

The most obvious attempt in the field of theory to incorporate Rome takes place at the end of the first century B.C. In his *History of Archaic Rome* Dionysius turns the Romans into Greeks⁸⁰ by making the native inhabitants of Latium, the Aborigines, colonists from Arcadia: οὐκ ἂν ἑτέρου τινὸς εἴησαν ἀποικοὶ γένους ἢ τοῦ καλουμένου νῦν Ἀρκαδικοῦ (*Ant. Rom.* 1.11.1–2). But this attempt takes place already on a borderline: the whole Greek world has become part of the Roman Empire, the “colonial” people have become the masters over the former center. The focus of perspective can now be changed.⁸¹ The Romans usurp the literary discourse. Vergil wants to surpass Homer, Horace the Greek lyric poets. Earlier, Cicero had not only “naturalized philosophy in Rome,”⁸² by doing so he also robbed the Greek language of the exclusive right to be the only voice in philosophical discourse.⁸³

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⁸⁰Cf. E. Gabba, *Dionysius and the History of Archaic Rome* (Berkeley 1991) Gruen (*supra* n.39) 7–8.

⁸¹See E. Rawson, *Intellectual Life in the Late Roman Republic* (Baltimore 1985) 3–18.

⁸²Harder (*supra* n.53) 330–353.

⁸³This paper is a revised version of an Oldfather Lecture, delivered at the University of Illinois at Urbana/Champaign on 13 October 2000. I am grateful to Oldfather Professor William M. Calder III for the invitation and to Dr Markus Dubischar for his welcome editing of the original manuscript.

The Ancients' One-Horned Ass: Accuracy and Consistency

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THIS PAPER explores ancient Greek and Roman accounts of the one-horned ass.¹ These narratives have been studied extensively by literary scholars and historians but have been largely ignored by zoologists and geographers. When the zoological and geographical underpinnings of the accounts are examined, however, it becomes apparent that these ancient writers may have had a more definite notion of the region about which they wrote than hitherto has been assumed. The animals contributing to the descriptions of the one-horned ass by Ctesias, Pliny, and Aelian can be found in the highlands of Central Asia. Indeed, Central Asia appears to be the only place on the Earth's surface that could have given rise to the corpus of ancient accounts of the unicorned ass and the animals that shared its landscape.

1. Introduction

Ctesias of Cnidus was a Greek physician who spent seventeen years ministering at the court of the King of Persia. In 398 B.C. he returned to Greece and began two reference works, a history of Persia in twenty-three volumes, now mostly lost, and *Indica*, a treatise on the region probably roughly coincident with

¹It will quickly become apparent to regular readers of this journal that the author is not a classicist. I am greatly indebted to Kent Rigsby, the editorial board of *GRBS*, and an anonymous reviewer for considering a manuscript from a zoologist, and for their kind assistance in turning a clumsy initial submission into the present, less clumsy version. All opinions and errors are mine.

northern India and the highlands of Central Asia.² The original text of *Indica* has not survived, but parts of the work have come down to us, possibly in revised form, in twenty-five abstracts compiled in the ninth century by Photius, then patriarch of Constantinople, and in excerpts from other authors.³

Earlier Greek explorers had not penetrated the Himalayan escarpment, so *Indica* must have been based on the accounts of travellers, merchants, and itinerant Persian officials (Shepard 27). Indeed, the description of India by Herodotus suggests that the very existence of these mountainous regions may have been unknown to the Greeks just a generation before Ctesias.⁴

In the final abstract of *Indica* Ctesias states that he heeded only credible witnesses and omitted from his book many more wonderful tales for fear of being branded a liar.⁵ Unfortunately, this confession did not protect him from being branded a liar by his contemporaries and many subsequent scholars.⁶ Recent research suggests, however, that it is no longer possible simply to dismiss Ctesias's claims without careful consideration of their empirical content.⁷ For example, his account of the elephant is rather precise, while his parrot can be equated with a real species.⁸ It cannot be denied, however, that many of the descriptions in *Indica* are fabulous indeed, and that such "tall tales" play, and have always played, a large part in colouring the opinions of scholars towards the work as a whole.⁹

One seemingly fabulous story in *Indica* concerns a supposedly

²O. Shepard, *The Lore of the Unicorn* (London 1930) 30; page numbers refer to the London 1967 reprint (hereafter SHEPARD).

³J. Bigwood, "Ctesias' *Indica* and Photius," *Phoenix* 43 (1989) 302–316.

⁴E. Bunbury, *A History of Ancient Geography I* (London 1883) 229.

⁵*FGrHist* 688 F 45.51; cf. L. Gotfredsen, *The Unicorn* (London 1999) 20 (hereafter GOTTFREDSEN).

⁶See Bunbury (*supra* n.4) 339–342 and Bigwood (*supra* n.3) 302 n.1.

⁷Bigwood (*supra* n.3) and references therein.

