transmission of catasterisms; there must have been a port of call, like Egypt for example. But this point will be developed soon in a further article.

Catalogue of constellations

The catalogue comprises of four columns. The first column contains the name of each constellation in Latin, with its name in Aratus' *Phaenomena* transliterated from the Greek original (in parenthesis). Celestial forms that are not proper constellations are given by their names in English, followed by their transliteration from Greek (in parenthesis) and the modern names of the astronomical objects they entail (in square brackets).

The second column deals with the representation of each constellation in the works of various authors of antiquity. They are: Aratus (AR), Eratosthenes (ER), Hyginus (HY), Diodorus Sicelus (DI), Ovid's *Metamorphosis* (OVM), Ovid's *Fasti* (OVF), Ovid's *Fabulae* (OVFab), Homer's *Iliad* (HOI), Homer's *Odyssey* (HOO), Hesiod (HE), Apollodorus (AP)

Table 1: Classification of constellations in Phaenomena

Constellation	Representation	Location	Date of observation as described in Phaenomena
Taurus (Tauros)	Bull (AR) / Taurus who carried Europa in Crete (HY ¹ -ER ¹) / Cow, retort of Io (HY-ER) / Jupiter transformed into a bull (OVF) / Paros' heifer (OVF)	Europa travelled from Phoenicia to Crete (AP-ER-HY) / Io pursued by horsefly went to Ionic gulf, then by Thracian strait, Bosphorus, Scythia, roamed between Europe and Asia to Egypt , then Syria and finally Egypt (AP) / Europa was living in Tyre , "daughter of Sidon" (OVF).	300(Eq)
Hyades (Hyades)	Hyades (HE-HOI-ER-AR-HY), a name well known by tradition (AR)/ 5 daughters of Atlas and Aithra, and one son called Hyas (HY ²)/ 7 daughters of Hyas and Boiotia (HY ³)/ Dionysus's nannies (HY-OVF), called before Dodona's nymphs (HY ⁴)/ 7 stars called Hyades by Greek sailors (OVF) / Granddaughter of Ocean and Thetys (OVF) / 6 sisters and Hyas, sons and daughters of Atlas and Aithra (OVF).	They were chased away by Lyncurgus, king of Nemea in Argolis (HY ⁵), / They sent Dionysus to Thebes (HY).	
Leo (Leon)	Lion (AR)/(Zodiacal lion (ER-HY)/Nemean lion (ER-HY ⁶)	Nemea in Argolis (ER-HY)	300(TrCnc) , 300(Leo)
Scorpius (Skorpios)	Scorpion (AR) / Scorpion which killed Orion (ER-HY)	Chios Island (ER)	2800(TrCap)
Aquarius (Hydrochoos)	Hydrochoos, with some water under his feet (AR) / Ganymedes (HY-ER) / Deucalion (HY ⁷) / Cecrops (HY ⁸)	<i>Deucalion was king of Phthie, in Thessaly. Ganymedes lived in Troy and Cecrops was the king of Attica.</i>	300(TrCap)
Piscis Austrinus (Notios Ichthys)	Southern fish (AR) / Big fish which drunk the water of Aquarius (ER) / Fish who saved Derketo (ER ⁹), or Isis (HY ⁹)	Bambyce (ER) / Syria (HY)	2800(Cnc)
Aquila (Aetos)	Eagle (AR) / Eagle who carried Ganymedes to Zeus (ER-HY) / Omen represented by the eagle which appeared to Zeus when he was about to fight against the Titans (ER-HY ¹⁰) / Merops transformed into an eagle (HY) / Eagle which stole Venus' shoe (HY)	The eagle appeared to Zeus in Naxos (ER) / Kos Island for Merops (HY) / in Egypt , where Venus met Mercury (HY) / Achelous river, where Venus is taking her bath (HY)	300(Leo), both(Cap)
Hydra (Hydra)	Hydra (AR) / Serpent or Hydra pulled out from a jet (ER) / Hydra that impedes the thirsty crow from reaching the crater (HY)		300(Leo), Neither although in 2800 it's a bit better(Aqr), Both(Vir), both(Sco), both(Cap)
Crater (Krater)	Crater (AR)/ Cup used by crow (ER) / pitcher (ER) / Crater where blood and wine are blended (HY ¹¹) / Icarus' cup(HY ¹²) / Jar where Mars was imprisoned (HY)	Town called Eleonte in Chersonessos in Thrace (HY) / Mastusian sea and port called " Crater " (HY)	Both(Eq)

