



# Snake names in the Greek-Roman antiquity: old characterizations, identity in current zoology, and change of their original meaning in post-Linnean herpetology

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Manuscript received: 29 July 2021

Accepted: 29 September 2021 by PHILIPP WAGNER

**Abstract.** Snakes have been mentioned and characterized in several Greek and Roman literary works. Here, we present a comparative investigation of texts of antique authors on snakes, according to their knowledge and beliefs of their time. The evaluation of their writings is made from a herpetological perspective and refers to the current identity of the snake species described as well as the biological correctness of the observations made on them, to date mostly done by philologists. A “synonymy” of the specific names by the selected authors over several centuries is provided in a tabular overview. An appendix lists the names of modern, i.e. post-Linnean snake names (genera and species) derived from antique names but denoting in nearly all cases completely different species.

**Key words.** Antique knowledge on snakes: Nicander, Pliny the Elder, Lucan and Aelian, current identity, reliability of early descriptions, use of antique names for modern genera and species.

## Introduction

Snakes played a dominant role in the imagination of the people living in the time of the Greek-Roman antiquity, because these reptiles were mostly considered as deadly dangerous creatures, either because of their gigantic size and their ability to strangle and to devour large prey items (Figs 1 & 2) including humans, or because of their likewise lethal toxicity. However, some snakes were also worshipped as holy and became a symbol of rebirth or eternal youth because of their ability to shed their skin and to reappear afterwards from a matt in a shiny appearance. The old epidermis starts to slough off at the mouth opening and sticks up on the upper head as well as on the chin (Fig. 3). This has lead, according to the suggestion by BÖHME (2015), to the presentation of crested and bearded snakes in antique statues and paintings (Figs 4 & 5) as well as in the staffs (caducei / kerykeia) of Mercur or Hermes respectively, the official signs of antique messengers (HORNBOSTEL & HORNBOSTEL 1988) (Fig. 6). In this paper, we want to describe and discuss the reception of snake diversity in the antiquity, based on the writings of some selected antique authors whose works contain a noteworthy amount of information on these animals.

NIKANDROS or NICANDER from Kolophon (ca 197 – ca 130 B.C.) (ADLER 2012) was one of the first authors who dis-

tinguished between the various kinds of snakes by different specific names in his famous didactic poems “Theriaka” and “Alexipharmaka”, and described them regarding both morphological characters and also toxicological properties (BRENNING 1904, GOW & SCHOLFIELD 1953). These names were used by a number of subsequent authors in the antique Greek and Roman natural history literature, with partly differing interpretations (next to the two above cited sources also by KELLER 1913 and GOSSEN & STEIER 1921). Most of these interpretations stem from philologists rather than from zoologists and are tentative or even more, and only a limited number of primary herpetological literature has been consulted, and if so, these were older works already out of date when they were cited. It is our aim to review the names of snakes attributed by NICANDER and the selected subsequent authors to the snakes they were aware of, with regard to the properties ascribed to them and to their venoms. A comparative table of snake names documents their linguistic synonymies from NICANDER onwards through several centuries up to the present time (see Table 1).

Moreover, we compile those snake names of antique authors which have been adopted by modern, i.e. post-Linnean zoologists, and we document their current taxonomic meaning which in nearly all cases concern other species (not only snakes but also lizards and even mammals!) than originally intended.



Figure 1. African Rock Python (*Python sebae*) begins to devour an antelope (*Gazella granti*), Nairobi National Park, Kenya. Photo: FRITZ PÖL KING, courtesy MARK AULIYA.



Figure 2. African Rock Python (*Python sebae*) digesting a huge prey item, near Murchison Falls, Uganda. Photo: WOLFRAM FREUND.



Figure 3. "Crested and bearded" grass snake (*Natrix natrix*) in life, caused by the beginning skin shedding process. Photo: WOLFGANG BÖHME.



Figure 4. Fountain adorned with crested and bearded snakes at Herculaneum (Ercolano), Italy. Photo: WOLFGANG BÖHME.



Figure 5. Crested and bearded snake. Detail from a wall painting in Pompei, Italy. From BÖHME (2015).

**NICANDER's snakes**

NIKANDROS' family held the priesthood in a temple of Apollon at Claros in the outskirts of Kolophon, ca 40 km south of the former Smyrna in the Greek province of Ionia in western Anatolia (now Izmir in Turkey). Here he spent most of his life working as a poet, grammarian and physicist who enjoyed wide reputation (ADLER 2012). Among his many works, all in the form of poems, is also the first surviving book on reptiles, viz. the didactic poem "Theriaka".

The text parts of this poem on the various kinds of snakes, of some of their characters and – mainly – on the effects of their bites and poison start (verses 115–144) with a hint on sexual dimorphism in snakes. The females have shorter, thicker tails than the males which is verified in modern herpetology because males have paired, inverted hemipenes in their tail roots which lead to longer tails with a raised number of subcaudal shields. Moreover, the bite of the females is said to be deadlier and faster lethal than that of the male. The first kind of snake mentioned is the

– Dipsas.

It is difficult to identify this snake. Its name is derived from the Greek word for "thirst", but feeling thirsty, with dry mucous membranes, is a common phenomenon after bites of various venomous snakes (BÜCHERL & BUCKLEY 1971, W. WÜSTER, pers. comm.). The "thirst snake" Dipsas is briefly mentioned in this paragraph as taking care of its young in a cave which argues for a live-bearing species, i.e. a viperid.

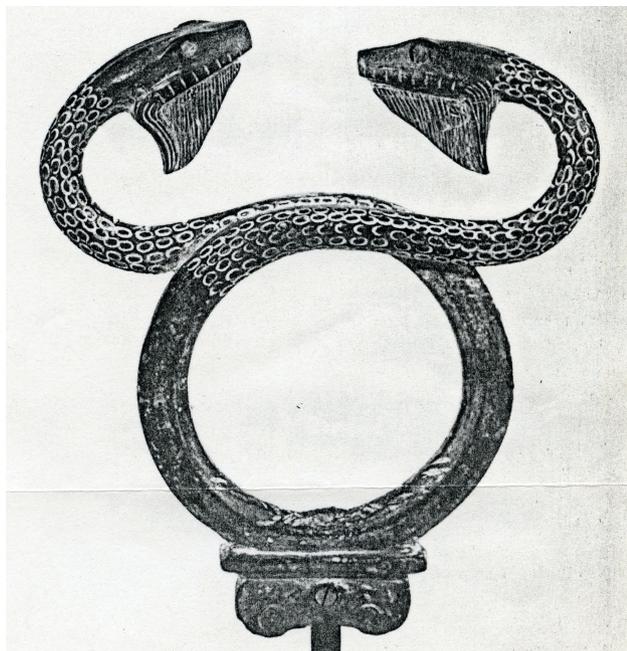


Figure 6. Hermes staff with two bearded snakes facing each other. Museum of Fine Arts, Dallas/TX, early 5<sup>th</sup> century BC. Courtesy: WILHELM HORNBOSTEL.

– Echis, Echidna.

Next is a story about vipers where the two sexes are, apart from their difference in toxicity, distinguished by their denomination, the male being called Echis, but the female Echidna, and also by their colouration. It is told that the blackish male tries to escape the rusty-coloured female but is seized by its head which is bitten off. The young, however, "revenge" the death of their father by nibbling themselves through the body of their mother, thus killing her during their birth. This is because only vipers (the name viper or *Vipera* respectively is a conjunction of the Latin adjective *vivipara*!) give birth to living young while all other snakes are said to lay eggs. According to BRENNING (1904) this fable or fairy tale dates back already to HERÓDOTOS or HERODOTUS (ca 4080/490 – 430/420 B.C.) and has survived for centuries in the old literature, through PLINY THE ELDER to the Middle Age (BÖHME & BÖHME 2011) (Fig. 7). Its origin could be due to an early observation of a killed, gravid female viper where the young inside were still alive or even escaping through an open wound, while an alterna-



Abb. 28. Kreuzotter, bei der die lebenden Jungen sich selbst durch den Leib der Mutter durchbeißen und diese dabei töten. Nach einer Klagenfurter Handschrift des 12. Jahrhunderts des altdeutschen Physiologos. Aus der Ausgabe der Hl. Hildegard von A. Huber.

Figure 7. Young vipers break through the body wall of her mother. Drawing from the herb booklet of Sainte HILDEGARD OF BINGEN. From BÖHME & BÖHME (2011).

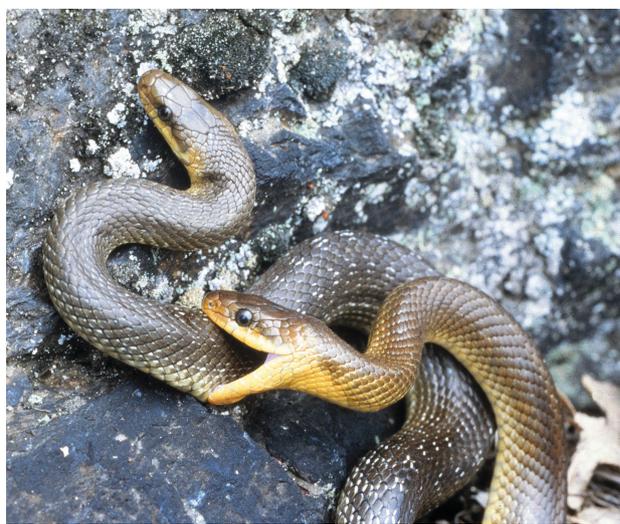


Figure 8. Aesculapian snake (*Zamenis longissimus*) mating. The male will move its mating bite towards the female's head. Photo: MICHAEL WAITZMANN.

tive scenario was first observed and published by SCHRANK (1786) (see below). The head bite myth, however, must be seen in early observations of the mating behaviour in several non-poisonous snakes where one individual (although the male!), fixes itself during copulation with a strong bite at the female's neck or even head (Fig. 8, see WAITZMANN et al. 2021).

–Seps.

A special case within the enumeration is the Seps (verses 145–157) because this small but nonetheless dangerous reptile is said to be able of colour change. Its colour is described as being adapted to the environment, either brownish like the soil, or greenish as the vegetation or even white as sand. Physiological colour change is extremely rare in snakes and has only been described for trophidophiid boas in the Caribbean (e.g. REHÁK 1987) or for homalopsid water snakes in SE Asia (MURPHY et al. 2005). It is, however, a main characteristic of iguanian reptiles, particularly chameleons which are through the greatest part of their distribution range considered to be deadly venomous (for some cultural-historical background see BÖHME 1988 a). A counter-argument against this interpretation is, however, that ARISTOTÉLES or ARISTOTLE (384–322 B.C.), although not specifying many reptiles, described the chameleon with an astonishing exactness (BALSS 1943) but without any hint on dangerous or even venomous properties of this animal. The Greek name “Seps” is derived from “sepein” = putrefy

– Aspis.

According to NICANDER, the most dangerous of all snakes is the Aspis (verse 157–189). Its name is derived from the Greek word for “aspis” = shield and refers to its characteristic defensive posture of erecting the first third of its body and extending its neck to a suspicious shield. NICANDER considered it to be the most treacherous of all creatures, with four hollow, curved fangs which contain the venom. Normally, venomous snakes have only two fangs in their upper jaws, but in many cases, a second replacement fang is visible next to the first one which could explain NICANDER's statement. In contrast to most other snakes the bite is said to leave no wound, and the bitten person would die painlessly. It is very clear that “aspis” is the modern Egyptian cobra (*Naja haje*) and this last statement sheds some light on the difference between neurotoxic and haemorrhagic types of snake venom (BÜCHERL & BUCKLEY 1971, MEBS 1992). BRENNING (1904) referred to other antique authors (e.g. GALÉNOS of Pergamon, 129–199 AD) who reported that cobras were used to kill people sentenced to death but granted with a mild and painless death and mentioned here also CLEOPATRA's alleged suicide with such a cobra. A whole paragraph (verse 190–208) is devoted by NICANDER to the enmity of the Egyptian mongoose (*Herpestes ichneumon*) against cobras and their dramatic fights.

– Echis, Echidna.

In the verses 209–257, NICANDER returns to the vipers (i.e. his Echis and Echidna) and their different kinds which can

be found in Europe as well as in Asia. In Europe they are said to be smaller and to have a horn above the nostrils which clearly refers to the European nose-horned viper *Vipera ammodytes* (Fig. 9) which is common along the entire Balcan peninsula including Greece. BRINGSØE (2019) tried to trace LINNAEUS' (1758) epithet *Ammodytes* back to pre-Linnean authors and ended up nearly two centuries earlier with GESNER (1589), who called it just “Ammodyte”. The name is, however, much older and dates back to LUCANUS in the first century AD (see below).

In Asia, vipers grow bigger, up to one fathom (= 6 feet = 1.8 meters), the males (i.e. Echis) with two fangs, the females (Echidna) with numerous teeth. The wound inflicted by the bite of these vipers will discolor the bitten skin part, will swell and become edematous, causing burning thirst (see above: Dipsas), heavy sweating, vomiting and diarrhea. These symptoms fit the severe envenomation caused by the big-growing West and Central Asian Lebetine vipers (*Macrovipera lebetinus*, Fig. 10) (SCHWEIGER 1983), but also the Palestine viper (*Daboia palestinae*) should be considered in this context. The strange detail that the fe-



Figure 9. Nose-horned or sandviper (*Vipera ammodytes*). Photo: WOLFGANG BÖHME.



Figure 10. Severe consequence of a bite of a Lebetine viper (*Macrovipera lebetinus*). Photo: Dr. med. HILDEGUND PIZA, courtesy MARIO SCHWEIGER.

male would have numerous teeth in contrast to the only two fangs of the male could point to reports of subsequent writers on connections between male vipers and (female) moray eels which have also been connected with the name *Echidna* (see below). Interestingly, also in modern Greek there are different names for the two sexes of the horned viper (*Vipera ammodytes*): While *Ochiá he kerasfóra* is a general name for the species, *Astrites* is used for the male only, leaving *echidna* for the female (STUMPEL-RIENKS 1992).

– Kerastes.

A particularly famous dangerous snake in antique writings and subsequent literature is the *Kerastes*, characterised by NICANDER (verses 208–281) by the possession of two or four (supraocular) horns and a special way of locomotion: While vipers (i.e. *Echis* / *Echidna*) are crawling fast and in regular twists forward, the *Kerastes* wallows itself with a crooked body on a curved way. This is a perfect and likely the earliest description of the highly derived locomotory strategy of desert snakes, the so-called side-winding (BÖHME & KOPPETSCH 2020)! Its bite is said to cause also necrotic symptoms, but the pain should be somewhat less.

This gives a hint on stronger neurotoxic components of the venom, and this snake can indeed induce strong neurological damages. *Kerastes* is by the way the only antique-denominated snake whose name – as latinized *Cerastes* – is still valid in modern Linnean nomenclature.

– Haimorrhous, Haimorrhous.