⁸J. Bigwood, "Ctesias' Parrot," *CQ N.S.* 43 (1993) 321–327.

⁹Bigwood (*supra* n.8) 321–322.

one-horned ass. This passage is the primary source of many later accounts of a similar animal and represents the earliest known description of a supposedly corporeal unicorn in European literature (Shepard 33, 27). But how tall is this particular tale? That Ctesias describes a one-horned horse-like animal suggests that the whole story can be immediately discounted, as such animals simply do not exist. However, a close technical reading of the text suggests that Ctesias's ass is entirely explicable in zoological and geographical terms. It also suggests that Ctesias was probably a better anatomist than most subsequent writers who criticised him for spinning improbable yarns. In turn, later accounts of the same animal by Pliny the Elder and Aelian add weight to the argument that Ctesias's original was geographically grounded in real animals, or legends of animals, that he combined himself or received from his informants already commingled.

The broad objective of this paper is thus to present a re-assessment of the passage on the one-horned ass in Ctesias's *Indica* from a zoological and geographical perspective. This reinterpretation will then allow the zoogeographical coherence of later accounts of the same animal, in particular that of Aelian, to be appropriately assessed. In the process I hope to clarify some zoological, biomechanical, and anatomical issues and offer a wider, more rigorous, and more coherent overview than is currently available of the sources that may have influenced the descriptions of this animal and its landscape by ancient Greek and Roman natural historians. The main conclusion is that these early writers may have been more aware of the biological coherence and geographical provenance of their information than is commonly assumed.

2. Ctesias's ass

Ctesias's account of the one-horned ass quoted by Photius runs as follows:

There are in India certain wild asses which are as large as horses, and larger. Their bodies are white, their heads dark red, and their eyes dark blue. They have a horn on the forehead which is about a foot and a half in length. The base of this horn, for some two hands'-breadth above the brow, is pure white; the upper part is sharp and of a vivid crimson; and the remainder, or middle portion, is black. Those who drink out of these horns, made into drinking vessels, are not subject, they say, to convulsions or the holy disease [epilepsy]. Indeed, they are immune even to poisons if, either before or after swallowing such, they drink wine, water, or anything else from these beakers. Other asses, both the tame and the wild, and in fact all animals with solid hooves, are without the ankle-bone and have no gall in the liver, but these have both the ankle-bone and the gall. This ankle-bone, the most beautiful I have ever seen, is like that of an ox in general appearance and in size, but it is as heavy as lead and its colour is that of cinnabar through and through. The animal is exceedingly swift and powerful, so that no creature, neither the horse nor any other, can overtake it. When it starts to run it goes slowly but it gradually increases its speed wonderfully, and the further it goes, the swifter. This is the only way to capture them: when they take their young to pasture you must surround them with many men and horses. They will not desert their offspring, and fight with horn, teeth, and heels; and they kill many horses and men. They are themselves brought down by arrows and spears. They cannot be caught alive. The flesh of this animal is so bitter that it cannot be eaten; it is hunted for its horn and ankle-bone.¹⁰

Much scholarly effort has been expended in the attempt to identify, or at least explain, the animal described by Ctesias.¹¹ The classic treatise on the subject in the English language is un-

¹⁰ *FCrHist* 688 F 45.45. Much of this paper concerns the thesis of Shepard, so I have used this translation (27–28, 31). Shepard's translation of the last five sentences is fragmentary; gaps have been filled using Gotfredsen 19, with the aid of an anonymous reviewer. An alternative version is offered by Aelian (*NA* 4.52).

¹¹ See for example G. Cuvier, *Discourse on the Revolutionary Upheavals on the Surface of the Globe* (Paris 1825; Arment unpaginated electronic text under "Fossil Quadrupeds"); Shepard 26–33; R. Beer, *Unicorn: Myth and Reality* (New York 1977) 11–14; Gotfredsen 19–20.

doubtedly that of Odell Shepard (1930, reprinted 1967, 1982, 1993, 1996, 1999; see this source for analyses of elements of Ctesias's description not dealt with in this paper). Indeed some later writers considered Shepard's thesis to be the last word on this and most other matters concerning the legend of the unicorn.¹² The regularity with which new editions of his book appear and the accuracy with which his conclusions have been copied from one text to another with little modification over the last seventy years seems to support this contention.¹³ In particular, Shepard's ideas on matters of natural history have been accepted more-or-less uncritically by later writers, despite the fact that his zoological knowledge was rather weak (see below). Shepard was a dedicated literary scholar, a charmingly self-deprecating character, and fully aware (220) of the dangers of doing zoology in libraries, so I have no doubt that he would admit this deficiency, were he in a position to do so.

After lengthy and ingenious arguments, Shepard concludes that the animal described by Ctesias is a chimera composed of the Indian rhinoceros (*Rhinoceros unicornis*), the Tibetan "antelope" or chiru (*Pantholops hodgsoni*), and the Persian ass or onager (*Equus hemionus onager*). An explanation and assessment of these claims is set out below.