Corvus (Korax)	Raven (AR) / Apollo's crow (ER-HY)		2800 (Eq)
Gemini (Dydimoi)	Twins (OH-AR) / Dioscuri (ER) / Castor and Pollux (OVF-HY ¹³) / Hercules and Apollo (HY) / Triptolemus and Jason (HY)	They grew up in Laconia (ER) / Castor was killed at Aphidnae (HY-OVF) / Castor was killed in Sparta (HY)	2800 (TrCnc)
Virgo (Parthenos)	Maiden, daughter of Astrea (AR) and Aurora (HY ¹⁴) / The personification of justice (AR) / (Dike, daughter of Zeus and Themis (HY15-ER ¹⁵) / Demeter (HY-ER) / Isis (ER) / Atargatis (ER) / Tychè (HY-ER) / Erigone (HY) / Parthenos (HY)	Athens and Attica (HY)¹⁶	300 (TrCnc)
Sagittarius (Toxotes)	The wielder of the bow (AR) / Archer, considered by many as a centaur: Croton, represented with a crown under him (ER-HY ¹⁷) He is represented with a small boat under him (ER)	Croton lived on Helicon (ER-HY)	Both (Eq)
Pisces (Ichthyes)	Fishes with celestial node (AR) / Grandsons of Southern fish (ER) / Fishes who saved Venus and Cupido (OV ¹⁸), sons of the Southern fish (HY ¹⁹)	Syria, near Euphrates (OV-HY)	
Aries (Krios)	The ram (AR) / Ram with golden fleece that carried Phrixos and Helle, and was given to them by Nephele (OVF-ER-HY) / Omen symbolized by a ram that saved Liber from thirst (HY ²⁰) / Man called Hammon who was the first man to give some cattle to Liber in Africa (HY ²¹)	The ram carried Phrixos to Euxin's bridge to Aiètes, king of Colchid (HY) and went by himself to the sky (OVF-ER) / Phrixos was born in the town of Orchomenus in Boeotia or was born in Thessalia (HY) / In Africa where was built the temple of Jupiter Hammon (HY²⁰) / Egypt (HY)	2800 (Eq)
Cancer (Karkinos)	Crab (AR) / Crab which bit Heracles during his fight against Hydra (HY-ER) /	Swamp of Lerna (ER) /	300 (TrCnc)
Asses (Assellus Australis: δ Cancri and Asselus Borealis: γ Cancri) [Onoi]	Asses (AR) / (Dionysus, Hephaestus and Satyrs' asses (HY-ER) / Asses which helped Liber to go to Dodone (HY) / Liber permitted to an ass to speak, but it was killed, then Dionysus placed it in the sky (HY)	Swamp of Thesprotia , in Epirus, near of Dodonean Jupiter's temple (HY)	
The manger (M44 or Praesepe) [Phatne]	The manger (AR) / Cowshed (ER)		
Libra (Chylai)	Chylai (AR) / Weighed-scale (OVF)		Both (Eq)
Capricornus (Aigokeros)	Aegokeros (AR) / Son of Egipan, and foster brother of Zeus (ER ²² -HY) / Pan's metamorphosis at Typhon's arrival (HY ²³)	On Ida's mountain (ER) / Egypt (HY)	Both (Eq)
Orion (Orion)	Orion, (HE-HOO-HOI-AR-HY-ER-OVF) killed by a Scorpion (OVF-ER-HY-AR)	Chios Island (AR) / Crete (ER-HY) / Orion, killed when he was with Oenopion (HY)	300 within 5°, acceptable to Hipparchus (Eq), 300 (Cnc), both (Sco), both (Sgr)