Also NICANDER's next venomous snake (verses 282–319), the *Haimorrhous* or *Haimorrhous*, is characterised by the locomotory way of sidewinding which is moreover causing a rattling noise. This makes clear that this name denotes the saw-scaled or carpet vipers of the modern genus *Echis* (in German “*Sandrasselettern*”), a species complex of relatively small, but highly venomous viperid snakes occurring from West Africa throughout the Sahara-Sindian desert belt to India and Sri Lanka. But also NICANDER's description of the envenomation of its bites corresponds to current knowledge. It is a strong haemorrhagic poison with neurotoxic components that causes tissue necrosis, spontaneous bleeding, hematuria etc.

NICANDER delivered also a mythical source how *Haimorrhous* became unable to crawl normally in a straight direction: On the way back from the Trojan War, such a snake killed the steersman of the beautiful *HELENA* whose kidnapping to Troy was the reason for the war. She angrily stepped on the snake thus breaking its vertebral column. Since that time *Haimorrhous* and also *Kerastes* are condemned to this seemingly handicapped kind of locomotion.

– Sepedon.

The name of the next snake (320–332), *Sepedon*, is etymologically closely related to *Seps* (see above) and means decay, putrefaction, related again to the effect of the venom on the body and tissue of the victims. As an additional

symptom, the hair, eyebrows and eyelashes are said to fall out from the dried skin, and body and limbs develop leprous-looking light flecks.

– Dipsas.

Already mentioned at the beginning of this chapter, NICANDER returns here (verses 334–358) in more detail to the “thirst snake” *Dipsas*. It is described as being smaller than the female viper *Echidna*, but deadlier, its bite leading also to a faster death. But first it provokes a terrible thirst with dried lips and an ignited heart and forces the victim to drink more water than the body can grasp. Here, the following old myth is reproduced by NICANDER: When ZEUS wanted to grant the mortals with eternal youth, they were too lazy to carry this gift themselves but loaded it on the back of a donkey. The donkey, however, escaped and met a snake in a cave asking its help against his burning thirst. The snake demanded the baggage on his back as a gift and received it. Since this event, the crawling reptiles regularly strip their skins (a symbol of eternal youth!), but the mortals are molested with their aging. The snake, however, took over the donkey's thirst as a sickness and that is why its bites provoke this symptom of terrible, burning thirst.

Its relatively small size and the peculiar morphological character of this snake, viz. a thin dark tail with a black tip suggest a possible identity with the *Avicenna* viper (*Cerastes vipera*, Fig. 11) whose black tail tip is even used for luring and attracting prey items (lizards) to the otherwise sand-buried snake (BÖHME & KOPPETSCH 2020). This conspicuous method of a tail-luring sit-and-wait predator should well have been observed in the antiquity, and the observation of females together with their young (see above) is also congruent with the viviparity of this viperid.

– Chersydros.

By its emphasized similarity with a cobra (*Aspis*), *Chersydros* obviously seemed to look more like a colubroid snake. It is described by NICANDROS (verses 359–371) as very venomous, its bite causing also necrotic modifications of skin and tissue and its putrefaction. *Chersydros* is said to live in



Figure 11. *Avicenna* viper (*Cerastes vipera*). Photo: BENNY TRAPP.

water-rich marshes and to hunt frogs. But when the marshes dry out in summer, it shifts to a terrestrial way of life, thus pointing also to its name which is composed of *chersos* (= dry land, mainland) and *hydor* (water). Its identification with the Common grass snake (*Natrix natrix*) as suggested by BRENNING (1904) is problematic since this species is non-venomous although the ability to live (and hunt) in water as well as on land would fit its autecology.

– Amphisbaina.

A thin creature, comparable to an earthworm is the characterization of the Amphisbaina (verses 372–383). Its name means “going in two directions” which means the ability of crawling forward and backward. And indeed are the limbless worm lizards (modern genus *Blanus*) from North Africa and the Near East looking like lumbricid earthworms (Fig. 12) and are also capable of backward-crawling. The minute rudimentary eyes and the short, stump tail favour the illusion of two heads, one on each end of the body, seemingly fitting the ability to crawl forwards and backwards. The alleged presence of colourful flecks on the skin could be related the second amphisbaenian genus (*Trogonophis*, Fig. 13) which also occurs in the realm of the antique observers.

– Skytale.

There is only few information given on the following snake which is said to resemble the Amphisbaina but being much larger and thicker, with a likewise short tail. It is the Skytale (verses 384–395) which is said to feed only on soil and will not drink despite its thirst. No hypothesis about its taxonomic identity can be drawn from this text, and there is no word about its possible toxicity.



Figure 12. Turkish worm lizard, amphisbaenian (*Blanus strauchi*). Photo: BENNY TRAPP.

– Basiliskos.

This is in contrast to the next following snake, the Basiliskos, meaning the royal snake or king of snakes (verses 396–410). It is said to have an acutely pointed head and to be of red-yellowish colour and, although small and only three palms long, it is described as being most venomous. Its hissing is feared by all other reptiles, and they immediately flee when they hear it. Its bite inflames the whole body of the victim, discolours the tissue and makes the dark flesh to fall down from the extremities. No bird, be it an eagle or a vulture, will taste from it, due to its terrible and disgusting smell. But if extreme hunger will force the bird nevertheless to feed on such a carcass, he will immediately die.

– Dryinas, Chelhydros.

The next deadly venomous creature NICANDER described is the Dryinas, sometimes also called Chelhydros (verses 411–437). It is said to build nests in oaks or beeches, but to hunt frogs and locusts in moister habitats. Its colour is blackish, the flat head resembles that of a Hydrus (a snake, although mentioned here, not further commented on in NICANDER'S didactic poem). It is said to give off a disgusting smell, but that is also a property of the true Hydrus (not mentioned here) of subsequent authors (AELIAN, see below). If a person is bitten by Dryinas or Chelhydros respectively, it suffers again from severe haemorrhagic reactions, accompanied by terrible pain, shortness of breath, vomiting, and trembling which ends up in its death.

– Drakon.

Again in contrast to the foregoing snake, the Drakon is described (verses 438–457) with largely positive properties. It is said to have been raised by the god ASKLEPIOS on Mount Pelion in a beech forest. It has a splendid look, large eyes, small teeth, and a golden-yellow beard under its chin (cf. Figs 4 & 5 above). Even if it is angry and biting, the wound caused by its small teeth is harmless. Its enemy is the eagle, the bird of ZEUS, because the Drakon plunders bird nests, devouring the eggs as well as the hatch-



Figure 13. Checkerboard worm lizard (*Trogonophis wiegmanni*). Photo: WOLFGANG BÖHME.

lings. Apart from phantastic details such as the struggle between the Drakon and the eagle (which is a global myth: LURKER 1983) for lambs and hares as prey items, there is some evidence that here the snake of Asklepios, the Aesculapian snake is concerned. This is likely because (1) the hint on Asklepios as the god who personally took care of the snake, (2) by the snake's beauty and harmlessness, (3) by its preference for bird eggs, and (4) due to the fact that the Aesculapian snake is a common part of the prey of the short-toed snake eagle (*Circaetus gallicus*) (BAKALOUKIS et al. 2008). Today it seems clear that the Aesculapian snake is at best only partly, but not primarily represented by *Zamenis longissimus*, as suggested by most of its vernacular names in Europe (STUMPEL-RIENKS 1992), but by its rather close relative *Elaphe quatuorlinata* (BODSON 1981, BÖHME 2015), and this issue will be further discussed below when Roman authors deal with this particular species again.

– Kenchrines.

The last snake dealt with in NICANDER's work is the Kenchrines (verses 458–482), a long monster living on the Thracian islands. Its thickness and length varies, but it causes hardly healing necrotic wounds. Typically, a painful dropsy develops under the umbilical scar. It follows the herds of sheeps with bloodthirst, when the shepherd is resting in the shadow of a tree. But when he tries to protect his animals, Kenchrines will treat his body with violent tail slashes and wrap itself around him so that his bones will break and his blood will be surped out. If one tries to escape from this snake, he should always try to do it on sloping ways with twists because the snake is only fast when moving in straight direction. The combination of all these characters, viz. large size, tail lashing, constricting, surping blood and being unable to move on curved pathways, plus the restriction of its distribution range to the Thracian islands, argue for a mythical creature rather than for a real snake.

– Askálabos.

Finally a lizard, Askálabos, with a harmful bite is listed by NICANDER (verses 483–487), translated by BRENNING (1904) with “Sterneidechse” (= star lizard) which reminds us to the Latin “Stellio” which is an agamid lizard viz. the hardun (currently *Stellagama stellio*, see BAIG et al. 2012). Askálabos was a mythical person in the antiquity, and the name was used as *Ascalabotes* in herpetology and denoted mostly gekkotan or agamid lizards (HENLE 1995). Most often it was interpreted as a gekkotan lizard, e.g. by GOW & SCHOFIELD (1953), who translated it just with “gecko”. This should likely refer to the group around the Moorish gecko (genus *Tarentola*) where one of the old synonyms in Linnean taxonomy (see the appended list below) is *Ascalabotes gigas*, currently *Tarentola gigas* (WERMUTH 1965). This last genus name has the same root as the poisonous tarantula spiders of the family Lycosidae, although the spider species that gave rise to the old Italian “tarantella” dance is the Mediterranean black widow *Latrodectes tridecimgutta-*

*tus*, a theridiid spider whose bites can cause hallucinations and uncontrolled movements (CORRAL-CORRAL & CORRAL-CORRAL 2016). In Dalmatia, the small Turkish gecko (*Hemidactylus turcicus*) has the vernacular name “tarantella”, and people regard it also as poisonous. Ascalabota (Gekkota plus Iguania), as opposed to Autarchoglossa, was also used as a higher category in the classification of lacertilian reptiles (CAMP 1923) which, however, later turned out to be paraphyletic.

NICANDER concludes his long list with some only cursorily mentioned harmless snakes (verses 488–492):

– Elops, translated by BRENNING (1904) as “Fischschlange” = fish snake, no translation by GOW & SCHOFIELD (1953), not identifiable;

– Libys, after BRENNING (1904) “Sandkriecher” = sand crawler, no translation by GOW & SCHOFIELD (1953), not clearly identifiable; the German name of the former refers to a Linnean fish taxon (see appended list below), and the latter, also proposed by BRENNING (1904), could point to the sandfish skinks of the genus *Scincus* because it is also common in Libya and famous for his swimming-like locomotion under the sand (BÖHME 2008).

– Myagros, after BRENNING (1904) “Mäusefänger”, literally translated by GOW & SCHOFIELD (1953) as mouse hunter, is not identifiable;

– Akontias, after BRENNING (1904) “Lanzenschlange” = lance snake, after GOW & SCHOFIELD (1953) darter; this snake is in detail described by Roman authors and also considered to be very dangerous (see below: LUCANUS' snakes).

– Molouros, not translated by both sources cited here;

– Typhlops, after BRENNING (1904) “Blindschleiche” = slow worm (*Anguis*), a limbless anguid lizard, literally translated by GOW & SCHOFIELD (1953) as blind-eye which might, however, also refer to the European blindsnake, *Xerotyphlops vermicularis* (Fig. 14).



Figure 14. Head portrait of the European blindsnake (*Xerotyphlops vermicularis*). Photo: RUDOLF KÖNIG.

**PLINY THE ELDER'S snakes**

The famous Roman naturalist GAIUS PLINIUS SECUNDUS (PLINY THE ELDER) was born in 23/24 AD at Novum Comum (today Como), northern Italy. At the age of 23 he started a military service and stayed among else also in the province of Germania Superior. Shortly before the death of emperor Nero (37–68 AD) he was procurator in the province of Hispania Tarraconensis where he dedicated much of his time to studies and writings. He died at Stabiae at the Gulf of Naples on 25 August 79 AD in connection with the great eruption of Mount Vesuvius.

In the monumental, epochal multi-volume work by PLINY THE ELDER, the “Naturalis Historia” where the whole natural scientific knowledge of his era is summarized, most zoological, often mythologically freighted information including snakes is found in the eighth volume (Liber VIII), but scattered information can also be found in the other volumes (KÖNIG & WINKLER 1976). Liber X (169–170) contains some general remarks on snakes, for instance that they are egg-laying except the vipers, that they copulate by mutual entwining or twisting so that they might be considered as one single snake with two heads. This is a common motif in ancient art (Fig. 15) but zoologically, this behaviour refers to male-male combats rather than to copulatory behaviour (Figs 16 a,b & 17 a,b). He was also ful-



Figure 15. Hermes staff with two twisted, crested and bearded snakes. From HORNPOSTEL (1979). Courtesy WILHELM HORNPOSTEL.



Figure 16. (a) Ritual combat between two slow worm males (*Anguis fragilis*) with twisted bodies, neck bite. Photo: DIETER RIECK; (b) head bite of a male during copulation. Photo: WOLFGANG BÖHME.

ly aware of the great diversity of these reptiles (liber VIII, XXXV.85) by stating: “innumera esse genera”.

The first snake dealt with in more detail (liber VIII; XIII.35 & XIV.36–37) is also the biggest one, viz. the

– Draco, Boa.

Here, obviously some different species of these Dracones are distinguished, the biggest living in India where they constrict and strangle elephants und suck their entire blood. In contrast to these unrealistic stories the information on those giant snakes which are capable to devour deers or cows seems more reliable or at least less exaggerated since bigger ungulates belong indeed to the prey spectrum of pythons (see Fig. 1 above). For African representatives, PLINY THE ELDER reports on an Ethiopian snake of 120 feet length that was killed – after a long battle with strong weapons – by the military leader REGULUS in the first Punic war (255 B.C.) at the Bagra river (the modern Oued Medjerda in Tunisia), its skin and jaw bones having been brought to Rome and kept in a temple until the Numantinian war (i.e. 133 B.C.). According to PLINY THE ELDER, this report which was repeated by several other subsequent Ro-

man writers, would make also the story more reliable that a snake which was killed at the Vatican in Rome during the emperorship of CLAUDIUS (41–54 AD), contained a human child in its belly. This is again an extremely unreliable report, but PLINY’s hint that these snakes were called Bovae (singular Boa, from Latin bos, bovis = cow) in Italy, and that their first nutrition is cow’s milk, is very interesting because it documents the connection between snakes and milk-drinking which is a widely distributed superstition in Europe – obviously transported by Europeans also into the New World where colubrids of the genus *Lampropeltis* are called milk snakes – until today (e.g. WILLIAMS 1978). Despite many expectations the alleged myth of milk-drinking snakes has a real and proven background. The Austrian author GEORG VEITH who worked on the herpetofauna of Bosnia and Herzegovina in the beginning of the 20th century, and whose work was published posthumously (VEITH 1991), stated that the local people over the entire distribution range of the four-lined rat snake (*Elaphe quatuorlineata*) believe that this species is milking cows and goats, and that in Istria it is still denoted with PLINY’s name “boa” (= cow snake), its slavic name “kravorcica” meaning the same. He reported on a reliable case where such a snake had seized and started to swallow one teet of the udder of a resting female goat (VEITH 1991). It was of course not because of the milk that the snake seized the goat’s teet but because it misregarded the teet as a naked rodent or rabbit nestling (Fig. 18) (BÖHME & SHCHERBAK 1993). But if such an observation of a bleating or screaming sheep, goat or cow fleeing with a bleeding udder and a snake behind it, was made only one time in the antiquity, then the myth is in the world! It may be recalled that PLINY explicitly stated that milk is the nutrition of the young Bovae because this alleged size class fits the dimensions of *Elaphe* rat snakes as compared with those of giant snakes. But some snakes devour even man-made “prey” items as observed by PAULSEN (2015) who caught a grass snake (*Natrix helvetica*) in the Netherlands which regurgitated a barbecue sausage after being captured! We mention this to elucidate the flexibility of snakes in their prey selection if the prey’s shape is



Figure 17. (a&b) Phases of ritual combats between two males of the whip snake *Dolichophis jugularis*, resembling a double-headed snake. From ABU BAKER et al. (2021), courtesy ZUHAIR AMR.