3. The Indian rhinoceros and Tibetan chiru

Two elements of the passage convince Shepard that Ctesias is referring in part to the Indian rhinoceros, namely the pharmacological properties of the horn and the assertion that the animal increases its speed as it runs. On the first point he is surely correct. In the time of Ctesias as before, rhinoceros horn was renowned for its pharmaceutical uses and ability to neutralise toxins. Although magical properties have been at-

¹² W. Ley, *The Lungfish and the Unicorn* (London 1948) 37.

¹³ For example Ley (*supra* n.12); Beer (*supra* n.11); Gotfredsen.

tributed to the cranial ornaments of other animals, none fits Ctesias's description of the horn's specific beneficence as closely as that of the rhinoceros.¹⁴ It is just possible, however, that tales of the medicinal properties of chiru horn may also have reached Ctesias's ear (see below; chiru horn is still used in Tibet as an antibiotic and to cure diarrhoea).¹⁵ Indian rhinoceroses are found in southern Nepal, southern Bhutan, and northeast India¹⁶ and were more widespread in the past, so travellers familiar with northern India may also have been familiar either with rhinoceroses, or with stories and legends associated with them.

In an attempt to explain why Ctesias transplanted the nasal horn of the rhinoceros onto the forehead of his one-horned ass, Shepard (282) invokes the Tibetan chiru, an animal resembling an antelope but now thought to be more closely related to goats. Chiru stand about 80 cm. at the shoulder and weigh around 40 kg., and males have relatively straight horns rising almost vertically from their heads. Seen at a distance and in profile they do indeed appear to have just one horn. Of course closer inspection reveals that they have two, but chiru are wary creatures and Tibet consists mostly of mountains and vast open plains, so close-up views of these animals are frustratingly rare (Schaller 42–43).

It is almost certain that chiru form the basis of an ancient and persistent legend about a Tibetan unicorn, documentary evidence of which stretches back to the time of Genghis Khan (Shepard 32). European explorers were still pursuing this particular myth across the Tibetan landscape well into the nineteenth century.¹⁷ Shepard is certainly plausible in his

¹⁴ Shepard 28; Cuvier (*supra* n.11).

¹⁵ G. Schaller, *Wildlife of the Tibetan Steppe* (Chicago 1998: hereafter SCHALLER) 297.

¹⁶ P. Whitfield, ed., *Illustrated Encyclopedia of Animals* (London 1998) 196.

¹⁷ Major Latter, letter to *Quart. Rev.* 24 (October 1820) 120–121; E. Huc and J. Gabet, *Travels in Tartary Tibet and China 1844–6* (London 1928) 311–314.

contention that the legend is probably much older than its first documentary reference and that it may have been communicated to Ctesias while he was resident in Persia. Armed with vague reports of animals in the mountains of India sporting single horns that are made into pharmaceuticals and used as a defence against poison, it is perhaps not surprising that Ctesias arrived at the idea of a composite chiru-rhinoceros with a horn in the middle of its forehead.

Shepard believes that the Indian rhino also lurks behind Ctesias's statement that the unicorn increases its speed as it runs. He calls this "a closely observed trait of the rhinoceros" (31) but adds no further explanation. While it is true that rhinoceroses increase their speed as they run, this is also the case for all animals—there would be no point running otherwise. When rhinoceroses run, however, the acceleration phase is particularly drawn out. In general, heavy animals accelerate less rapidly than small ones because of their great inertia, and so gather speed noticeably.¹⁸ In addition, the speed at which mammals enter their fastest, galloping gait is roughly proportional to the square root of leg length,¹⁹ which is to say that animals with short legs are forced to gallop at relatively low speeds. Long-legged horses, for example, enter their galloping gaits at relatively high speeds and so appear to accelerate little thereafter; they also gather speed rapidly at the transition points between their various gaits and so seem to accelerate slightly, if at all, in between. Rhinoceroses, in contrast, have more mass to shift and start to gallop at relatively low speeds, so they appear to accelerate relatively slowly and more-or-less continuously without changes in gait until they are running as fast as they can.

Shepard's conclusion can thus be rationalised on bio-mechanical grounds, but this is not to say that Ctesias really

¹⁸ R. McNeill Alexander, pers. comm.

¹⁹ R. Alexander and A. Jayes, "A Dynamic Similarity Hypothesis for the Gaits of Quadrupedal Mammals," *J. Zool. Lond.* 201 (1983) 135–152.

was reporting a rhinoceros when he wrote of the one-horned ass's pattern of acceleration. Weight limitations apply to all heavy terrestrial mammals, including some others that live in northern India, e.g. the Indian elephant and Tibetan yak. Further, some smaller animals have the ability to jump into a scurrying gallop almost from a standing start when startled, wild asses being a good example. The stately progression of horse gaits—walk, trot, canter, gallop—is much beloved of equestrians and students of biomechanics alike, but in the real world this sequence can be, and often is, collapsed into a purely utilitarian scramble characterised by almost continuous acceleration within a single gait.