Ara (Thyterion)	Altar where the gods sealed their alliance before their war against the Titans, built by the Cyclops (AR-HY-ER)		2200-1350BCE (by its relation to Arcturus) ⁴³ , both (Cap), both (Ari)
Pleiades (Pleiades)	Pleiades (AR-ER-OVF-HE-HOO-HOI) / 15 (HY) daughters of Atlas and Plioné (HY ² -OVF)	Hesperid garden (ER)	
Draco (Drakon)	Dragon (AR) / Big snake, keeper of golden apples (ER-HY) / Dragon send by giants to fight Minerva (HY)		
Ursa Major (Helike)	Chariot (AR-HY) / 2 bears, nannies of Zeus, Helike was used by Achaean sailors (AR) / Callisto (HY ²⁴ -AP), daughter of Lycaon (HY ²⁴ -ER ²⁴ -AP) / Megisto daughter of Ceteus and granddaughter of Lycaon (HY ²⁴) / Hamaxa (HY) / Nanny of Zeus (AR-DI) / Callisto, Cynosure (OVF)	Crete (AR) / <i>Lycaon was king of Arcadia/ Arcadia</i> (HY) / Nonacris Mountain for Megisto (HY) / Myth of Crete where this goddess was venerated in the town of Engyon (HY) / Each dweller of Peloponnesus used this bear (HY)	
Ursa Minor (Kynosoura)	Bear called chariot (HOO-HOI) / Chariot (AR) / 2 bears, nannies of Zeus, Kynosoura was used by Phenician sailors (AR) / Hélicè (OVF) / Phoinikè (HY ²⁶), nymph of Artemis (ER) / Kynosoura, nymph of Ida and nanny of Zeus (ER ¹⁰) / Arcas, son of Callisto (HY)	Crete (AR) / Kynosoura was the name of the port and a neighbourhood of a city, Istes or Hystoi founded by Nicostrates (ER) / Phoenicians used this bear (HY) / Temple of Lycian Jupiter in Arcadia (HY) /	
Hercules (Engonasin)	The kneeler, Engonasin (AR) / Heracles with club and lion's skin (HY-ER) / Theseus (HY ⁷) / Ceteus: Lycaon's son and Megisto's father (HY ²⁷) / Thamrys blinded by Muses (HY) / Orpheus killed by Thracian women (HY) / Hercules (OVM) fighting Ligurians (HY ²⁸) / Ixion with chains (HY) / Prometheus with chains (HY)	After Heracles killed the Hesperid's serpent: Hesperid garden (HY-ER) / Elloppia , near Telethron mount, on the north of Eubee for Theseus (HY) / Arcadia for Ceteus / Thracia for Orpheus (HY) / Territory of Ligurians (HY) / Thessalia , Ixion was king of the Lapithes / Caucasus mount for Prometheus (HY) /	300(Leo), both (Lib), both (Sgr)
Ophiuchus (Ophiouchos) + Serpens (Ophis)	Ophiuchus (OVM) / Ophiuchus + snake (AR) / Asclepius (HY ¹³ -ER) + snake (ER) / Anguitenens <i>is the usual roman name</i> (HY) / Carnabon fighting Triptolemus's dragon (HY ⁷) / Hercules fighting a Snake (HY) / Triopas or Phorbas (HY ²⁹) fighting a dragon (HY)	Thracia , for Carnabon, king of Getes (HY) / In Lydia, near the Sagaris river , which is a Phrygian river, Hercules killed the snake and then went back to Argos. (HY) / Triopas was king of Thessalia (HY) / Phorbas came to Rhodos which was an island infested with snakes called "Ophiussa", then Rhodians made a sacrifice before their sailors went to sea (HY)	2800 (TrCnc) , 2800 (Eq) , 300(Cnc), 300(Gem), both (Lib), both (Sgr)
Boötes (Bootes/ Arktophylax)	Herdsmen (AR-OVF-HOO), Bear keeper, Arcturus, Arktophylax (AR) / Bear keeper called Arcas, son of Zeus and	Arcas lived in a town called Trapezonte, in south-west Arcadia (ER) / sanctuary of Zeus Lycaios (HY-ER) / Athens and Attica (HY)	300(Cnc), 300(Tau), Both (Lib)