Figure 18. Cow udder with teets, which can rarely be misregarded as small mammal nestlings (i.e. prey) by snakes such as the four-lined snake (*Elaphe quatuorlineata*). Photo: WOLFGANG BÖHME.

suitable for being swallowed which is the case also for udder teets of cows, sheep and goats.

The question whether snakes are generally thirsty, and what they use to drink has been raised and excessively discussed by TRINQUIER (2012). His first question is superfluous since all snakes need water for their survival. In his second question, which is intended to be answered according to antique writers, this author restricts himself to snakes fond of water, wine and blood but dismisses milk completely.

In liber XXIX (XXII, 74) PLINY brings this snake (“Draco non habet venena”= Draco lacks venom!) in direct connection with the god AESCULAPIUS and reports its transfer from Epidaurus (an Asklepiian sanctuary where snakes were worshipped) to Rome where “it was commonly kept as pet even in our homes”. The term “anguis Aesculapius” does obviously not denote here a further snake species but refers to the kind of Draco which was called Boa in antique Italy and which is currently identified with the four-lined rat snake *Elaphe quatuorlineata*. That it was this species and not – at least not primarily – the related *Zamenis longissimus* which is commonly called Aesculap’s snake in many modern European languages (STUMPEL-RIENKS 1992), has been convincingly demonstrated by BODSON (1981) and is additionally corroborated by antique figures of this snake (Fig. 19) and also by statues of ASKLEPIOS’ or AESCULAPIUS’ daughter HYGIEIA carrying dishes with eggs to feed this snake (Fig. 20) which is not only fond of bird eggs but has even specialised neck vertebrae for swallowing these hard-shelled items (BÖHME 2015). Originally, these antique sculptures were colourfully painted (REED 2007)



Figure 19. Ceramic vase with the painted motif of a four-lined snake (*Elaphe quatuorlineata*). Courtesy LILIANE BODSON.

and would have made the identity of the snake even more clear (see also the discussion below).

– Cerastes.

The next snake discussed in some detail in PLINY THE ELDER’S work (liber VIII, XXXV, 85) is the Cerastes. It is characterised by the possession of four pairs (= eight!) of moveable horns with which it attracts birds as prey. This is in contrast with the two stiff supraocular horns which are characteristic for the two modern species of the viperid genus *Cerastes*. BÖHME & KOPPETSCH (2020) tried to solve the contradiction between the number of horns and their flexibility by putting the hypothesis forward that PLINY’S description could also refer to the rather recently discovered spidertail viper *Pseudocerastes urarachnoides* of the Middle East which has a perfect spider-mimicking tail tip with which it indeed attracts birds as its prey, and – as is well known – spiders use to have eight legs.



Figure 20. The Roman goddess of health SALUS (= HYGIEIA), daughter of the god AESCULAPIUS (= ASKLEPIOS) with an accompanying snake (a fragment visible behind the bowl at her forearm) being fed with bird eggs. From BÖHME (2015).

– Amphisbaena.

After the horn-bearing vipers two further legless reptiles are briefly mentioned: Firstly the Amphisbaena with a second head on the tail tip “as if it would not be sufficient to spit poison out of one mouth”; some of them should be colourfully spotted what is doubtlessly a citation of NICANDER (see above) and could be referred to the genus *Trogonophis*. A further interesting aspect for the origin of the belief in double-headed snakes was raised by EGLI (1982) which will be separately discussed below.

– Iaculus.

Secondly Iaculus which is swinging down itself from trees so that one has not only to take care of one’s feet when meeting with a snake, because the Iaculi pass the air like fired arrows. There is one snake species in the Mediterranean known for its ability to perform jumps, viz. the black racers of the *Dolichophis jugularis* complex, in German also called “Springnatter” (= jumping snake) which could have served as a model for the belief of snakes rushing themselves down from above. But, as WB was able to observe in a big facility for the keeping of Northwest African sand snakes (genus *Psammophis*), also big individuals of *P. afroccidentalis* rushed themselves down from higher lookouts with considerable vehemence on their rodent prey running on the ground.

– Aspis.

What is called “viper” in the translation by KÖNIG & WINKLER (1976) means PLINY’s Aspis “with a swelling neck”, i.e.

the famous Egyptian cobra (*Naja haje*). Its bite can be survived only by an immediate amputation of the bitten body part (if anyway amputable). These cobras are said to live in pairs and will avenge their partners if those are killed. They react on sounds (a hint on antique predecessors of the famous modern snake charmers?), and their enmity to the ichneumon, extensively described by NICANDER (see above), is only briefly mentioned here.

– Aspis Ptyas.

An interesting addition to the Aspis is the Aspis Ptyas (liber XXVIII, XIII, 65) because (1) it has a binomen similar to LINNAEUS’ (1758) binary classificatory system 17 centuries later, and (2) the name “Ptyas” is highly onomatopoeic because it denotes the spitting cobras of the *Naja pallida/mossambica* complex of which several species are distinguished today (TRAPE & MANÉ 2006, WÜSTER & BROADLEY 2007). They use to spit their venom from specialised fangs with the venom canal opening on the frontside of the tooth unerringly in the eyes of their enemies (Fig. 21), wherefore PLINY THE ELDER offered a strange antidote: The urine of sexually still immature boys should help against the danger of getting blind from such a cobra attack!

– Vipera.

In liber X (LXXXII, 169–170) the true viper’s (i.e. Echis and Echidna sensu NICANDER) mating behaviour is described. In contrast to NICANDER’s report (see above) PLINY’s Vipera female does not bite off the head of the male but gnaws at it with voluptuousness (“abrodit voluptatis dulce-



Figure 21. Spitting cobra of the *Naja pallida/mossambica* complex in defence action. Photo: GUIDO WESTHOFF.

dine”) conceiving during this procedure. She then develops unicoloured white, soft fish-like eggs which are incubated in her uterus for three days. Every day, one single juvenile is born, but because most often they are twenty, the last ones become impatient and break through the body wall of their mother what is lethal for her. This story of the conception of female vipers through the mouth and their being killed by their own young breaking through the body wall has had a great influence on subsequent writers until the Middle Age (e.g. ALBERTUS MAGNUS: STADLER 1920). A possible explanation for the origin of the second of these strange beliefs has been provided by SCHRANK (1786) who had reported the observation that in Bavaria newborn adders (*Vipera berus*, called by him *Coluber cherssea* or *Vipera anglorum*) would crawl into the freshly shed skin of their mother. “This may have caused the opinion that the vipers are killed by their young” (our translation; see SCHMIDTLER 2019). The first point, viz. the mouth grip of the female on the male’s head can be explained by the mating bite per-

formed by several snakes, although performed by males only; but because in some snake species, including *Elaphe quatuorlineata* and *Zamenis longissimus*, the – mate-guarding! – males grow bigger than the females, they might have been sexually confounded by antique observers, since normally female snakes grow bigger than males (BÖHME 1993).

In his book IX (aquatic animals: KÖNIG & WINKLER 1979) PLINY mentioned that because moray eels (e.g. *Muraena* or *Echidna*) are jumping sometimes on the dry land, that they are copulating with snakes, obviously with male vipers, and this myth has also been perpetuated and embellished until the Middle Age and can be found in ALBERTUS MAGNUS’ writings (STADLER 1920). Actually, this myth may have also have a true origin (such as the milk drinking boa above), since the viperine snake (*Natrix maura*), a water snake which can occasionally also hunt in marine habitats, was observed to feed on an adult eel (*Anguilla anguilla*) (FUENTES & ESCORIZA 2015). The photograph of these authors (Fig. 22) documenting a viper-like



Figure 22. Viperine snake (*Natrix maura*) preying on an eel (*Anguilla anguilla*), a situation that may have given rise to the antique belief that the viper-like reptile and the moray eel-like fish would have sexual relationships. Photo: MIGUEL ANGEL FUENTES, courtesy DANIEL ESCORIZA.

snake in close contact with a moray eel-like fish, if similarly observed only once in the antiquity, is highly suggestive for a possible origin of this famous and long perpetuated myth.

– Hydrus.

A further snake mentioned in liber XXXII, XIX, 56 as being the most beautiful of all but being also the most venomous is the Hydrus (“in orbe terrarum pulcherrimum anguium genus est quod et in aqua vivit, hydri vocantur, nullo serpentium inferiores veneno”), followed by the only cursorily mentioned

– Scytale.

This snake is characterised by the translator as “a snake of equal thickness throughout. The word means a cylinder” (JONES 1958). As it was already the case with NICANDER’S Skytale, it is not referable to any zoological species, if not – at best – to the sub-Saharan puff adder (*Bitis arietans*) with its plump, cylindrical, hardly tapering body shape. Earlier, it had certainly a wider northern distribution, where it still occurs in relict populations at the northwestern margin of the Sahara (SW Morocco, e.g. TRAPE & MANÉ 2006), i.e. the Roman province of Mauretania tingitana.

– Stelio.

Finally, as did NICANDER, also PLINY THE ELDER mentioned a lizard which should mean the same species as NICANDER’S Askálabos (see above). He denoted it with the Latin name Stelio, translated as “spotted lizard” by JONES (1958) and described it also as poisonous, with the translator’s comment: “often called gecko”.

### LUCANUS’ snakes

MARCUS ANNAEUS LUCANUS (39–65 AD) or LUCAN from Cartagena, originally a friend of emperor NERO (37–68 AD) and later his enemy, was forced by him to commit suicide when he was just 25 years old. Despite his short life span he left a great work to posterity, viz. a huge, though unfinished epos, known as “Pharsalia” on the civil war between JULIUS CAESAR and the forces of the Roman senate under POMPEIUS, consisting of ten books. In our context, the ninth book with the description of CATO’S march through the Libyan desert has the greatest relevance because a whole chapter is dedicated to the snake fauna of this region and to the manifold deadly threats and dangers caused by these creatures to the Roman soldiers. In this great work, LUCANUS distinguishes between 17 different kinds of snakes, which are first (book 9, from section 700 onwards) enumerated in the order as also listed below (apart from a Hydrus which represents with many fellows the hair of GORGO MEDUSA whose assassination is described in much detail: verse 660 onwards). The venomousness of the “real” snakes CATO’S expedition had to face in Libya is described subsequently by some specific examples, with human victims involved, but in a different

order. These stories are, however, added to the first mentioning of the respective “species” by LUCANUS in the following text.

– Aspis.

The first one mentioned is the Aspis, in the German translation by EHLERS (1978) misleadingly termed as “Schildviper” (= shield viper) although it is – in spite of the modern *Vipera apis* – just not a viperid but a cobra, i.e. an elapid snake. It is characterized as having an inflated neck and a poison that makes the victim sleep. This fits NICANDER’S (above) description of the painless mode of action of this particular poison. Here, the same snake is also called Niliaca Serpens and accordingly its poison is again said to kill painlessly. One of these, again misleadingly translated as “Nilviper” (= Nile viper) by EHLERS (1978), bit the unfortunate LAEVUS who again did not feel pain from the bite but slipped into coma and died without regaining consciousness.

The tribe of the Psylli that lived in Libya and was believed to be immune against snake venom, used the Aspis for testing the paternity of their babies. If there was reason for assuming a newborn with alien tribal paternity, it was associated with cobras. If it turned out to be fearless, to touch the snakes and to treat them as toy, then it was accepted as genuine.

– Dipsas.

Thirst snakes were forming a phalanx inmidst a pond trying to prevent the Roman soldiers from drinking. One of them bit the Etruscan soldier AULUS when he unintentionally stepped on it. First he did not notice pain from the bite, and the wound looked first harmless. But soon the venom spread throughout his body and caused a terrible thirst feeling and forced him to search for water, increased by the dryness of the desertic environment until he finally died.

– Haemorrhoids.

The huge Haemorrhoids uncoils its scaly body rings. This might be seen as a hint of the rattling noise these snakes (modern genus *Echis*) produced when rubbing their flanks against each other. One such snake knocked their teeth into TULLUS, a young hero and admirer of CATO. Immediately he started to bleed out of all body openings including eyes, nostrils and mouth, his sweat became red and his whole flesh resembled an open wound, the spontaneous bleeding being in fact typical for an envenomation by an *Echis* species (BÜCHERL & BUCKLEY 1971).

– Basiliscus.

There was no advantage for the unhappy MURRUS that he pierced a Basiliscus with his spear, because the venom spread upwards along the shaft of his spear and reached his hand so that he immediately took his sword, amputated his arm up to his armpit and watched, having saved himself, how his hand had the fate what otherwise would have been his own.

– Chersydros, – Chelydros, – Kenchris, – Hammodytes, – Cerastes, – Scytale, – Amphisbaena, – Natrix.

The following eight kinds of snakes are not involved in special incidents with CATO's soldiers. They are just enumerated with one simple property each: the Chersydros, endemic for the Region of the Libyan Syrte; the Chelydros, leaving smoke on the track he produces by his locomotion; the Kenchris, crawling always on a straight way (obviously mentioned in contrast to the Cerastes); the Hammodytes, described just as sand-coloured; the Cerastes which is forced, due to its spinal cord, to move in a curved, twisted manner, i.e. performing sidewinding, a locomotory strategy used by several desert vipers (BÖHME & KOPPETSCH 2020); the Scytale, shedding its skin already when the environment is still covered with hoarfrost; this detail does not necessarily point on a northern, i.e. European snake, because according to LUCANUS, also the Cyrenaica was still frosty during CATO's expedition, finally, the plump Amphisbaena with a head on each end of its body, and the Natrix, contaminating the water where it lives.

– Iaculus.

This snake is said to speed up itself through the air. Down from an oak stump, a terrible snake – in Africa called iaculus – flew rapidly, faster than an arrow, against the temple of PAULUS and punched through his skull, continuing its way on the other side. There was no poison involved, the wound was deadly also without it.

– Parias.

It is said to make its track only with its tail. This is a problematic hint because it could mean a snake moving forward in an elevated, vertical posture, having soil contact only with the hindpart of its body and the tail. This behaviour could refer to the Montpellier snakes of the modern genus *Malpolon* (see below under AELIANUS' snakes), but this author termed Parias, or Pareas, a servant of Asklepios, i.e. the Aesculapian snake which was called boa by PLINY THE ELDER (above). Such an important positive property of a snake remains unmentioned by LUCANUS who characterized all snakes with a negative connotation.

– Prester.

It emits smoke from its open mouth. Its venom has the contrary effect on the victim as compared with the next reptile. A farmer named NASIDIUS was bitten and began to swell, his face, his body and the extremities, so that his armour became too narrow and the whole person lost its shape. His comrades did not dare to burn his carcass which was even avoided by vultures, on a pile of wood but preferred to flee from this place while the dead body still continued to grow.