It would also be foolish to expect ancient observers (or even modern ones) to be precise on the matter of acceleration. Some wild asses, for example, the type of animal Ctesias claims to be writing about, are so fast and sure-footed in their own environments that healthy adults are almost impossible to catch, even with the aid of a horse.²⁰ A mounted rider chasing an ass at full tilt while watching it recede by increments ever further into the distance may well conclude that the animal "increases its speed as it runs," the truth of the matter notwithstanding. Thus Ctesias's intriguing statement about how the one-horned ass accelerates is just too vague to implicate any animal in particular.

4. Of asses

I suspect that most of Ctesias's description—other than the points associated with the cranial location and medicinal properties of the horn—was based on an ass of some kind and not the Indian rhino. First and foremost Ctesias calls it an ass, a type of animal with which he would have been familiar²¹ (it will

²⁰S. Turner, *Account of an Embassy to the Court of the Teshoo Lama in Tibet* (London 1800) 205.

²¹Shepard 31.

be shown in section 6 that Ctesias had a rather sophisticated knowledge of ass-like animals). He also says that the animal is as large as a horse or larger, fierce, exceedingly swift such that not even a horse can catch it, and in the habit of using its teeth and heels when fighting. There is much that is zoologically asinine here. The use of teeth and heels as weapons clearly implicates a horse or ass and not the Indian rhinoceros. Anyone who has observed male mustangs or Tibetan asses fight,²² and noted the often dire state of the protagonists after a couple of hours of battle, will be in no doubt about the ferocity of wild horses either. As for Ctesias's contention that the unicorn is as large as a horse or larger (the implication being "not much bigger than a horse, if at all"), it is difficult to see how anyone could confuse a 4.2 m.-long Indian rhinoceros weighing over two tonnes with a 2 m.-long horse weighing perhaps 200–400 kg. Lastly, Ctesias's allusion to the unicorn's great speed does not sit comfortably with the Indian rhinoceros. I am not aware of any direct measurements of the running speed of Indian rhinos (weight ca 2100 kg.), but maximal speeds of 25 km./h. and 45 km./h. have been quoted for African white (3000 kg.) and black (1400 kg.) rhinos respectively, compared with 70 km./h. for horses and wild asses.²³ The idea that a rhinoceros could outrun a horse, therefore, is problematic. In contrast, an ass of some sort seems a more appropriate basis for many of Ctesias's claims.

5. The Persian onager?

The asinine characteristics that Shepard does recognise in Ctesias's description compel him to invoke a horse-like animal of some kind, and he immediately alights upon the Persian

²²N. Prejevalsky, *Mongolia* (London 1876) 147; Prejevalsky calls the kiang the "kulan."

²³T. Garland, "The Relation between Maximal Running Speed and Body Mass in Terrestrial Mammals," *J. Zool. Lond.* 199 (1983) 157–170.

onager. At 2 m. in length these wild asses are about the right size, males fight with their teeth and heels, and they are renowned for their swiftness and ferocity (these qualities made the onager a favourite quarry of Mesopotamian kings on royal hunts: Shepard 31). The fundamental flaw in this idea, however, is that Ctesias, a resident of Persia, must have known the onager well. Is it likely that he mixed up travellers' tales of two unknown animals from a far-off land with elements of an animal that lived on his doorstep? Ctesias may have known very little but he undoubtedly knew where both he and Persian asses lived, and this assuredly was not northern India.

There is a much more suitable type of ass that probably influenced Ctesias's account, namely the Tibetan kiang (*Equus kiang*). This is the largest of all wild asses at 2.1 m. in length and 250 to 400 kg. in weight (Schaller 165). A denizen of the Tibetan plateau, the kiang has the attractive advantage over the onager of at least living in the right place. Kiangs are also notoriously swift. The French missionary Evariste Huc, in an account of his travels in Tibet in 1844–46, relates some typical Tibetan beliefs about the kiang:

This animal ... is of the size of an ordinary mule; but its form is finer and its movements more graceful and active; its hair, red on the back, grows lighter and lighter down to the belly, where it is almost white ... [I]ts speed is so great that no Thibetan or Tartar horseman can overtake it. The mode of taking it is to post oneself in ambush near the places that lead to the springs where they drink, and to shoot it with arrows or bullets ... They have never been tamed to domestic purposes. We heard of individuals having been taken quite young, and brought up with other foals; but it has always been found impractical to mount them or to get them to carry any burden.²⁴

The correspondence between the words of Huc and Ctesias is striking. The unyielding nature of kiangs contrasts strongly with

that of horses in places adjacent to Tibet, particularly China to the east and ancient Mongol lands to the north, so it is not surprising that intractability became almost the defining characteristic of these animals. There can be few more frustrating situations for a semi-nomadic people than to live in a landscape overflowing with horses that are too fast to catch and too stubborn to domesticate anyway.