	Callisto(HY-ER ²⁴) / Arctophylax (HY) / Icaros (HY) / Philomelos, son of Ceres and Jason (HY ³⁰)	/ Men who killed Icaros went to Keos Island , which was hit by disease and hunger (HY) / Philomelos had one son, called Parias, whose became king of Parians and of Parion town (HY)	
Auriga (Heniochos)	Charioteer (AR) / Erichtonios (ER-HY) / Henochius (HY) / Auriga is the <i>Latin name</i> (HY) / Orsiloque (HY ¹³) / Myrtilos (ER-HY)	Athens' Acropolis (ER) / Argos (HY) / Myrtos Island near Eubea (OVFab ⁴²)	2800(TrCnc), 300(Sgr), both(Tau)
The she goat and her kids (γ, ζ, η Aur. and Capella) [Aiga]	Goat called Olenian goat and her kids (AR) / Goat (OVF ³¹ -HY-ER), daughter of Helios, nanny of Zeus, given by Amalthea (OVF-HY ² -ER ²) / Aix and Helice, daughters of Olenos nannies of Jupiter (HY) / daughters of Melisse(HY ³²), king of Crete which had to feed Jupiter as a baby (HY ³³), but as he didn't have milk, a goat named Amalthea brought him up with her 2 kids (HY ³⁴) / Aix was a goat like Amalthea, which fed Jupiter as a baby (AR-AP) / The passion of Jupiter for Aix, wife of Pan, gave birth to Egipan or Jupiter Egiochos (HY ³⁵)	Ida mount in Crete (ER-HY-OVF) / Aix and Helice gave their names to three towns: Olenon in Aulida, Helice in Peloponnesus and Aege in Haemonia (HY ³⁶)	
Cetus (Ketos)	Sea Monster, Cetus (AR-ER-HY) sent by Poseidon to kill Andromeda (ER-HY)		300(TrCap) , both(Lib), both(Sco), both(Tau),both(Gem)
Eridanus (Eridanos)	River full of tears: Eridanus (AR) / Nile (ER-HY) / Ocean (HY)		300(Gem), Both(Vir)
Pegasus (Hippos)	Horse that made Hippocrene's source spurting out (AR) / Hippocrene's horse (ER) / Pegasus (ER-HY37-OVF) / Hippè (ER ³⁸ -HY ³⁸) / Bellerophon's horse (HY) / Prophetess transformed into a mare (HY ³⁸)	Helicon mount, in Beotia (AR-ER) Hippocrene's source (AR) called today Kryopigadi / Argos and Lycie for Bellerophon (HY)	2800(TrCnc) , Neither date but Hipparchus finds no fault(Lib), both(Vir)
Centaurus (Kentauros)	Centaur (AR) / Chiron (ER-OVF) / Centaur called Pholos (HY)	Chiron used to live on Mt Pelion (ER)	2800, though Hipparchus finds no fault (TrCap) , 300 (Psc), both (Lib), both (Sco)
Lupus (Therion)	Beast (AR-ER) / wine flask (ER) / victim of the centaur (HY)		300(Psc), both(Sco)
Argo (Argo)	Argo (AR-ER-HY)	Argo was built in Magnesia , eastern region of Thessalia, in a town called Demetrias, near Actian's Apollo's temple (HY ³⁸)	300 (Vir), 300 (Cap), both (Lib) 300 (Sgr), 300 though 2800 is also close (Sco), both (Lib)
Cepheus (Kepheus)	Cepheus (AR-ER-HY)	King of Ethiopia (ER ⁴⁰ -HY)	300 (Sgr), 300 though 2800 is also close (Sco), both (Lib)
Cassiopeia (Kassiepeia)	Cassiopeia (AR-ER-HY)	Ethiopia	300 though 2800 is also close (Sco)