– Seps.

The name derives from putrefying flesh and bones. A minute Seps bit the soldier SABELLUS into its leg and was fixed with its recurved teeth, until the soldier pulled it off and pierced it with his spear into the sand. But although being a very small snake, it causes the most atrocious death of all.

The entire tissue and also the bones are dissolved by the poison, so that nothing is left from the body.

– Basiliscus.

This is the king of all in the empty desert. It is pernicious also without venom.

– Draco.

Often considered as harmless and holy, glittering from golden hues, it gets dangerous in Africa's heat, strangles buffaloes and is dangerous even for elephants, so the Draco doesn't need poison for its destructive way of life.

The enumeration of these horrible creatures of the Libyan desert ends with two arachnid arthropods, the Scorpion and the Salpuga (camel spider, solifuga), the latter being actually not venomous but able to inflict painful bites.

As to a zoological or herpetological identification of these snakes which played a role in LUCANUS' dramatic stories of CATO's march through the Libyan desert, KELLER (1913) was certainly right when he regarded this identification nearly impossible, due to the mythical exaggeration of what LUCANUS had described, at least in most cases. But in some cases it seems well possible, the more when it agrees with the identifications that can be deduced from PLINY THE ELDER's names. For example, his *Aspis* can also be identified with the Egyptian cobra (*Naja haje*); his Haemorrhous with the species of the *Echis carinatus* complex, his Hammodytes perhaps with the European sandviper *Vipera ammodytes*; his Cerastes clearly with the side-winding modern *Cerastes* species; his water-polluting Natrix with the modern *Natrix natrix* complex and *N. tessellata* which have anal glands with repelling secretions; his Iaculus with the whip snakes of the *Dolichophis jugularis* complex or a *Psammophis* species; and finally his Draco is clearly the modern *Python sebae*.

#### AELIANUS' snakes

CLAUDIUS AELIANUS (ca 170 – ca 235 AD) or AELIAN, born in Praeneste, today Palestrina in Latium, was a Roman writer and teacher of rhetorics. He spoke so fluently Greek that he wrote his works in this language. In our context most relevant is his work "Peri zoon idiotetos" (= On the characteristics of animals) in 17 books, in Latin "De Natura Animalium", where much knowledge, facts as well as beliefs of his time on snakes, is summarized, largely based on earlier authors, in particular PLINY THE ELDER (SCHOLFIELD 1958–1959). The information about snakes, however, is so scattered over the three volumes without a recognizable regularity, the same snake showing up again several times at various places within the books, so that we will list and discuss them here in alphabetical order, summarizing the respective information scattered over the various books.

– Akontias.

The javelin snake, Akontias, is said to stand often in an upright position which would make it easier to get the food items gravity-assisted down through the esophagus. It is

also believed to be capable to run with remarkable speed in this upright position. In modern snakes, such a behaviour of standing upright – but to watch the environment in respect to predators (mainly birds of prey) – and even to move forward in this position is known from the Montpellier snakes of the genus *Malpolon* (Fig. 23), mainly performed by males to shield and protect their females (DE HAAN 1999). It is a bit disturbing that this locomotory ability is attributed by LUCANUS to his *Parias* which (see above) is different from his *Iaculus*, the Latin equivalent of *Akontias*. A second mention of *Akontias* refers to the typical property of the javelin snake described already by PLINY and LUCAN (see above), viz. to rush itself down from a tree on its prey. Its jumps can bridge a distance up to 20 cubits and are able to accelerate when still in the air. These abilities have been compared by us already with the hissing snakes of the modern genus *Psammophis* which is actually a close relative of *Malpolon*, united in one joint family *Psammophiidae*.

– *Amphisbaina*.

This double-headed “snake” is believed to have two heads, one on each side of the body, and to be able to crawl in both directions. The latter assumption is correct when related to the modern lizards of the family *Amphisbaenidae*.

– *Aspis*.

Many mentionings throughout AELIAN’s 17 books can be found on the *Aspis*. Obviously, AELIANUS distinguished between the two kinds of cobras of the area, viz. the *Uraeus Snake* (*Aspis*) and the *Spitting Cobra* (*Aspis Ptyas*), however, without giving the latter a separate name. But the latter is doubtlessly meant with the statement that its “breath” makes people blind whose faces are struck by this breath; he added that the other kind of cobra does not behave like this but kills immediately. Their colours are characterized as black, ash-grey or reddish. The poisonous fangs are covered by a thin membrane which remains, together with the venom, with the bitten person, but is quickly regenerated. The puncture site of the fangs is hardly visible. AELIAN cites the superstition that of a cobra, beaten in two parts,

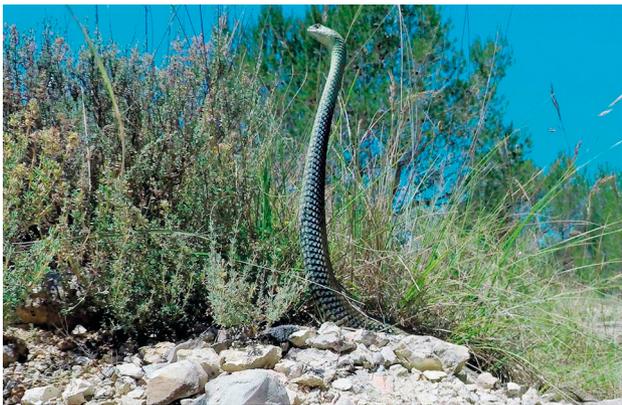


Figure 23. Montpellier snake (*Malpolon monspessulanus*) in upright position: Photo: FRANTZ GRIES, courtesy CORNELIUS DE HAAN.

both parts would be able to survive. Referring to *PHYLARCHOS*, he reports that the *Aspis* can be easily tamed: It appears when the owner claps his hands, is ready to feed on offered food, and after a repeated hand-clapping disappears again, so becoming a nice pet. Also PLINY THE ELDER had claimed (see above) that the *Aspis* reacts on noise which is, however, not very likely as all snakes lack a middle ear. A last comment refers to the ability of the *Aspis* which it used to show in Egypt, viz. to predict the regular Nile inundations up to 30 days in advance; then they flee with their young to higher laying areas. This is certainly that what is meant by LUCANUS with the attribute *Niliaca Serpens* (= Nile snake, see above) which he referred to the *Aspis*.

– *Basiliskos*.

Here described as small, measuring just a span (approx. 0.2 m). When viewed by other snakes, these shrink immediately in their dimensions. When snakes have assembled to feed, e.g. at a dead animal, and become aware of the *Basiliskos*’ hissing, they flee at once so that this “king of snakes” can feed in a relaxed manner before disappearing again. The poison is strong: If a *Basiliskos* bites in a stick, the person who holds this stick, will die. All these details (driving out other snakes by hissing, communal feeding of snakes on one single prey item, transport of venom upwards a stick) are incompatible with any real snake making it to a purely mythical creature.

– *Chelydros*, *Chersydros*.

The former of these two is considered by AELIAN as identical with the second. It is assumed to live in the sea and is said to be deadly dangerous if one would accidentally step on it. If presumed to be a marine snake, it should be a laticaudine elapid since they are forced to visit the beaches for egg-laying. However, another snake (below) is described with a typical character fitting also, but exclusively, a sea snake.

– *Dipsas*.

A snake equipped with rather numerous synonyms by AELIAN is the *Dipsas*, according to its translator the “thirst provoker”, characterised as being smaller than the viper (here *Echis*), whitish, with two black streaks at the tail. The synonyms are (in parentheses SCHOFIELD’s 1958/1959 translations): – *Prester* (inflator), – *Kauson* (burner), – *Melanouros* (black-tail), – *Ammobates* (sand crawler) and – *Kentris* (stinger) are commented by Aelian with the statement: “One may believe me that in these cases the same (kind of) snake is meant”.

– *Prester*.

Only for one of these snakes, viz. the *Prester*, different envenomation symptoms are listed: lethargy, paralysis, shortness of breath, memory loss, urinary retention, hair loss, and finally convulsion, agony and death which, however, should be valid also for the *Dipsas* itself. It is namely capable to kill also without venom, simply by its breath, like a toad is able to do, too. For our tentative interpretation of

Dipsas as *Avicenna viper* (*Cerastes vipera*) (Fig. 11) referring also to the black strip on the tail, see under *Sepedon* below. "I have heard that a donkey ...": With these words AELIAN begins his repetition of NICANDER's parabel of the donkey and the thirst snake *Dipsas* which we told already above.

– Drakon.

There are several mentionings of the Drakon in AELIAN's work. He tells that it is the largest snake living in Ethiopia and is able to kill elephants. Drakones occur also in Phrygia where they reach a size of 60 cubits. They use to straighten up to attract birds with their breath, and at sunset they visit the flocks of sheep which they attack. Sometimes they kill also the shepherd.

In Epirus, however, they are regarded as the holy snakes of APOLLO. This might be a hint on Delphi and the PYTHIA who gave her name for the python with which the Drakon must be identified. The Drakon of Lavinium, a place in Latium, lived in a cave, and served as an indicator to test the virginity of young women: If it accepted food offered by such a young woman, then she was still untouched; if the food was refused, then she had lost already her virginity.

ALEXANDER THE GREAT met Drakon specimens in India of 70 cubits in length while it is difficult to define the length of this measurement in the antiquity. At least 40 m, such data are strongly exaggerated and underline the mythical nature of these animals, as do also their properties and behaviours mentioned above, in contrast to their real biological background as giant snakes of the family Pythonidae and the modern genus *Python*.

A real background, in contrast, can be assumed for the story mentioned also by AELIAN that two huge snakes of 14 and 13 cubits have been caught and brought alive to Alexandria where they were kept at the palace of king PTOLEMAIOS (PTOLEMY) II (BODSON 1984). This first herpetological expedition in history, reported by DIODORUS of Sicily (1<sup>st</sup> century B.C.) took place in the 3<sup>rd</sup> century B.C., was analyzed in depth and evaluated by BODSON (2003, 2004).

– Echis/Echidna.

In respect to these two names, AELIAN maintains the viewpoint of earlier authors, in particular that of NICANDER, that they refer to the two sexes of the same snake, Echis being the male, and Echidna the female. He also repeats that the bite of the male leaves two punctures (as correct for vipers), but that of the female many more. The bitten body part gets pale in the former and leads to convulsions but not so in the latter where the bitten part gets white. The male, again according to NICANDER and his predecessors, uses to copulate with the moray eel (see above, and Fig. 22). It chokes out saliva, hisses quietly and swallows its saliva after the copulation again before disappearing. This strange myth would at least explain the different number of punctures after the respective bites of both.

But also "normal" (i.e. infraspecific) copulations are reported where both snakes are entwining each other. However, then the female bites off the head of the male while she conceives and gets pregnant. This does not mean that she

conceives through the mouth and gets pregnant through the male's saliva but that the penetrating male can continue sperm transfer also in a headless state. AELIAN refers to THEOPHRAST (ca 371 – ca 287 B.C.) in denying the tale by NICANDER that the young would nibble themselves through their mother's body during her pregnancy and so killing her.

– Haimorrhous.

Haimorrhous, the bloodletter, is described as living in rock caves, being only one foot in length, with a broad head and a body tapering towards the tail. Sometimes with a fiery glow, sometimes jet black, bristles on the head looking similar to horns. The locomotion is slow, the scales scratching on the ground, and its way is often curved and crooked, making a fine rattling noise. If it bites, however, the wound gets immediately dark blue, and spontaneous bleeding out of nose, ears, bladder, old wounds and even fingernails takes place. According to SCHOLFIELD (1958–1959) "it is impossible to identify this snake", but as already stated by BODSON (1982) it is very clear that a saw-scaled or carpet viper (genus *Echis*) is concerned, corroborated by the description of a sidewinding locomotion and the rattling noise produced. The only problem is that black specimens are unknown (at least to us), so that we suspect that a desert cobra (*Walterinnesia*) might have become unintentionally involved in AELIAN's concept of the Haimorrhous.

– Hydra.

Despite its water-related name Hydra, this snake is mentioned only as living on the island of Corfu (= Kerkyra) where it repels its persecutors with a disgusting breath. This argues for a watersnake of the genus *Natrix* which defend themselves with a foul-smelling secretion produced in specialized anal glands. Both the *Natrix natrix* complex and *N. tessellata* are possible recent role models.

– Hydrus thalattius.

This Linnean-like binomen points to sea snakes living in the Indian Ocean, diagnosed by flattened broad tails. They are said to bite with saw-like teeth, not with fangs. This combination of characters is somewhat enigmatic. While broadened tails are indeed the main character of marine hydrophiine elapids, the dentition of many teeth forming a saw could also point on a moray eel, a poisonous serpentine fish which has been brought into connection with venomous snakes by AELIAN, as already in the paragraph on the viper Echis/Echidna above.

– Kerastes.

According to AELIAN, the people of the Libyan Psylli tribe which were believed to be immune against snake venom, used this species for their paternity test wherefore according to LUCAN (see above) they used cobras (*Aspides*).

– Pareias.

It is said to have a reddish coloration while its bite is harmless. Therefore it is sacred and is called the servant of ASKLEPIOS.

– Sepedon.

This snake is termed an evil reptile. Citing NICANDER, AELIAN describes its coloration and general habitus as similar to that of the Haimorrhous, but its movements would be faster. Also it seemed to be smaller because its way is winding and deceived so the observer in respect of its true size. Its bite is terrible, the venom spreads out very quickly, and the hair including eyebrows and eyelashes, the face being covered with white flecks. The same details had already been mentioned by NICANDER (see above) for his Sepedon. AELIAN's hints on the special locomotion (side-winding?) and the general similarity to the Haimorrhous would suggest its identity with the Avicenna viper (*Cerastes vipera*), making it “conspecific” with the Dipsas.

– Seps.

Linguistically related with the former is also the putrefying Seps. Its characters and properties, viz. the ability to change colour and to adapt it to the environment, and its deadly venom, are again taken from NICANDER, however, with the addition that it has four hollow teeth in the lower jaws to inject the poison. There is of course no snake with hollow (solenoglyph) teeth in the lower jaws, and the only venomous reptiles possessing venom glands in the lower jaw thus making the lower jaw teeth dangerous are the helodermatid lizards (genus *Heloderma*) from North and Central America, thus from an unknown world for antique observers. As already indicated above, the small size and the ability to change colours, together with the widely distributed – wrong – belief that they are poisonous, could perhaps mean that the model for NICANDER's and AELIAN's Seps was a chameleon.

– Typhlops.

The snake mentioned last by AELIAN is the Typhlops, with two synonyms, viz. – Typhline und – Cophias, these names meaning blind and deaf. Typhlops is said to have small eyes, with a head shape similar to a moray eel and a reduced ability to hear. Apart from the fact that snakes generally do not hear airborne sounds, AELIAN's additional information that the skin of the Typhlops would be hard and difficult to be cut through suggests that rather an anguid lizard is concerned, since all anguids have – in contrast to snakes – a bony armour of osteoderms under the keratinous skin so that either the European glass lizard (*Pseudopus apodus*) (Fig. 24) or the slow worms of the closely related genus *Anguis* are the best candidates for identifying this “snake”.