Of the ferocity and fighting tactics of kiangs Prejevalsky writes (emphasis added):

Should one of these stallions [the leaders of harems] notice another approaching too near his troop, he rushes to the encounter and tries in *every way by kicking and biting* to drive him off ... The males are very jealous and combative at this season [of rut], and sometimes go out of their way to seek an antagonist.²⁵

But perhaps the most important point about kiangs in the present context concerns their fur. The red and white body of Ctesias's unicorn has either been ignored by previous authors,²⁶ attributed to the sometimes dull reddish-brown fur sported by the Persian onager (Shepard 29) or artistic representations of unicorns on Indian textiles (31), or vaguely related to the sacred colours of Chinese mythic animals (Gotfredsen 20). However, not only is the Tibetan ass large, fast, and fierce, it is also distinctly red and white in its summer pelage (see Huc quoted above, and Schaller 165).

Curiously, Shepard locates the ass-like elements of Ctesias's unicorn in the Persian onager despite being aware of the travel writings of Sven Hedin.²⁷ Had Hedin mentioned the colour of the Tibetan asses he encountered, Shepard may well have pounced on the connection. In any case, if the rhinoceros's nasal horn ended up on the one-horned ass's forehead via tales of the Tibetan chiru as Shepard claims, it seems more than likely that

²⁴Prejevalsky (*supra* n.22) 147.

²⁵Beer (*supra* n.11).

²⁷Shepard 279 and 297; S. Hedin, *Central Asia and Tibet* (London 1903).

²⁴Huc/Gabet (*supra* n.17) 146–147.

Ctesias may also have heard about a big, red and white, fleet, quarrelsome, ass-like animal living in precisely the same landscape. That Ctesias erroneously arrived at the idea of an ass with a single horn on its forehead may be the product of these biogeographical circumstances. The geographical and historical implications of replacing the Persian onager with the Tibetan kiang will be discussed in a later section.

6. The unicorn's ankle and gall

There are two more elements of Ctesias's text that have not to date been satisfactorily explained, namely the identity and significance of the unicorn's anklebone and his statement about gall in the unicorn's liver. Careful consideration of Ctesias's statements on these matters confirms that he intended to describe a type of ass when he wrote of the unicorn, and that he was a highly accomplished anatomist.

Ctesias states that the one-horned ass's anklebone is like that of an ox in size and shape, deep red throughout and as heavy as lead. Previous authors have assumed that the object seen by Ctesias was a real anklebone or astragalus, and in this they are almost certainly correct.²⁸ Most likely Ctesias was familiar with astragali because they were widely used as dice in the ancient world (Shepard 35–36). Only the anklebones of certain creatures are suitable and were widely used for this purpose, however, namely conservatively-shaped examples from the ankles of artiodactyls (e.g. pigs, llamas, camels, deer, goats, sheep, antelopes, and cattle). The relatively simple astragali of sheep and goats were probably the most popular and would certainly have been the most abundant. Suitable astragali fall in one of four ways when thrown, the appearance of the upper face indicating the values one, three, four, or six.²⁹

²⁸Shepard 35–36; Gotfredsen 20.

²⁹F. Wright and M. Vickers, "Astragalus," *OCD*³ (1996) 195.

The common and widespread use of astragali as gaming pieces in Ctesias's time suggests that he would at least have known an anklebone when he saw one. Accordingly, a tentative suggestion can be advanced regarding the original owner of the bone to which he refers. An astragalus the size and shape of an ox's would seem to rule out the horse, ass, and rhinoceros as donors, as all are perissodactyls with astragali of a very different kind (the double-pulley shape of the artiodactyl astragalus is so distinctive that it is one of the diagnostic characters of the group).³⁰ Further, it seems doubly unlikely that Ctesias would have mistaken the very large and robust perissodactyl-type astragalus of a rhinoceros³¹ for that of an ox. By such reasoning one is led to the disappointing conclusion that the object seen by Ctesias resembled an ox's anklebone because it was an ox's anklebone, or perhaps one belonging to some other large artiodactyl (the Tibetan yak?). Needless to say, neither oxen nor any other species of artiodactyl owns deep red astragali, and bone never weighs as much as lead. The object of Ctesias's wonder, therefore, if it existed at all, was probably a dyed and artificially weighted gaming piece, charm, or talisman derived from a large bovid of some sort. That its human owner should claim ultimate provenance in the ankle of a magical beast in a far-off land is not particularly surprising.

Ctesias's statement that only the Indian ass among equine species has an anklebone *appears* particularly foolish (Shepard 35). However, we must judge this assertion carefully and in an appropriate historical context. All of the large domestic mammals with which Ctesias would have been familiar can be divided into two distinct groups: perissodactyls (horses) and artiodactyls (everything else). As mentioned above, one of the diagnostic anatomical features separating these two groups is

³⁰R. Nickel *et al.*, *The Locomotor System of the Domestic Mammals* (Berlin 1986) 93.