Andromeda (Andromeda)	Andromeda (AR-ER-HY)	Ethiopia	2800(TrCnc) , 300(Aqr), both(Lib), both(Sco)
Perseus (Perseus)	Perseus (AR-ER-HY)	Born in Seriphos he undertook a quest to behead the Medusa, beyond the Ocean . On his return, he passed over Ethiopia , where he rescued Andromeda from the Sea Monster (Ketos). He returned to his maternal home-city of Argos and later retired to Tyrins (AP)	300(TrCnc), 300(Cap), both(Aqr), both(Ari)
Corona Borealis (Stephanos)	Ariadne's crown (AR-ER-HY -OVF-OVM) / Venus' crown given to Liber (HY) / Theseus' crown (HY)	On Minos territory in Crete (ER-HY) / Dia Island (HY) / Near Argos territory, at a gate to Hades called Stephanos (HY)	300(Cnc), Neither date but Hipparchus finds no fault(Lib), both(Sco)
Triangulum (Deltotos)	Delta (AR) / "Delta", first letter of Zeus (ER) / "Delta" form of the Nile (ER) / Deltoton (HY) / First letter of Jupiter, form of Nile or form of Sicily (HY)		Neither(Lib)
Lyra (Chelys)	Hermes' (AR-ER-HY) lyre (AR-ER-HY-OVF), turtle scale (AR) / Orpheus' lyre (ER-HY)	Mountain called Leibethres , on Pangeus, place where Orpheus died (ER) / Mount Olympios separating Macedonia and Thrace (HY) / Mount Cyllen in Arcadia, place where Hermes built his lyre (HY) / Lesbos Island (HY)	300(Vir), both(Lib), both(Sgr), 2800 though 300 is also close(Cap)
Cygnus (Ornis)	Bird (AR) / Zeus metamorphosed into Cygnus to seduce Nemesis (ER-HY) /	Rhamnonta in Attica (ER)	300(Vir), Neither date but Hipparchus finds no fault(Lib)
Sagitta (Oistos)	Arrow (AR) / Apollo's arrow used to kill the Cyclopes (ER) / Hercules' arrow used to kill the eagle which ate Prometheus' liver (HY)	In Hyperborea near a temple made of feathers (ER) / (Mount Caucase in Scythia)	Both(Vir), both(Cap)
Delphinus (Delfis)	Dolphin (AR-ER-HY) / Tyrenian sailors changed into dolphins by Liber (HY ¹⁰) / Dolphin which transported Arion (HY-OVF)	Atlas island coast (ER) / Naxos island (HY) / From Sicilian sea to Tenare which is a Laconian headland for Arion (HY)	Both(Vir)
Canis major (Kyon)	Orion's dog (AR-ER-HOI) / Sirius (AR) / Europe's dog, then Cephalos' dog (AR-ER) / Icaros's dog (HY-OVF) called Maera (HY)	Thebes for Cephalos (ER) / Maera died in a well called Anigros in Attica (HY)	300(TrCap) , 300(Leo), 300(Sgr), 300(Vir)
Canis minor (Procyon)	Procyon (AR) / Procyon, Orion's dog (AR-ER)		300(Leo), both(Cap)
Lepus (Lagoos)	Grey Hare, without name (AR) / Hare pursued by Orion's dog (ER-HY) / Hares of Lemnos island (HY)	People of Lemnos Island placed the hare in the sky to remember this tragedy (HY)	300(TrCap) , 300(Leo), both(Sgr)

and the Orphic Hymns (OH).

The third column details the locations entailed in the myths behind each constellation, according to the

different sources. Bold font denotes the names of key locations in each myth. Italic font denotes supplementary mythological information.