SCHOLFIELD (1958–1959) tried to identify AELIAN's snakes according to their zoological taxonomic identity of his era. We here try to evaluate his identifications and to give them a taxonomic update, according to his list in the “Index of Fauna, Flora etc., Reptiles” in his 3<sup>rd</sup> volume. We follow his alphabetical list ordered after English or anglicized Latin names, but we are adding also the transcribed Greek names as used by AELIAN (*italics* only used for modern, i.e. post-Linnean genus and species names):

– “Acontias (Akontias) – *Zamenis gemonensis*” (Balkan whipsnake – now *Hierophis gemonensis*). We think its described behavior is much better matched by either the *Dolichophis jugularis* complex or by the psammophiine genera *Malpolon* and *Psammophis*.

– “Amphisbaena (Amphisbaina) – *Typhlops vermicularis*?” (European blindsnake, now *Xerotyphlops vermicularis*). The ability to crawl back- and forwards in a peristaltic way is realized by amphisbaenian lizards, here from geographic reasons represented by the *Blanus strauchi* complex or by *Trogonophis wiegmanni*.

– “Asp (Aspis) – *Naja haie*” (Egyptian cobra, *Naja haie*). This non-spitting species is certainly correctly identified by SCHOLFIELD, but AELIAN mentioned also an – unnamed – type of cobras making humans blind with their “breath” (PLINY's *Aspis Ptyas*). These represent a different species, viz. a spitting cobra of the *Naja pallida/nigricollis* complex.

– “Basilisk (Basiliskos) – fabulous”. Correct, this is an unidentifiable mythical creature.

– “Blood letter (Haimorrhóus) – *Vipera latasti*”. This identification remains enigmatic, since the extremely severe symptoms of envenomation described in this and other antique sources point clearly to the saw-scaled or carpet vipers of the genus *Echis*, particularly to the *E. pyramidum* complex, as suggested already by BODSON (1982). The identification with the Iberian LATASTE's viper is not at all comprehensible.

– “*Cerastes* (Kerástes) – *Cerastes cornutus*” (Horned viper). This identification is correct, concerned are currently two species: *Cerastes cerastes* and *C. gasperettii*, “*cornutus*” being a synonym of the former). The supraocular horns which are present in most but not all populations of these two species “are like in snails, but not soft”.

– “Chelydrus (Chelydros) – *Tropidonotus tessellatus*” (Dice snake, now *Natrix tessellata*). AELIAN's text states that it is identical with Chersydros, that it lives in the sea, and that an unintentional step on it would have lethal consequences. This could well be the case with a sea snake (such as *Hydrus thalattius*, see below) which are known



Figure 24. European glass lizard (*Pseudopus apodus*), characterised by its armoured skin, each keratinous scale being underlaid with a bony tile. Photo: MORRIS FLECKS.

to be inoffensive on land, but *Chelydrus* is identified here with the Dice snake, a completely harmless aquatic natrixid snake which does, however, occur also in saltwater, e.g. the Black Sea.

– “Dipsas (thirst provoker) – *Vipera prester*” (currently a synonym of *Vipera berus*, mostly referring to its black mutant). This identification again is incomprehensible, since *V. berus* is largely missing in the entire Mediterranean realm and secondly has a relative weak venom, normally not lethally dangerous for humans.

– “Pareas (Pareas) – *Coluber longissimus* or *Aesculapii*” (currently *Zamenis longissimus*; note that the Linnean name *C. aesculapii* refers to a South American snake, viz. the false coral snake *Erythrolamprus aesculapii*). The identification as AESCULAP’s snake is generally correct, but today the snake which was primarily worshipped in Epidaurus is identified as *Elaphe quatuorlineata* (see above: PLINY’s snakes: Draco).

– “Python (Drakón) – *Python molurus* or *P. cebae* [sic]?” AELIAN’s Drakón is translated as Python and certainly correctly referred to this modern genus, to *P. molurus* (if of Indian origin) or to *P. sebae* (if African).

– “Sepedon” – unidentified. Termed an evil reptile.

– “Seps – *Vipera macrops*”. This is a completely incomprehensible identification, since *V. macrops*, belonging to the *V. ursinii* complex, is among Europe’s smallest vipers with a weak venom, specialized to kill grasshoppers (saltatorian orthopterans). Moreover, this species complex has a disjunct distribution scattered to several restricted cooler and humid areas in Europe, and this should not have been much different in the antiquity.

– “Typhlops – *Pseudopus pallasi*” (currently *Pseudopus apodus*). The mentioning of small eyes combined with bad hearing (the synonymous name being “Cophias”) and a hard skin which can be hardly cut through, point indeed on an anguid lizard rather than on a snake, so the identification with the huge European glass lizard may be justified. But its smaller close relative, the slow worm (*Anguis fragilis* complex), with relatively smaller eyes, with a lacking or at best point-shaped, minute tympanum, and which in contrast to *P. apus* can also autotomize its tail and regenerates only a roundish stump, is another possibility.

– “Viper (Echis/Echídna)” – *Vipera aspis*. This identification is rather likely as it concerns the commonest viper species in Italy and some neighbouring regions. However, the sandviper (*Vipera ammodytes*) which is widely distributed on the Balcan Peninsula and the Aegean islands, is also a likely candidate.

#### POLEMUS SILVIUS’ snakes

POLEMUS SILVIUS was a Roman writer who lived in the 5<sup>th</sup> century AD. In 448/49 he wrote his “Laterculus” which contains also long lists of animal names, among them also 26 different “colobres” (snakes) (EIGLER 2011, PIECHOCKA-KŁOS 2020). Those of them denoting only snakes in general (anguis, ofis), or arthropods (pagurus, salpugna) or unin-

terpretable “snakes” (anabulio, camedra, elefantias), are omitted in our comparative table of antique snake names over time. This table aims to elucidate synonym identities among the different kinds of snakes cited by the five selected authors and their linguistic modifications in the course of seven centuries of Greek/Roman antiquity (see Table 1 below).

POLEMUS SILVIUS’ snakes (names relevant for comparison with earlier authors are underlined) were listed by him as follows:

Basiliscus. draco. camedra. vipera. iaculus. natrix. anguis. cerasta. ipnalis. dipsas. aspis. ofis. boa. seps. et morrois. prester. cenoris. ansisbena. echidra. schitale. pagurus. salpugna. hamodita. elefantias. celidrus. anabulio.

#### Discussion

According to KELLER (1913), a reliable zoological identification of LUCAN’s kinds of snakes is impossible. And just in respect to this writer, he is often correct. Some points, however, are remarkable: (1) When LUCAN reported on the terrifying snake fauna of the Libyan desert, he did not mention PLINY’s *Vipera*, i.e. NIKANDER’s and AELIAN’s Echis/Echidna. Is this gap perhaps filled by his Hammodytes which is listed without certain properties, except of its sandy colouration? (2) His Hydrus is not a real snake but only part of the hair of GORGO MEDUSA which consisted of dozens of snakes. (3) Also Parias as the snake connected with Asklepios is only just mentioned without any positive property, since all snakes described by him are all exclusively characterised as terrible and lethal animals, be they venomous or not.

Trials of translating the antique names of snakes into present day taxonomy of their era have been made also by other authors, for example by GOSSEN & STEIER (1921). Of the antique authors dealt with in here, AELIAN’s names have been treated in this respect by SCHOLFIELD (1958–1959) and are already discussed in this paper above. A thorough analysis of the origin and etymology of Greek and Roman snake names has also been performed by BODSON (1986), but nearly all earlier trials for such a translation of these antique names towards their current scientific identity have been made by philologists rather than by zoologists. This is why we are summarizing the names used by the five antique authors selected for this study together with our interpretation of their current taxonomic meaning from a herpetological point of view (see Table 1).

In the following, we discuss some more general issues concerning the antique knowledge of snakes which was dealt with already by the authors in the antiquity.

#### Sexual dimorphism

As mentioned already above, NIKANDER was already aware of the morphologically different tails of male and female snakes, those of the first being longer. This is correct be-

Snake names in the Greek-Roman antiquity

Table 1. Linguistic synonymies of snake names (and designations applied for lizards or even mythical creatures) used by Greek-Roman antique authors from NIKANDER onwards and their possible current taxonomic meanings.

NIKANDROS (ca 197–ca 130 B.C.)	GAIUS PLINIUS SECUNDUS (23/24–79 A.D.)	MARCUS ANNAEUS LUCANUS (39–65 A.D.)	CLAUDIUS AELIANUS (ca 170–235 A.D.)	POLEMUS SILVIUS (ca 448/449 A.D.)	modern taxonomic name [vernacular name]
<b>snakes</b>					
Akontias	Iaculus	Iaculus	Akontias	Jaculus	<i>Dolichophis</i> spp. [whipsnakes]; <i>Psammophis sibilanus</i> complex [striped sand snake]
Amphisbaina	Amphisbaena	Amphisbaena	Amphisbaina	Ansisbena	<i>Blanus</i> spp. [worm lizards]; <i>Trogonophis wiegmanni</i> [checkerboard worm lizard]
Aspis	Aspis	Aspis	Aspis	Aspis	<i>Naja haje</i> [Egyptian cobra]
–	Aspis Ptyas	–	–	–	<i>Naja pallida /mossambica</i> complex [spitting cobras]
–	Boa	–	–	Boa	<i>Elaphe quatuorlineata</i> [four-lined snake]
Basiliskos	Basiliscus	Basiliscus	Basiliskos	Basiliscus	mythical creature
Chelydros/ Dryinas	–	Chelydrus	Chelydros = Chersydros	Celidrus	not identifiable
Chersydros	–	–	see above	–	not identifiable
Dipsas	–	Dipsas	Dipsas = Prester	–	not identifiable
Drakon	Draco	Draco	Drakon	Draco	<i>Python sebae</i> [African rock python]; <i>P. molurus</i> [Indian python]; <i>Elaphe quatuorlineata</i> [four-lined snake]
Echis/Echidna	Vipera	–	Echis/Echidna	Vipera/Echidna	<i>Vipera</i> spp. [Eurasian vipers]
Elops	–	–	–	–	not identifiable
Haimorrhous	–	Haemorrhous	Haimorrhous	Et morrois	<i>Echis</i> spp. [saw-scaled vipers]
–	–	Hammodytes	–	Hamodita	<i>Vipera</i> spp. [Eurasian vipers]
Hydrus	Hydrus	Natrix	Hydra	Natrix	<i>Natrix</i> spp. [water snakes]
–	–	–	Hydrus thalattious	–	<i>Hydrophis</i> spp. [sea snakes]
–	–	–	–	Ipnalis	not identifiable
Kenchrines	–	Cenchrus	Kentris = Dipsas	Cenoris	not identifiable
Kerastes	Cerastes	Cerastes	Kerastes	Cerasta	<i>Cerastes cerastes</i> ; <i>C. gasperettii</i> [horned vipers]
Libys	–	–	–	–	not identifiable
Molourus	–	–	–	–	not identifiable
Myagros	–	–	–	–	not identifiable
–	–	Parias	Pareias	–	<i>Elaphe quatuorlineata</i> [four-lined snake]; <i>Zamenis</i> <i>longissimus</i> [Aesculapian snake]
–	–	Prester	–	Prester	not identifiable
Sepedon	–	–	Sepedon	–	not identifiable
Seps	–	Seps	Seps	Seps	?? <i>Chamaeleo africanus</i> ; ?? <i>C. chamaeleon</i> ? [chameleons]
Skytale	Scytale	Scytale	–	Schitale	?? <i>Bitis arietans</i> [puff adder]
Typhlops	–	–	Typhlops/Typhline/ Cophias	–	<i>Anguis</i> spp. [slowworms]; <i>Pseudopus apodus</i> [Shelto- pusik]; <i>Xerotyphlops vermicula- ris</i> [Eurasian worm snake]
<b>lizards</b>					
Askalabos	Stelio	–	–	–	<i>Tarentola</i> spp. [wall geckos]; ?? <i>Stellagama</i> spp. [starred agama]

cause of the inverted hemipenes of males laying in the tail root. This sexual difference is also reflected by higher subcaudal scale counts in males as compared to females. Despite the two different names, it is very likely that *Echis* and *Echidna* did not mean two different kinds of snakes but male and female of the same kind. The old myth that moray eels enter the land in order to mate with a male viper has experienced a long-lasting tradition (NICANDER: verse 209–257, PLINY: liber IX, XXIII.76) and was perpetuated even until the Middle Age by Albertus Magnus in Latin (STADLER 1920) and by his follower and partly translator KONRAD VON MEGENBERG in Old High German (PFEIFFER 1861). The described difference in the number of tooth punctures after a bite (two versus numerous) would correspond to a male viper and a female moray eel. In respect to sexual dimorphism also in the denomination of animals, it is interesting to emphasize that also in modern Greek the nose-horned viper *Vipera ammodytes* has several names, viz. Ochiá he kerasóra, Óchentra, Échidna; the fourth name, however, viz. Astrítes, is exclusively used for males!

The antique name *Echidna* has been used by post-Linnean authors for two vertebrates thought to be venomous (see the Appendix below), viz. (1) moray eels (Pisces: Muraenidae: *Echidna* spp.), for which not only severe bites (BARREIROS & HADDAD 2008), but also toxic secretions have been proven (MOLGÓ 1993, BÖHLKE & RANDALL 2000), and (2) the Australian monotreme mammal called echidna (Monotremata: Tachyglossidae: *Tachyglossus aculeatus*) which keeps this nomen even as its English vernacular name (STORCH 2015). However, in contrast to the platypus (*Ornithorhynchus anatinus*) which has a poison-secreting spine at its hindfoot, in the echidna the respective rudimentary spine is not erectile, and its secretion may play a role in chemical communication rather than in poisoning (Kraus 2010, Wong 2013).

#### Sexual behaviour: Mating

Obviously, mating behavior of snakes has been repeatedly observed in the antiquity, including the neck and/or head bites of various non-venomous snakes and legless (here anguoid) lizards (see Figs 8 and 16 above). It was, however, interpreted as a very aggressive attitude in that the male's head was bitten off from the female during this act. Less dramatic is the version given by PLINY THE ELDER: Here, the female gnaws voluptuously at the male's head and conceives through the mouth. This myth has been transmitted through the literature until the Middle Age (ALBERTUS MAGNUS: STADLER 1920). KONRAD VON MEGENBERG explained still in the 1350s this oral conception by stating that the female's cloacal slit would be too small for conceiving successfully (PFEIFFER 1861).

As mentioned already above, mutual entwining of two snakes was also described by PLINY THE ELDER and interpreted as an interaction between the two sexes. This behavior was also used as a motif of twisted, seemingly double-head-

ed snakes in artistic performances, already in the so-called Hermes staffs (*kerykeia*, in Latin *caducei*) dating back to the 6<sup>th</sup> to 5<sup>th</sup> century B.C. (Fig. 15, see HORNBOSTEL 1979). However, the natural model for this behavior is in most cases a ritual combat between two rivalling males (Figs 16 a) strikingly reminding antique depictions resembling one snake with two heads (ABU BAKER et al. 2021, Fig. 17 a, b above).