³¹T. Huxley, *Atlas of Comparative Osteology* (London 1864) pl. 12.

the anklebone, and it is the artiodactyl-type that was commonly used for dice. When Ctesias says that horses do not have anklebones, therefore, it seems likely that he is making not an absolute distinction, but a practical one—horses do not have anklebones that serve any obvious purpose. "Anklebone," therefore, should not be taken to mean "the homologous structure that all sorts of animals share but that differs in form from one type to another." Rather, it should be taken to mean "a bone of a certain sort with a specific utility." Pigs, sheep, goats, and cattle have such bones; horses do not. Thus Ctesias's statement about horses is internally consistent. He was shown a dyed and weighted ox-like anklebone and told that it was derived from a type of ass. Knowing that other sorts of horses do not have such bones he sensibly concludes that only the mysterious Indian ass among horse-like animals does. As Ctesias predated formalised comparative anatomy, we cannot even regard this conclusion as gullible. Lest it be thought that Ctesias here is being credited with too much knowledge, it should be remembered that he was a trained physician and lived at a time when astragali had a utilitarian purpose. As such he would almost certainly have been more aware of the anatomical niceties of animals' legs than nearly everyone alive today.

The above arguments can be reprised to explain Ctesias's statement about gall in the unicorn's liver. Most animals with livers also have gall bladders connected to them where bile is stored and concentrated. Horses, however, along with rats, pigeons, and dolphins, do not (horses produce bile in their livers but it is not concentrated anywhere). By "gall," therefore, Ctesias means "reservoir of gall" and is making the same distinction as before: horses have neither anklebones nor gall bladders, with the exception of the Indian ass. The first part of this conclusion is correct; the second part is incorrect only in the admittedly important sense that the one-horned Indian ass turned out not to exist. In any case, it appears that Ctesias's

knowledge of anatomy was far superior to that of most subsequent writers who criticised him for telling tall tales.

7. The accounts of later writers in antiquity

It may now be possible to reinterpret some of the claims made by later Greek and Roman authors who based their account of the unicorn on Ctesias's original but added details as and when they came across them. For example, Pliny the Elder writes:

He says that in India ... the fiercest animal is the monoceros, which in the rest of the body resembles a horse, but in the head a stag, in the feet an elephant, and in the tail a boar, and has a deep bellow, and a single black horn three feet long projecting from the middle of the forehead (*HN* 8.76, transl. Rackham).

In describing the unicorn's feet as resembling those of an elephant and its tail as like that of a boar, Pliny seems to be describing a rhinoceros and getting much closer to it than Ctesias. (To an anatomist the feet of rhinos are not very much like those of elephants, but in being big, located at the end of very stocky legs and furnished with "nails," they are sufficiently elephant-like in the present context.) By Pliny's reference to "stag's head" we should understand that the head is shaped like that of a deer but without antlers, because the name "monoceros" and the rest of his description indicate a one-horned animal. The chiru has such a head as of course do many other animals. The body is still equine, so Ctesias's ass-like animal has not been completely swamped by new notions of the rhinoceros.

The most important passage on the one-horned ass after Ctesias was written by Aelian:

In certain regions of India (I mean in the very heart of the country) they say that there are impassable mountains full of wild life, and that they contain just as many animals as our own country produces, only wild. For they say that even the sheep there are wild, the dogs too and the goats and the cattle, and

that they roam at their own sweet will in freedom and uncontrolled by any herdsman. Indian historians assert that their numbers are past counting and among the historians we must reckon the Brahmins, for they also agree in telling the same story.

And in these same regions there is said to exist a one-horned beast which they call *Cartazonus*. It is the size of a full-grown horse, has the mane of a horse, reddish hair, and is very swift of foot. Its feet are, like those of the elephant, not articulated and it has the tail of a pig. Between its eyebrows it has a horn growing out; it is not smooth but has [rings]³² of quite natural growth, and is black in colour. This horn is also said to be exceedingly sharp. And I am told that the creature has the most discordant and powerful voice of all animals ... It likes lonely grazing grounds where it roams in solitude, but at the mating season, when it associates with the female, it becomes gentle and the two even graze side by side. Later when the season has passed and the female is pregnant, the male *Cartazonus* of India reverts to its savage and solitary state.³³

The details of this passage make it clear that Aelian's "certain regions of India" are the highlands of Central Asia. Firstly he presents a very useful catalogue of the animals to be found there: sheep, dogs, goats, cattle, and reddish horse-like animals with single horns, all wild and undomesticated. Excluding the unicorn, only one place on the Earth's surface supports a community of mountain-dwelling, wild, "domestic" animals such as this: Tibet and the adjacent highlands of Central Asia. His sheep are argali, giant members of the family weighing in at over 100 kg., while his dogs are wolves, the principal predators of the region. The goats are blue "sheep," animals strongly resembling goats and now known to be more closely related to goats than sheep (Schaller 282). His cattle are yaks, while his one-horned reddish horses clearly correspond to the chiru-kiang myth of Ctesias.