The fourth column is the product of our study of the validity of Aratus' observations in 2800 BCE and 300 BCE. Results that are derived from the locations of constellations on the Equator or the Tropics are in bold font, with the celestial circle utilized in each case in parenthesis, while results derived from the risings of constellations include the name of the utilized constellation in parenthesis. Specifically:

(TrCnc): From the description of the tropic of Cancer

(TrCap): From the description of the tropic of Capricornus

(Eq): From the description of the Equator

(Lib): From the rising of specified constellation (in this case Libra)

300 text (): True in 300BCE with [text] conditions from the description of ()

2800 text (): True in 2800BCE with [text] conditions from the description of ()

Bold: Having to do with the tropics and equator

Normal: Having to do with the risings of zodiacal constellations

Italic: Having to do with the description of constellations

e.g. 300(TrCnc) means that the constellation is as Aratus describes it in 300BCE and not in 2800BCE.

References

- Bérard, V. (2001) *L'Odyssée d'Homère*, Chants I à VII, Chants VIII à XV, Les Belles Lettres, Paris.
- Le Boeuffe, A. (1983) *L'astronomie d'Hygin* Les Belles Lettres, Paris.
- Charvet, P. and Zucker, A. (1998) *Le ciel, mythes et histoire des constellations : Les catastérismes d'Eratosthène*, Nil Editions, Paris.
- Carriere, J.C. and Massonie, B. (1991) *La Bibliothèque d'Appolodore d'Athènes*, Les Belles Lettres, Besançon.
- De Lisle, L. (1869) *Hymnes Orphiques*, Alphonse Lemerre, Paris.
- Mazon, P. (1996) *La Théogonie, Les Travaux et les Jours, le Bouclier d'Hésiode*, Les Belles Lettres, Paris.
- Martin, J. (1998) *Les Phénomènes d'Aratos*, Les Belles Lettres, Paris.
- Mair, A.W. and Mair, G. R. (2000) *Callimachus, Hymns and Epigrams, Lycophron, Aratus*, Harvard University Press, Cambridge, Massachusetts, London, England.
- Mazon P. (1998) *L'Iliade d'Homère*, Les Belles Lettres, Paris.
- Ovenden, M. (1966) The Origin of the Constellations. *Philosophical Journal*, 3, p.1-18
- Roy, A.E. (1984) The Origin of the Constellations. *Vistas in Astronomy*, 27, 171-197.
- Rogers, J.H. (1998a) Origins of the ancient constellations: I. The Mesopotamian Traditions. *J. Brit. Astron. Assoc.*, 108, 9-28.
- Rogers, J.H. (1998b) Origins of the ancient constellations: II. The Mediterranean Traditions. *J. Brit. Astron. Assoc.*, 108, 79-89.
- Schilling, R. (1993) *Les Fastes d'Ovide*, Livre I-VI, Les Belles Lettres, Paris.
- Terasson, Abbé (1737-55) *Histoire universelle de Diodore de Sicile*, De Bure, Paris.
- Villeneuve, G.T. (1806) *Les Métamorphoses d'Ovide*, Imprimerie P.Didot l'aîné, Paris.
- Henriksson G. & Blomberg M. (2000) New arguments for the Minoan origin of the stellar positions in Aratos' *Phainomena*. In *Astronomy and cultural diversity, Proceedings of the International Conference «Oxford VI and SEAC 99»*, La Laguna, 21-29 June 1999, Tenerife, 300-310.

Endnotes:

- ¹ ER and HY quoted Euripides in *Phrixos*, (Vth century 300 BCE) for the origin of the myth.
- ² HY or ER quoted Musaeus, a Greek scholar, for the origin of the myth.
- ³ HY quoted Alexander Polyhistor (around 80 300 BCE) for the origin of the myth.
- ⁴ HY quoted Pherecydes of Athens (VI century 300 BCE)
- ⁵ HY quoted Asclepiades of Tragilus (IV century 300 BCE)
- ⁶ ER quoted Peisander of Rhodes (VI century BC)
- ⁷ HY quoted Hegesianax in *Phenomena* (IInd century 300 BCE) for the origin of this myth.
- ⁸ HY quoted Eubule (IV th century 300 BCE)
- ⁹ ER & HY quoted Ctesias (Vth century 300 BCE) for the origin of the myth.