#### Parity

Since NICANDER's time and even earlier, the antique naturalists knew that most snakes were egg-laying, the eggs being arranged in two chains. PLINY THE ELDER stated explicitly (liber IX, verse 45) that of all hairless animals, only the dolphin and the viper give birth to living young, and we remind here again that the Latin name "vipera" is a conjunction of "vivipara" = livebearing. Also the myth of impatient viper fetuses breaking through the body wall of her mother and thus killing her is perpetuated through the centuries (Fig. 7 above).

#### Double-headed snakes

Apart from twisted, entwined copulating snakes which, according to PLINY, could be regarded as one specimen with a double head (ABU BAKER et al. 2021; see Fig. 17 a,b above), also the "amphisbaena" type of a two-headed snake, but with the heads at both ends of one body seems to be a widely distributed myth, exceeding by far the distribution range of amphisbenian lizards (EGLI 1982). This author, following STEMMER-MORATH (1968), suggested an interesting alternative explanation for the myth of dicephalic snakes with the heads on both ends of their body. He explained that as being based on the observation of copulating vipers where the spiny hemipenis of the (mostly smaller) male gets caught in the cloaca of the larger female so that the latter when fleeing drags the smaller male backwards along after her. Because male vipers, due to their venomous fangs, cannot fix themselves with a neck bite at the female, as do many colubrids (see Fig. 8 above), their hemipenes are much stronger equipped with calcified spines as their only means to get hold at or respectively in the female (BÖHME 1988 b).

#### Aesthetic reception

The connotation of snakes is mostly ambiguous in the antiquity. A rare example of a completely positive connotation highlighting the aesthetics of the snake's scalation, colour pattern and movements can be found in the work of PUBLIUS VERGILIUS MARO, or just VERGIL (75–19 B.C.). He described a beautiful, dazzling snake (*anguis lubricus*) in his epic *Aeneid*, exciting the observers by its shiny scales resembling the colours of a rainbow. It moved elegantly around the altars and grave of AENEAS' father ANCHISES,

tasting from the sacrificial bowl and disappearing again without causing any harm (GÖTTE 1997).

#### Snakes in antique performing arts

Most paintings and sculptures containing or representing snakes are similarly mythically overloaded as are the literary testimonies and sources dealt with above. Examples are the snake reliefs at the Pergamon altar in Berlin or the famous LAOKOON group in the Vatican museum in Rome (Fig. 25). In the latter, the snakes trying to constrict LAOKOON and his sons are not big enough to be a real danger for these three men who nonetheless seem to surrender themselves in their fate. These obviously constricting (i.e. most likely non-venomous) snakes came out of the sea what qualifies them already as mythical creatures. In fact constricting snakes, particularly boas and pythons, start to become dangerous for humans only from four to five meters upwards in length, and even if one of the snakes has been measured as being more than 6 m long (HÄUBER, in press), it is much too thin as that it could be strong enough

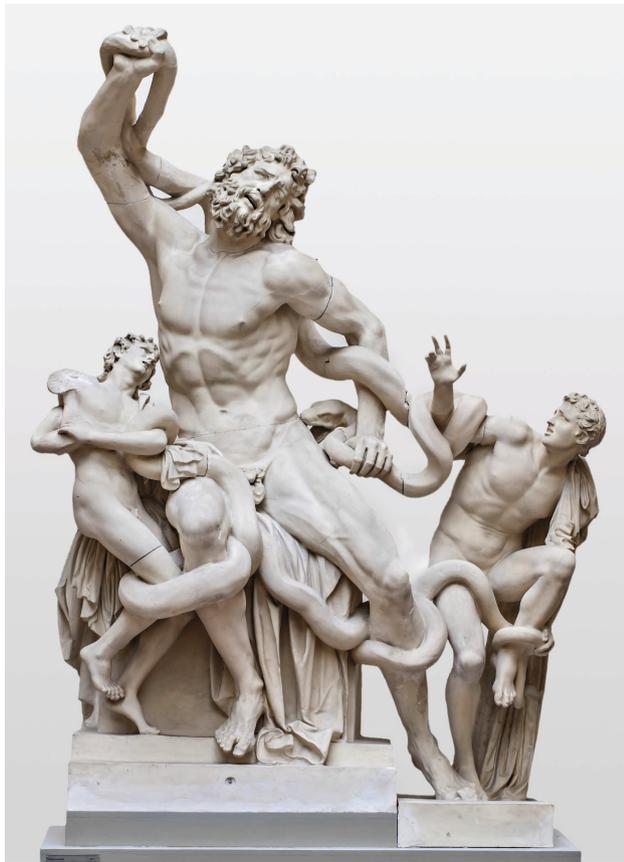


Figure 25. The famous LAOKOON group of the Vatican Museum in Rome, copy in the Akademisches Kunstmuseum, Bonn, made before the reconstruction of LAOKOON's right arm. Photo: JUTTA SCHUBERT, Akademisches Kunstmuseum Bonn, courtesy KORNELIA KRESSIRER.

for strangling these three men. In this paper, CHRYSTINA HÄUBER performed a particularly thorough and detailed analysis of the LAOKOON group including interpretations of the sculptured snakes, also in respect to herpetological knowledge.

The only realistic, extremely natural-looking antique snake sculpture we are aware of is in the Archeological Museum of Rabat, Morocco. It has been found in the antique Roman city Volubilis and clearly depicts a Montpellier snake (*Malpolon monspessulanus*) which is characterized by a particularly prominent supraocular shield and by a unique scale character (Fig. 26). The body scales are neither smooth nor keeled, but concave what led to the generic synonym *Coelopeltis* (= hollow scale) of this snake. And indeed is each body scale of this Volubilis specimen equipped with a longitudinal groove referring to this unusual concavity of the *Malpolon* scales (BÖHME & DE HAAN 2002).

The presumed natural scientific reason for the presentation of crested and bearded snakes in the antique performing art, i.e. the regular change of their old skin as a symbol of rebirth or eternal youth has already been mentioned at the very beginning of this paper. It has certainly also contributed to the:

#### Worshipping of snakes

Despite their often negative image which is due to their undisputed dangerousness, snakes enjoyed also forms of worshipping. Most important here is the snake of Asklepios/Aesculapius, as a symbol of medicine. Among the authors discussed here, it was already NICANDER who told about the Drakon which lived on Mt. Pelion raised by Asklepios. Its bite with only small teeth was described as harmless, and the snake itself as being fond of bird eggs and nestlings. PLINY THE ELDER distinguished between different size classes of his Draco and informed the reader that the young, smaller specimens would be fond of drinking milk, and that's why they were called in Italy Bovae (= cow snakes). This distinction fits the size classes of pythons on the one hand and of Four-lined racers (*Elaphe quatuor-*



Figure 26. Roman snake bronze from Volubilis, Morocco, clearly depicting a Montpellier Snake, *Malpolon monspessulanus*. Archeological Museum, Rabat. Photo: WOLFGANG BÖHME.

*lineata*) on the other. According to him, this last-named snake has been brought from Epidauros (i.e. an Aesculapian sanctuary for this species) to Rome. LUCAN with his predominantly negative attitude against snakes mentioned this snake as Pareas only briefly, stating its harmlessness, but refraining from the description of more positive details while AELIAN, again under the name Pareas, ascertained its harmless bite, ascribed it a red color but added that it would be called the “servant of Asklepios”.

#### Surviving traditions

There are two cases of antique snake worshipping which survived, despite their pagan origin, in Christian ceremonies to our days. One of them took and likely still takes regularly place on the Ionian island of Kefallenia, in two villages called Markópoulo and Argínia, where people commemorate the death of the holy virgin MARY. The “Snakes of Our Lady”, as they are called, erroneously termed as *Elaphe situla* (currently *Zamenis situla*), are in fact European cat snakes (*Telescopus fallax*) (BODSON 1977, 1978, GITTENBERGER & HOOGMOED 1985, WARNECKE 1987) and are moving around in the small churches while people try to touch and handle them because of their belief that these snakes would protect them from bad experiences in their lives (STÖRTENBECKER 1994) (Fig. 27). The second, also

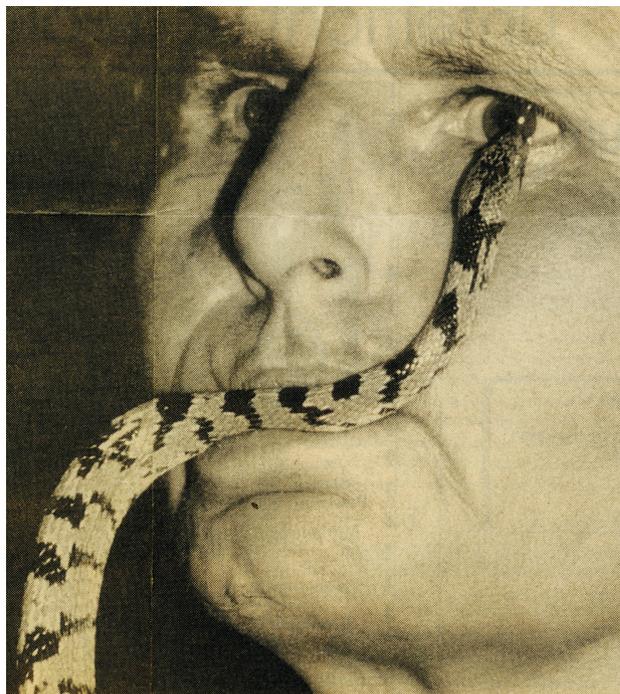


Figure 27. Greek woman in Argínia, Ionian island of Kefallenia, with a cat snake, *Telescopus fallax*, during a religious ceremony. Photo: RAINER STÖRTENBECKER, from STÖRTENBECKER (1994).



Figure 28. A statue of San Domenico, adorned with numerous snakes (*Elaphe quatuorlineata*) during the annual ceremonial procession through the Abruzzo village Cocullo, Italy. Photo: BERND SKUBOWIUS.

well documented case of the usage of snakes in a Christian-religious context has been described from the small village Cocullo in the central Italian Abruzzo Mountains. Here, a statue of the holy DOMENICUS is carried through the village, draped with numerous large snakes, most of them four-lined snakes, *Elaphe quatuorlineata* (Fig. 28), i.e. the same species which was primarily worshipped in the antiquity as the companion of the god ASKLEPIOS (BRUNO 1971, DE HAAN 1974, ENGELMANN & OBST 1981, and also his daughter HYGIEIA (BÖHME 2015). Although in some years also some large Aesculapian (*Zamenis longissimus*) and large grass snakes (*Natrix helvetica*) were involved in the ceremony, we believe that it is not by chance that the just the four-lined snake (*Elaphe quatuorlineata*) stands in the focus of this obviously pagan-Christian tradition.

### Acknowledgements

For philological advice and expertise, for providing photographs as well as literature references we thank LILIANE BODSON, Liège, MORITZ BÖHME and HEIKE BÖHME (both M.A.), Berlin, and CHRYSINA HÄUBER, München; for photographs: ZUHAIR AMR, Amman; MORRIS FLECKS, ZFMK Bonn; FRANTZ GRIES, Orange, through CORNELIUS DE HAAN, Loiras du Bosc; MIGUEL ANGEL FUENTES, Barcelona, through DANIEL ESCORIZA, Girona, Spain; WILHELM HORNBOSTEL, Berlin; RUDOLF KÖNIG (†), Kiel; FRITZ (†) and GISELA PÖLCKING, Greven, through MARK AULIYA, Bonn; HILDEGUND PIZA, through MARIO SCHWEIGER, Obertrum; MICHAEL WAITZMANN, Karlsruhe; DIETER RIECK, Bad Münstereifel; JUTTA SCHUBERT, through KORNELIA KRESSIRER, Bonn; BERND SKUBOWIUS, Herne; BENNY TRAPP, Wuppertal; and GUIDO WESTHOFF, Hamburg. URSULA BOTT, ZFMK Bonn, contributed again significantly to the successful completion of this paper.

### References

- ABU BAKER, M. A., M. AL-SARAIREH, Z. S. AMR & P. J. SENTER (2021): Male-male combat in the large whip snake, *Dolichophis jugularis* (Serpentes: Colubridae). – *Herpetology Notes*, **14**: 735–744.
- ADLER, K. (ed., 2012): Contributions to the history of herpetology. – *Contributions to Herpetology*, **29**: 1–564.
- AL-SHEIKHLI, O. M., W. BÖHME, M. K. HABA, H. K. ABDULZAHRA, N. A. FAZAA, R. H. AL-ASSADY & S. B. MOUSAVI (2021): Extraordinary colour morphs in the Lebetine viper *Macrovipera lebetinus* (Linnaeus, 1758) from the Mesopotamian marshes of southern Iraq and western Iran. – *Sauria*, **43**(1): 38–50.
- BAIG, K. J., P. WAGNER, N. B. ANANJEVA & W. BÖHME (2012): A morphology-based taxonomic revision of *Laudakia* Gray, 1845 (Squamata: Agamidae). – *Vertebrate Zoology*, **62**(2): 213–260.
- BAKALOUDES, D. E., C. G. VLACHOS & G. J. HOLLOWAY (2008): Habitat use by the short-toed eagles *Circaetus gallicus* and their reptilian prey during the breeding season in Dadia Forest (north-eastern Greece). – *Journal of Applied Ecology*, **35**: 821–828.
- BALSS, H. (1943): Aristoteles. Biologische Schriften. Griechisch und deutsch. – Verlag Ernst Heimeran, München.
- BARREIRAS, J. & V. HADDAD (2008): Bite by the moray eel. – *Journal of Venomous Animals and Toxins including Tropical diseases*, **14**: 541–545.
- BODSON, L. (1977): De la symbolique religieuse à l'herpétologie: les serpents sacrés de Marcopoulo, Céphalonie-Grèce. – *Bulletin de la Société zoologique de France*, **102**(4): 485–487.
- BODSON, L. (1978): Hiera Zoia. Contribution à l'étude de la place de l'animal dans la religion grecque ancienne. – *Mémoires de la classe des lettres, Académie Royale de Belgique*, (2) **63**(2): i–xvii + 1–210.
- BODSON, L. (1981): Les Grècs et leurs serpents. – *L'Antiquité Classique*, 1981: 57–78.
- BODSON, L. (1982): La pathologie des morsures de serpents venimeux dans la tradition gréco-latine. – *Confrontations*, **59**: 43–48.
- BODSON, L. (1984): Living reptiles in captivity: A historical survey from the origins to the end of the XVIII<sup>th</sup> century. – *Acta Zoologica et Pathologica Antverpensia*, **78**: 15–32.
- BODSON, L. (1986): Observations sur le vocabulaire de la zoologie antique: Les noms des serpents en grec et en latin. – *Documents pour l'histoire du vocabulaire scientifique*, **8**: 65–119.
- BODSON, L. (2003): A python (*Python sebae* Gmelin) for the king. The third century BC herpetological expedition to Aithiopia (Diodorus of Sicily 3.36–37). – *Museum Helveticum*, **60**: 22–38.
- BODSON, L. (2004): A python, *Python sebae* (Gmelin, 1789), for the king: The third century B.C. herpetological expedition to Ethiopia. – *Bonner zoologische Beiträge*, **52**(3/4): 181–191.
- BÖHLKE, E. B. & J. E. RANDALL (2000): A review of the moray eels (Anguilliformes: Muraenidae) of the Hawaiian Islands, with descriptions of two new species. – *Proceedings of the Academy of Natural Sciences of Philadelphia*, **150**: 203–278.
- BÖHME, W. (1988 a): Brustweisen und Milchspritzen gambianischer Frauen gegenüber Chamäleons – eine interdisziplinäre Studie. – *Tier und Museum*, **1**(1): 1–9.
- BÖHME, W. (1988 b): Zur Genitalmorphologie der Sauria: funktionelle und stammesgeschichtliche Aspekte. – *Bonner zoologische Monographien*, **27**: 1–176.
- BÖHME, W. (ed., 1993): Handbuch der Reptilien und Amphibien Europas. Vol. 3/1. Schlangen I. – AULA-Verlag, Wiesbaden.
- BÖHME, W. (2008): Der Apothekerskink (*Scincus scincus*) oder "Sandfisch" der Araber – vom medizinhistorischen Aphrodisiakum zum Modell der Bionik. – *Koenigiana*, **2**(2): 75–80.
- BÖHME, W. (2015): Die heilige Schlange des Aesculapian. – *Koenigiana*, **9**(2): 91–99.
- BÖHME, W. & M. BÖHME (2011): "Berus" und "Tirus", zwei schwer zu deutende Schlangennamen aus vorlinnaeischer Zeit. – *Sekretär*, **11**(2): 3–16.
- BÖHME, W. & C. DE HAAN (2002): Eine römische Schlangenskulptur aus Volubilis mit naturalistischer Detaildarstellung: *Malpolon monspessulanus*. – *Beiträge zur Literatur und Geschichte der Herpetologie und Terrarienkunde*, **II**: 47–33.
- BÖHME, W. & T. KOPPETSCH (2020): Wann wurde das Seitenwinden wüstenbewohnender Vipern erstmals beschrieben? Und war die Spinnenschwanzvipere (*Pseudocerastes urarachnoides* Bostanچی et al., 2006) vielleicht schon fast 2000 Jahre vorher bekannt? – *Sekretär*, **20**: 81–89.
- BÖHME, W. & N. N. SHCHERBAK (1993): *Elaphe quatuorlineata* (Lacépède, 1789) – Vierstreifenmutter. – pp. 373–396 in: BÖHME, W. (ed.): Handbuch der Reptilien und Amphibien Europas, vol. 3/1. – AULA-Verlag, Wiesbaden.