³²I have followed Shepard (36) and translated *heligmos* as "rings" rather than "spirals." This alteration is justified below.

³³NA 16.20, transl. A. Schofield (Loeb: London 1959) 289-291.

The surprising abundance of large animals that once roamed this region, and the importance of human absence in this regard, was also noted in the nineteenth century by the Russian explorer Nicolai Prejevalsky:

[N]otwithstanding their sterility and the unfavourable conditions of climate, the deserts of Northern Tibet abound with animal life. Had we not seen with our own eyes it would have been impossible to believe that in these regions, left so destitute by nature, such immense herds of wild animals should be able to exist, and find sufficient nourishment to support life by roaming from place to place. But though food is scarce, they have no fear of encountering their worst enemy, man; and far removed from his bloodthirsty pursuit, they live in peace and liberty.³⁴

Prejevalsky travelled widely around Central Asia but only in Northern Tibet, the home of the chiru and kiang, was he astonished by the abundance of wild mammals. Somewhat incongruously given the last sentence of this passage, Prejevalsky then goes on to give detailed advice on the best way to kill each species.

Aelian's allusion to the male unicorn's behaviour in different seasons certainly brings to mind the Indian rhinoceros,³⁵ although this part of the passage could apply to a number of species of large mammal. The animal is still horse-sized and extremely fleet, however, which brings back thoughts of an ass, as does his allusion to the animal's mane. But the most striking reference is to the unicorn's horn. Now it is black, tapers to a very sharp point and has "natural rings." A modern description of the chiru's horns by George Schaller runs as follows (42-43):

The male's most conspicuous antelope-like feature is the long, slender, black horns, which rise almost vertically from the head, curve slightly back in the distal half, and then terminate

³⁴Prejevalsky (*supra* n.22) 186.

³⁵A. Laurie, "Behavioural Ecology of the Greater One-horned Rhinoceros (*Rhinoceros unicornis*)," *J. Zool. Lond.* 196 (1982) 307-341.

with smooth rapier-like tips pointing forward. The horns are laterally compressed and have about 15–20 ridges along the front for two thirds of their length.

The descriptions of Schaller and Aelian are almost interchangeable. Assuming Aelian really was writing about somewhere in Eurasia as he claimed, this horn can *only* be that of the chiru.³⁶

It is quite possible that a traveller in the general vicinity of the chiru's domain could have seen or acquired one of these horns, because they were valued by local people and pilgrims to Tibet and often transported to other regions. For example, Prejevalsky writes:

The blood [of the chiru] is said to possess medicinal virtues, and the horns are used in charlatanism: Mongols tell fortunes and predict future events by the rings ... these horns are carried away in large numbers by pilgrims returning from Tibet, and are sold at high prices.³⁷

As expensive items the horns were probably most often bought singly and possibly sold overtly as the horn of a unicorned animal. I can think of few more effective ways by which a legend might increase its geographic range.

This confusion between the horns of chiru and those of the supposed Tibetan unicorn persisted for much of the next two

³⁶There is some doubt about whether the word *helignos* used by Aelian should be translated as "rings" or "spirals" (Gotfredsen 22). Either is possible and among unicorn scholars the difference is crucial. If Aelian meant spirals then he may have given us the first ever reference (by almost a thousand years) to a narwhal tooth, the "horn" that came to be associated with the unicorn of European art and literature in the Middle Ages. The rest of Aelian's description, however, concerning both the geographical location of the animal and the nature and colour of its horn, strongly suggests derivation from the chiru. Chiru horns are black, terminate in rapier-like points, and are found in the mountains of "India" (Schaller 297). Narwhal tusks are ivory white, up to 2.7 metres in length, rarely end in sharp points, and are owned by animals that frequent the seas around Greenland (Whitfield *supra* n.16] 189). In the absence of clear etymological evidence one way or the other, therefore, "rings" seems the best translation. To add to the confusion, however, chiru horns actually sport half-rings, pronounced, elevated ridges that wrap around the front of the horns for about half their circumference.

³⁷Prejevalsky (*supra* n.22) 207.

thousand years. For example, Huc and Gabet, writing of their travels in Tartary, Tibet, and China in 1844–46, state:

A Thibetan manuscript ... calls the unicorn the one-horned *ts'o'po*. A horn of this animal was sent to Calcutta: it was fifty centimetres in length and twelve centimetres in circumference from the root; it grew smaller and smaller and terminated in a point. It was almost straight, black, and somewhat flat at the sides. It had fifteen rings, but they were only prominent on one side.³⁸

Given the correspondence of this description in all particulars with that of Schaller above, it comes as no surprise when Huc reveals an alternative name for the unicorn of Tibet: the *tchirou*.