- ¹⁰ ER and HY quoted Aglaosthenes (IVth century 300 BCE)) for the origin of the myth.
- ¹¹ HY quoted Phylarcus (IIIrd century 300 BCE) who said that ancient astronomers placed this cup into the sky, for the origin of the myth.
- ¹² HY quoted ER (?), for the origin of the myth.
- ¹³ HY quoted "a lot of astronomers" or "some astronomical books", for the origin of the myth.
- ¹⁴ HY quoted AR for the origin of the myth.
- ¹⁵ HY quoted Hesiod and ER Hesiod and AR for the origin of this myth.
- ¹⁶ HY, in the chapter about Bootes, with the story of Icarus and Erigone.
- ¹⁷ ER and HY quoted Sositheus (IIIrd century 300 BCE) for the origin of the myth.
- ¹⁸ HY quoted Diogenes of Eritrea (IInd IIIrd CE) for the origin of the myth.
- ¹⁹ HY quoted wrongly ER, for the origin of the myth.
- ²⁰ HY quoted Hermippus (IInd century 300 BCE), for the origin of the myth.
- ²¹ HY quoted Leo the Egyptian for the origin of the myth.
- ²² ER quoted Epimenidus in *Cretica*, (VII th century 300 BCE)
- ²³ HY quoted "Egyptian priest and some poets" for the origin of the myth.
- ²⁴ HY & ER quoted Hesiod, but we are not sure that Hesiod developed this myth.
- ²⁵ HY quoted Araitos of Tegeus (VIh, IVth centuries 300 BCE) for the origin of this myth.
- ²⁶ HY quoted that Thales was the first to call it Bear, because he was Phenician (according to Herodote of Milet)
- ²⁷ HY quoted Araitos of Tegeus and Anacreon (it doesn't seem to be the famous Anacreon of Teos but a poet, author of *Phaenomena*) for the origin of this myth.
- ²⁸ HY quoted Aeschylus (VIth Vth century 300 BCE) in *Delivered Prometheus* (lost book) for the origin of this myth.
- ²⁹ HY quoted Polyzelus of Rhodes in *Rhodiaca* (?), for the origin of this myth.
- ³⁰ HY quoted Hermippus and Petellides, mythograph of Crete.
- ³¹ The kids are mentioned but not explained. Amaltheia and Melissae, legends see Amaltheia like a nymph (Ovid, *Fasti*, V, 115-128;
- ³² Apollodorus, *Library*, I,1,6) or like a goat.
- ³³ HY quoted Parmeniscus for the origin of the myth.
- ³⁴ HY quoted that Cleostratus of Tenedos (VIth BCE) was the first to mention these 2 kids.
- ³⁵ ER quoted Evemerus of Messene (IVth or IIIrd century BCE), for the origin of the myth.
- ³⁶ HY quoted Homer in *Iliad* for the origin of the myth.
- ³⁷ HY quoted AR (who do not mention Pegasus) and "a lot of authors" for the origin of the myth.
- ³⁸ ER and HY quoted Euripides in *Melanippe in chains*, for the origin of the myth.
- ³⁹ HY quoted Callimachus (IIIrd BCE) for the origin of the myth.
- ⁴⁰ ER quoted Euripides for this mention.
- ⁴¹ HY quoted Conon the mathematician for the invention of this constellation (IIIrd BCE) and Callimachus.
- ⁴² in Ovid, *Fabulae 84 for Myrtilos* (endnote from translator of HY).
- ⁴³ Aratus (403-405) claims that the constellation Ara is opposite to Arcturus. The commentators Attalus and Hipparchus explain that what is meant is that Ara is as far away from the South Pole as Arcturus is from the North Pole. Hipparchus states that that is not true, since Arcturus is 59° from the North Pole, while Ara is only 46° from the South Pole. Depending on the point of reference used for Ara, Aratus' claim would have been true sometime within the time range 2200 BCE – 1350 BCE.