- BRENNING, M. (1904): Nikanders "Theriaka" und "Alexipharmaka". – Allgemeine Medicinische Centralzeitung, **1904**(6): 112–114, (7): 132–134, (17): 327–330, (18): 346–349, (19): 368–371, (20): 387–390.
- BRUNO, S. (1971): Il serpente nel folklore e nelle usanze magiche e religiose della Marsica. – L'Universo, Roma, **51**(2): 443–460.
- BÜCHERL, W. & E. E. BUCKLEY (1971): Venomous animals and their venoms. Vol. II. Vertebrates. – Academic Press, New York, London.
- CAMP, C. L. (1923): Classification of the lizards. – Bulletin of the American Museum of Natural History, **48**: 289–435.
- CORRAL-CORRAL, I. & C. CORRAL-CORRAL (2016): Tarantism in Spain in the eighteenth century: Latrosectism and suggestion. – Revista de Neurología, **63**(8): 370–379.
- DE HAAN, C. (1974): Aantekeningen over slangen van Abruzzo, Campania, Calabria en Sicilia (Italië). – Lacerta, **32**(7): 120–125.
- DE HAAN, C. (1999): *Malpolon monspessulanus* – Eidechsenmutter. – pp. 661–756 in: BÖHME, W. (ed.): Handbuch der Reptilien und Amphibien Europas. – AULA-Verlag, Wiesbaden, vol. III/2 A, pp. i–xii + 481–815.
- DUMÉRIL, A. M. C., G. BIBRON & A. DUMÉRIL (1854): Erpétologie générale ou histoire naturelle des Reptiles. – Roret, Paris, vol. 7(2): pp. i–xii + 781–1536.
- EIGLER, U. (2011): Polemus Silvius. – in: LANDFESTER, M., H. CANKIC & H. SCHNEIDER (eds): Der Neue Pauly. Enzyklopädie der Antike. – Brill, Leiden.
- EGLI, H. (1982): Das Schlangensymbol. Geschichte-Märchen-Mythos. – Walter-Verlag, Olten.
- EHLERS, W. (1978): M. Annaeus Lucanus – Bellum civile. M. Annaeus Lucanus – Der Bürgerkrieg. – München (Heimeran-Verlag), Second edition.
- ENGELMANN, W.-E. & F. J. OBST (1981): Snakes. Biology, Behavior and Relationship to Man. – Croomhelm, London, Canberra.
- FRETEY, T. (2019): Capitalized epithets in the work of Linnaeus (1758–1767): findings and consequences in herpetology. – *Bionomina*, **16**: 22–45.
- FUENTES, M. A. & D. ESCORIZA (2015): *Natrix maura* (viperine snake) marine foraging. – Herpetological Bulletin, **134**: 31–32.
- GITTENBERGER, E. & M. S. HOOGMOED (1985): Notizen zum christlichen Schlangenkult auf der ionischen Insel Kefallenia. – Salamandra, **21**: 90–94.
- GÖTTE, J. (1997): Vergil – Aeneis. Lateinisch-deutsch. – Artemis & Winkler, Düsseldorf, Zürich, 9<sup>th</sup> edition.
- GOSSEN, H. & A. STEIER (1921): Schlangen (Arten). – pp. 494–557 in: WISSOWA, G. (ed.): Pauly's Realenzyklopädie der klassischen Altertumswissenschaften. Band II.A.1 "Sarmatia – Selnos". – Metzler, Stuttgart.
- GOW, A. S. F. & A. F. SCHOLFIELD (1953): Nicander. The poems and poetical fragments. – Cambridge University Press, Cambridge.
- HÄUBER, C. (in press): Die Laokoon-Gruppe im Vatikan – drei Männer und zwei Schlangen: „Ich weiß gar nicht, warum die sich so aufregen“ (Wolfgang Böhme). Die Bestätigung von F. Magis Restaurierung der Gruppe und der Behauptungen, sie sei für die Horti des Maecenas, später Domus Titi, geschaffen, und dort entdeckt worden. – FORTVNA PAPERS, Munich.
- HENLE, K. (1995): A brief review of the origin and use of „stellio“ in herpetology and a comment of the nomenclature and taxonomy of agamids of the genus *Agama* (sensu lato). – Herpetozoa, **8**(1/2): 3–9.
- HORNBOSTEL, G. & W. HORNBOSTEL (1988): Syrakusanische Herolde. – pp. 233–245 in: BATHRON: Beiträge zur Architektur und verwandten Künsten. Für Heinrich Drerup zu seinem 80. Geburtstag. – Saarbrücker Studien zur Archäologie und Alten Geschichte, **3**.
- HORNBOSTEL, W. (1979): Syrakosion Damosion. Zu einem bronzenen Heroldstab. – Jahrbuch der Hamburgischen Kunstsammlungen, **24**: 33–62.
- International Commission on Zoological Nomenclature (1999): International Code of zoological nomenclature. – Fourth edition. – International Trust for Zoological Nomenclature, London.
- JONES, W. H. S. (1958): Pliny Natural History, with an English translation in ten volumes. Vol. VIII, Libri XXVIII–XXXII. – Cambridge/Mass., London (William Heinemann Ltd. and Harvard University Press).
- KELLER, O. (1913): Die antike Tierwelt. Zweiter Band: Vögel, Reptilien, Fische, Insekten, Spinnentiere, Tausendfüßler, Krebstiere, Würmer, Weichtiere, Stachelhäuter, Schlauchtiere. – Georg Olms Verlagbuchhandlung, Hildesheim, Reprint Leipzig 1963.
- KÖNIG, R. & G. WINKLER (1976): C. Plinius Secundus d. Ä., Naturkunde, Lateinisch – Deutsch, Buch VIII, Zoologie: Landtiere. – Heimeran-Verlag, München.
- KÖNIG, R. & G. WINKLER (1979): C. Plinius Secundus d. Ä., Naturkunde, Lateinisch – Deutsch, Buch IX, Zoologie: Wassertiere. – Heimeran-Verlag, München.
- KRAUSE, W. J. (2010): Morphological and histochemical observations on the crural gland-spur apparatus of the Echidna (*Tachyglossus aculeatus*) together with comparative observations on the femoral gland-spur apparatus of the Duckbilled platypus (*Ornithorhynchus anatinus*). – Cells, Tissues, Organs, **191**: 336–354.
- LAURENTI, J. (1768): Specimen Medicum, exhibens Synopsis Reptilium emendatam cum experimentis circa venena et antidota reptilium Austriacorum. – Joan. Thom. Nob. de Trattner, Viennae.
- LESCURE, J. & B. LE GARFF (2006): L'étymologie des noms d'amphibiens et des reptiles. – Collection Eveil Nature, Paris, Belin.
- LINNAEUS, C. (1758): Systema Naturae per Regni Tria Naturae, Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Tomus 1, Edition Decima, reformata. – Laurentii Salvii, Holmiae: i–ivv, 5–823.
- LURKER, M. (1983): Adler und Schlange. Tiersymbolik im Glauben und Weltbild der Völker. – Rainer Wunderlich-Verlag Hermann Leins GmbH, Tübingen.
- MEBS, D. (1992): Gifttiere. Ein Handbuch für Biologen, Toxikologen, Ärzte, Apotheker. – Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart.
- MERTENS, R. & H. WERMUTH (1960): Die Amphibien und Reptilien Europas (Dritte Liste nach dem Stand vom 1. Januar 1960). – Verlag Waldemar Kramer, Frankfurt am Main.
- MOLGÓ, J., Y. M. GAUDRY-TALARMAN, A. M. LEGRAND & N. MOULIAN (1993): Ciguatoxin extracted from poisonous moray eels *Gymnothorax javanicus* triggers acetylcholine release from Torpedo cholinergic synaptosomes via reversed Na<sup>+</sup>–Ca<sup>2+</sup> exchange. – Neuroscience Letters, **160**: 65–68.

- MÜLLER, P. L. S. (1774): Des Ritters Carl von Linné Königlich Schwedischen Leibarztes u. u. vollständiges Natursystem nach der zwölften lateinischen Ausgabe und nach Anleitung des Holländischen Hottuynischen Werks mit einer ausführlichen Erklärung angefertigt. – Gabriel Nicolaus Raspe, Nürnberg.
- MURPHY, J. C., H. K. VORIS & M. AULIYA (2005): A new species of *Enhydryis* (Serpentes: Colubridae: Homalopsinae) from the Kapuas River system, West Kalimantan, Indonesia. – The Raffles Bulletin of Zoology, **53**(2): 271–275.
- PAULSSEN, L. (2015): Worst op het menu. – RAVON Nieuwsbrief, **26**: 19.
- PFEIFFER, F. (ed., 1861): Das Buch der Natur von Konrad von Megenberg. Die erste Naturgeschichte in deutscher Sprache. – K. Aue, Stuttgart.
- PIECHOCKA-KLOS, M. (2020): Nomina Animalium in Laterculus by Polemy Silvius. The beginning of the liturgical calendar (5<sup>th</sup> century). – Forum Teologiczne, **21**: 249–261.
- PLENK, J.J. VON (1785): Joseph Jakob Plenck, Doktor der Wundarzneykunst, öffentlicher, ordentlicher Lehrer der Chemie und Botanik an der Militair Akademie der Chirurgie, Direktor der Feldapotheken und Staatschirurgus. Toxikologie, oder Lehre von den Giften und Gegengiften: Aus dem Lateinischen. – bey Rudolph Gräffer, Wien.
- PRINZ, O. (ed., 1967): Mittellateinisches Wörterbuch bis zum ausgehenden 13. Jahrhundert. – C. H. Beck, München: vol. 1: A–B, 1638 columns.
- REED, C. (2007): Dazzlers. Ancients reborn in bright array. – Harvard Magazine, November/December 2007: 30–33.
- REHÁK, I. (1987): Color change in the snake *Tropidophis feicki* (Reptilia: Squamata: Tropicodidae). – Věstník Československé společnosti zoologické, **51**: 300–303.
- SCHLEICH, H.-H., W. KÄSTLE & K. KABISCH (1996): Amphibians and Reptiles of North Africa. – Koeltz, Königstein.
- SCHMIDTLER, J. F. (2019): Die Reptilien und Amphibien Bayerns. – pp. 23–50 in: ANDRÁ, E., O. ASSMANN, T. DÜRST, G. HANSBAUER & A. ZAHN (eds): Amphibien und Reptilien in Bayern. – Eugen Ulmer-Verlag, Stuttgart.
- SCHOLFIELD, A. F. (1958–1959): Aelian. On the characteristics of animals. Volumes I–III, with an English translation. – Harvard University Press, Cambridge, Massachusetts.
- SCHRANK, F. V. P. (1786): Baiersche Reise. – Johann Baptist Strobl, München.
- SCHWEIGER, M. (1983): Die Folgen eines schweren Bisses von *Vipera lebetina obtusa*, seine medizinische Behandlung und Spätfolgen. – Herpetofauna, **26**: 14–16.
- SEBA, A. (1734–1765): Locupletissimi rerum naturalium thesauri accurata descriptio, iconibus artificiosissimis expressio per universam physices historiam. – apud Janssonio-Waesbergios & J. Weststenium & Gul Smith, Amsterdami. – Vollständige Ausgabe der kolorierten Tafeln. Taschen GmbH, Köln.
- STADLER, H. (1920): Albertus Magnus, de animalibus libri XXVI. Nach der Cölner Urschrift. Zweiter Band, Buch XIII–XXVI enthaltend, 1598 pp. – in: BÄUMKER, C. (ed.): Beiträge zur Geschichte der Philosophie des Mittelalters. Texte und Untersuchungen, Band XVI. – Aschendorfsche Verlagsbuchhandlung, Münster/Westfalen.
- STEMMLER–MORATH, C. (1968): Schlangen. – Gute Schriften-Verlag, Basel.
- STÖRTENBECKER, R. (1994): Das Wunder von Arginia. – Die Zeit, Nr. 33 (August 1992).
- STORCH, G. (2015): Mammalia, Säugetiere. – pp. 441–660 in: WESTHEIDE, W. & G. RIEGER (eds): Spezielle Zoologie, Teil 2, Wirbel- oder Schädeltiere. – Springer-Spectrum, Berlin, Heidelberg.
- STUMPEL-RIENKS, (1992): Nomina Herpetofaunae Europae. Die Trivialnamen der Herpetofauna Europas. The Vernacular Names of the Herpetofauna of Europe. Ergänzungsband, Handbuch der Reptilien und Amphibien Europas. – AULA-Verlag, Wiesbaden.
- TRAPE, J.-F. & Y. MANÉ (2006): Guide des serpents d'Afrique occidentale. Savane et désert. – IRD Éditions, Paris.
- TRINQUIER, J. (2012): Serpents buveurs d'eau, serpents oenophiles et serpents sanguinaires: les serpents et leur boissons dans les sources antiques. – Anthropozoologica, **47**(1): 177–199.
- VEITH, G. (1991): Die Reptilien Bosniens und der Herzegowina. Teil II. – Herpetozoa, **4**(1/2): 1–96.
- WAITZMANN, M., A. ZITZMANN, A. MALTEN & O. ASSMANN (2021): Die Äskulapnatter in Deutschland. – Elaphe, 2021(4): 12–17.
- WARNECKE, H. (1987): Die tatsächliche Romfahrt des Apostels Paulus. – Stuttgarter Bibelstudien, **127**: 1–164.
- WERMUTH, H. (1965): Liste der rezenten Amphibien und Reptilien. Gekkonidae, Pygopodidae, Xantusiidae. – Das Tierreich, **80**: I–XXII + 1–245.
- WILLIAMS, K. L. (1978): Systematics and natural history of the American Milk Snake *Lampropeltis triangulum*. – Milwaukee Public Museum Publications in Biology and Geology, **2**: 1–258.
- Wong, E. S. W., S. Nico, W. C. Warren & K. Belov (2013): Venom gland transcriptome provides insights into the evolution of monotreme venom. – PLoS ONE, **8**(11): e79092.
- WÜSTER, W. & D. G. BROADLEY (2007): Get an eyeful of this: a new giant spitting cobra from eastern and northeastern Africa (Squamata: Elapidae: *Naja*). – Zootaxa, **1532**: 51–68.

## Appendix

Names of snake-related reptiles in the Greek-Roman antiquity, used, partly modified and re-addressed by LINNAEUS and post-Linnean authors for various vertebrate genera (including their type species) and species<sup>1</sup>

### Names used for both genus and species descriptions

*Acontias* CUVIER, 1817, type species *Anguis meleagris* LINNAEUS, 1758 = *Acontias meleagris* (LINNAEUS, 1758) (scincid lizard)

*Ammodytes* BONAPARTE, 1831, type species: *Vipera ammodytes* (LINNAEUS, 1758) (viperid snake; preoccupied by *Ammodytes* LINNAEUS, 1758 and 1766, both fishes) / *Coluber Ammodytes* LINNAEUS, 1758 = *Vipera ammodytes* (LINNAEUS, 1758) (viperid snake) / *Apostolepis ammodites* FERRAREZZI, BARBO & ALBUQUERQUE, 2005 (dipsadid snake)

<sup>1</sup> Capitalized epithets refer to those Linnean species names which are not flectible adjectives but were used as nouns in apposition (FRETEY 2019), thus underlining their origin from mostly classical sources.

*Amphisbaena* LINNAEUS, 1758, type species *Amphisbaena alba* LINNAEUS, 1758 (amphisbaenid lizard)

*Ascalabotes* CUVIER, 1829, type species *Ascalabotes leachianus* CUVIER, 1829 = *Rhacodactylus leachianus* (CUVIER, 1829) (gek-kotan diploclactylid lizard) / *Gekko ascalabotes* MERREM, 1820 = *Ptyodactylus hasselquisti* DONNDORFF, 1798 (gek-kotan phyllodactylid lizard)

*Aspis* LAURENTI, 1768, type species *Aspis cleopatrae* LAURENTI, 1768 = *Cerastes vipera* (LINNAEUS, 1758) (vipерid snake) / *Coluber Aspis* LINNAEUS, 1758 = *Vipera aspis* (LINNAEUS, 1758) (vipерid snake)

*Basiliscus* LAURENTI, 1768, type species *Lacerta Basiliscus* LINNAEUS, 1758 = *Basiliscus basiliscus* (LAURENTI, 1768) (iguanaid lizard) / *Chamaeleo basiliscus* COPE, 1868 = *Chamaeleo africanus* LAURENTI, 1768 (chameleonid lizard)

*Boa* LINNAEUS, 1758, type species *Boa constrictor* LINNAEUS, 1758 (boid snake) / *Tortrix boa* SCHLEGEL, 1837 = *Bothrochilus boa* (SCHLEGEL, 1837)

*Cenchrus* DAUDIN, 1803, type species *Agkistrodon mokeson* DAUDIN, 1803 = *Agkistrodon contortrix* (LINNAEUS, 1758) (vipерid snake) / *Boa Cenchrus* LINNAEUS, 1758 = *Epicrates cenchrus* (LINNAEUS, 1758) (boid snake)

*Cerastes* LAURENTI, 1768, type species *Coluber Cerastes* LINNAEUS, 1758 = *Cerastes cerastes* (LINNAEUS, 1758) (vipерid snake)

*Chelydra* SCHWEIGGER, 1812, type species: *Testudo serpentina* LINNAEUS, 1758 = *Chelydra serpentina* (LINNAEUS, 1758) (chelydrid turtle)

*Chersydrus* CUVIER, 1817, type species *Hydrus granulatus* SCHNEIDER, 1799 = *Acrochordus granulatus* (SCHNEIDER, 1799) (acrochordid snake)

*Cophias* MERREM, 1820, type species *Coluber crotalinus* (GMELIN, 1789) = *Lachesis muta* LINNAEUS, 1766 (vipерid snake) / *Bachia cophias* CUNHA, 1958 = *Bachia flavescens* BONNATERRE, 1789 (gymnophthalmid lizard)

*Dipsas* LAURENTI, 1768, type species *Dipsas indica* LAURENTI, 1768 (dipsadid snake) / *Herpetodryas dipsas* SCHLEGEL, 1837 = *Ptyas dipsas* (SCHLEGEL, 1837) (colubrid snake)

*Draco* LINNAEUS, 1758, type species *Draco volans* LINNAEUS, 1758 (agamid lizard)

*Dryinus* MERREM, 1820, type species *Coluber mycterizans* LINNAEUS, 1758 = *Ahaetulla mycterizans* (LINNAEUS, 1758) (synonym of *Dryinus* LATREILLE, 1804 and *Dryinus* FABRICIUS, 1805 (both hymenopterans) / *Crotalus Dryinus* LINNAEUS, 1758 = *Crotalus durissus* LINNAEUS, 1758 (vipерid snake)

*Echidna* LINK, 1806, type species *Coluber redi* GMELIN, 1788 = *Vipera aspis* (LINNAEUS, 1758) (vipерid snake), preoccupied by *Echidna* FORSTER, 1788 (muraenid fish), and by *Echidna* Cuvier, 1797 (type species *Echidna aculeata* (SHAW, 1792) = *Tachyglossus aculeatus* (SHAW, 1792) (tachyglossid monotreme mammal)

*Echis* MERREM, 1820, type species: *Pseudoboa carinata* SCHNEIDER, 1801 = *Echis carinatus* (SCHNEIDER, 1801) (vipерid snake)

*Elops* LINNAEUS, 1766, type species *Elops saurus* LINNAEUS, 1766 (elopid fish)

*Hemorrhois* F. BOIE, 1826, type species *Coluber hippocrepis* LINNAEUS, 1758 = *Hemorrhois hippocrepis* (LINNAEUS, 1758) (colubrid snake)

*Hypnale* FITZINGER, 1843, type species *Cophias hypnale* MERREM, 1820 = *Hypnale hypnale* (MERREM, 1820) (vipерid snake) / *Cophias hypnale* MERREM, 1820 = *Hypnale hypnale* (MERREM, 1820) (vipерid snake)

*Hydrus* SCHNEIDER, 1799, type species *Coluber hydrus* PALLAS, 1771 = *Natrix tessellata* (LAURENTI, 1768) (natricid snake)

*Jaculus* ERXLBEN 1777, type species *Mus jaculus* LINNAEUS, 1758 = *Jaculus jaculus* (LINNAEUS, 1758) (dipodid rodent mam-

mal) / *Anguis Jaculus* LINNAEUS, 1758 = *Eryx jaculus* (LINNAEUS, 1758) (boid snake)

*Natrix* LAURENTI, 1768, type species *Coluber Natrix* LINNAEUS, 1758 = *Natrix natrix* (LINNAEUS, 1758) (natricid snake)

*Pareas* WAGLER, 1830, type species: *Dipsas carinata*, WAGLER, 1830 = *Pareas carinata* (WAGLER, 1830) (pareatid snake)

*Parias* GRAY, 1849, type species *Megaera flavomaculatus* GRAY, 1842 = *Trimeresurus (Parias) flavomaculatus* (GRAY, 1842) (vipерid snake)

*Pelias* MERREM, 1820, type species *Coluber Berus* LINNAEUS, 1758 = *Vipera berus* (LINNAEUS, 1758) (vipерid snake) / *Coluber Pelias* LINNAEUS, 1758 = *Chrysopelea pelias* (LINNAEUS, 1759) (colubrid snake)

*Ptyas* FITZINGER, 1848, type species *Coluber blumenbachii* MERREM, 1820 = *Ptyas mucosa* (LINNAEUS, 1758) (colubrid snake)

*Scytale* LATREILLE in SONNINI & LATREILLE, 1801, type species *Boa contortrix* LINNAEUS, 1758 = *Agkistrodon contortrix* (LINNAEUS, 1758) / *Anguis Scytale* LINNAEUS, 1758 = *Anilius scytale* (LINNAEUS, 1758) (aniliid snake)

*Sepedon* MERREM, 1820, type species *Coluber haemachatus* BONNATERRE, 1790 = *Hemachatus haemachatus* (BONNATERRE, 1790) (elapid snake; synonym of *Sepedon* LATREILLE, 1804: scio-myrid fly - snail-killing fly) / *Coluber Sipedon* LINNAEUS, 1758 = *Nerodia sipedon* (LINNAEUS, 1758) (natricid snake)

*Seps* LAURENTI, 1768, type species: *Seps caerulescens* LAURENTI, 1768 (designated *hoc loco*) = *Lacerta agilis* LINNAEUS, 1758 (lacertid lizard) / *Lacerta Seps* LINNAEUS, 1758 = *Tetradactylus seps* (LINNAEUS, 1758) (gerrhosaurid lizard)

*Typhlina* WAGLER, 1830, type species *Typhlops lineatus* SCHLEGEL, 1839 = *Ramphotyphlops lineatus* (SCHLEGEL, 1839) (typhlopoid snake)

*Typhlops* SCHNEIDER in OPPEL, 1811, type species: *Anguis lumbricalis* LINNAEUS, 1758 = *Typhlops lumbricalis* (LINNAEUS, 1758) (typhlopoid snake)

*Vipera* LAURENTI, 1768, type species: *Vipera francisci redi* LAURENTI, 1768 = *Vipera aspis* (LINNAEUS, 1758) (vipерid snake) / *Coluber Vipera* LINNAEUS, 1758 = *Cerastes vipera* (LINNAEUS, 1758) (vipерid snake).

#### Names only for species descriptions

*Coluber Prester* LINNAEUS, 1761 = *Vipera berus* (LINNAEUS, 1758) (vipерid snake)

*Coluber Molurus* LINNAEUS, 1758 = *Python molurus* (LINNAEUS, 1758) (pythonid snake)

<sup>2</sup> LAURENTI (1768) did not designate a type species for his genus *Seps* ("Caput cataphractum; femora postica subtus calloso-punctata" = Head armour-plated; hindthighs below with callous pores) and listed 17 nominal species under this name. The first of them, *Seps scincus*, "with a black, greenish body" cannot be identified with *Lacerta scincus* LINNAEUS, 1758 (= *Scincus scincus*, family Scincidae). The diagnosis above fits a lacertid lizard best, and among LAURENTI's 17 species in this genus, seven are figured on the three tables of his work. Of these, Fig. III on table I offers the most unequivocal illustration, *Seps caerulescens*, showing a clear male sand lizard, *Lacerta agilis* LINNAEUS, 1758 (see also MERTENS & WERMUTH 1960). Six further names, based on figures in SEBA (1734-1765) are less reliably identifiable. In accordance with Art. 69.1 (ICZN 1999: Type species by subsequent designation) *Seps caerulescens* LAURENTI, 1768 (= *Lacerta agilis* LINNAEUS, 1758) is fixed here as the type for this genus name.

Species epithets derived from other Greek or Latin nouns  
in apposition

*Coluber Berus* LINNAEUS, 1758 = *Vipera berus* (LINNAEUS, 1758)

This *nomen* turned out to be unknown in classical Latin but could be found in dictionaries for Medieval Latin (PRINZ 1967). It denotes “a brown water snake”, and the name is ascribed to ALBERTUS MAGNUS (1193 or 1206/07–1280) from Cologne who coined this name in vol. 26 of his *opus magnum* “De animalibus” (STADLER 1920). Verified by his follower and partly translator KONRAD VON MEGENBERG (1309–1374) ca. 100 years later (PFEIFFER 1861), ALBERTUS MAGNUS latinized his name “berus” simply from a German-root word “ber” which means to bear = to be pregnant, to give birth (in German “tragen”, “gebären”, BÖHME & BÖHME 2011).

In contrast, FRETEY (2019), unaware of these previous papers, followed LESCURE & LE GARFF (2006) in deriving this name from a Greek word “beros” (not traceable in dictionaries of classical Greek), followed by its presumed Latin derivative “verus”, meaning “true”, and “common” by extension. This is certainly an unfounded interpretation.

*Coluber Lebetinus* LINNAEUS, 1758 = *Macrovipera lebetinus* (LINNAEUS, 1758)

For a long time this big-growing viper which is distributed from Asia Minor to Central Asia (with an outlier in North Africa), was known as *Vipera lebetina* (LINNAEUS, 1758). In their book on the etymology of the scientific names of amphibians and reptiles, LESCURE & LE GARFF (2006) offer two explanations: 1. Derived from the Levantine coast or Levant, according to SCHLEICH et al. (1996), being derived from the German vernacular name “Levante-Otter”; or 2. derived from the Greek word “lebes” meaning the “Greek kettle drummer of funerals”, referring to a warning situation. However, the original meaning of “lebes, lebetos” is a copper basin or bronze vessel which was used to boil water or flesh. So, with its medieval Latin ending lebet-inus the word could also have meant just the color of the material, viz. copper. This assumption is corroborated by a contemporary of LINNAEUS, viz. PAUL LUDWIG STATIUS MÜLLER (1774), who translated LINNAEUS’ *Coluber Lebetinus* with “Kupfernatter” which means copper snake, and the same name was also used by VON PLENCK (1785) in his famous toxicological work. Our conclusion is therefore that LINNAEUS (1758) used *C. Lebetinus* as a noun in apposition which refers to the color of the snake he described. So this name has nothing to do with the Levant, and the English vernacular name Lebetine viper is much more appropriate than Levantine viper (AL-SHEIKHLY et al. 2021).

*Coluber Situla* Linnaeus, 1758 = *Zamenis situla* (LINNAEUS, 1758)

According to FRETEY (2019) from Latin “sitis” = thirst, referring to the same meaning as expressed by the antique name “Dipsas”, viz. a terrible feeling of thirst after the bite of a venomous snake. The Latin noun “situla”, meaning a (bailing) bucket, i.e. an antique vessel, as it is also the case with “lebes”, is certainly connected with “sitis” (Duméril et al. 1854). According to P. L. S. MÜLLER (1774), “situla” is a vessel for boiling water wherefore he called LINNAEUS’ *Coluber Situla* “Wasserschlange” (= water snake).