To return to writers of antiquity, Pliny and Aelian both mention the unicorn's voice—deep and the most powerful and discordant of any animal. Indian rhinos utter about ten distinct vocalisations but all are relatively deep in pitch and some may indeed be considered discordant.³⁹ But Aelian's description will certainly strike a chord with anyone who has heard the extraordinary vocalisations of the Tibetan chiru. For example, after describing the chiru's ugly nostrils, the Tibetan explorer Captain Rawling observes:

During the rutting season ... at which date the bucks are in a constant state of war,⁴⁰ these nostrils are used for bellowing challenges to all and sundry. It is a deep-toned roar of rage or defiance, and seems to have a dispiriting effect on the courage of the younger or more timid bucks near by. The bellow is more what one would expect from a savage and carnivorous beast of the jungle than from an antelope.⁴¹

In other words, this mighty deep-toned roar, emanating as it does from the mouth of a small "antelope" (really a goat), is

³⁸Huc/Gabet (*supra* n.17) 312.

³⁹Laurie (*supra* n.35).

⁴⁰An exaggeration: see Schaller 297.

⁴¹C. Rawling, *The Great Plateau* (London 1905) 311–312.

startling and certainly worthy of note. Is the powerful and discordant voice of the legendary one-horned animal of India the same as the roar of the real "one-horned" chiru of Tibet? As Aelian goes on to describe the chiru's horn so precisely such an inference is tempting, to say the least.

The name "cartazon" used by Aelian is also intriguing. It is connected with the Sanskrit *kartājan*, meaning "lord of the desert" (Shepard 36) or "king of the wilderness" (Gotfredsen 22). Shepard thought that "lord of the desert" was perfectly consistent with the habitat of the Indian rhinoceros, a possibility if by desert Aelian just meant "remote place," but certainly not if he meant "remote place where nothing much grows" or something closer to our modern conception of a desert. (The Indian rhino once roamed widely across alluvial plain grasslands but also frequented adjacent swamps and forests; its range has shrunk dramatically in recent centuries and it now also uses cultivated areas, pastures, and modified woodlands.)⁴² It seems more straightforward to assume that Aelian's etymological allusion to "desert" or "wilderness" corresponds to the real and rhino-less deserts and wildernesses of Tibet, thus implicating all the usual zoological suspects identified in this paper.

The Alexandrian Greek Cosmas Indicopleustes ("the India-farer") also wrote about the unicorn (ca A.D. 545). His description borrows heavily from Ctesias, but he adds an intriguing detail:

People say he is completely invincible and that his whole strength lies in his horn. When he knows he is being pursued by many hunters and about to be captured, he leaps up to a cliff-top and throws himself down from it, and as he falls he turns himself in such a way that his horn completely cushions the shock and he escapes unharmed.⁴³

⁴²Laurie (*supra* n.35)

⁴³*Top. Chr.* 11.7; quoted in Gotfredsen 24.

It would appear that the one-horned ass is here descending, literally and figuratively, into nonsense. However, just such beliefs were once held about the musk ox,⁴⁴ ibex, oryx, Rocky Mountain goat (Shepard 43), and, most importantly in the present context, the Tibetan argalis. The early twentieth-century explorer Sven Hedin even observed an argalis break its fall by landing on its horns, although it has to be admitted, with some disappointment on several fronts, that one of his men had just put a bullet into it.⁴⁵ Prejevalsky confirms the myth just long enough to dispel it:

I have seen the males jump from heights of twenty or thirty feet, always alighting on their feet ... but the stories told of argali throwing themselves down steep precipices, and alighting on their horns, are pure fiction.⁴⁶

The testimony of Cosmas Indicopleustes has troubled scholars, not least because it is by no means clear where he travelled, what he saw, and thus which legends he may have picked up along the way (Gotfredsen 23–24). Nevertheless, it remains an odd coincidence that of the five animals supposedly capable of using their horns to protect themselves in a fall—four if we correctly remove the Rocky Mountain goat from Cosmas's universe and three if we reasonably remove the musk ox—one happens to live alongside deep-voiced "one-horned" chirus, large red and white asses, and not far from the domain of the Indian rhinoceros.

8. Horn manipulation

Before concluding there is one more factor that, just possibly, may have influenced ancient Greeks and Romans who wrote about the one-horned ass. I am inclined to think that what follows has no bearing on the development of ancient literature

⁴⁴C. Gould, *Mythical Monsters* (London 1886) 112.

⁴⁵Hedin (*supra* n.27) 162.

⁴⁶Prejevalsky (*supra* n.22) 142.

on this subject, but I feel that the practice of horn manipulation is interesting enough to warrant a mention.

It is a little known fact that the horns of animals can be abused in various ways to produce quite startling effects. For example, J. G. Wood states:

Among us [Europeans] the horn does not seem capable of much modification, but a Kaffir, skilful in his art, can never be content to leave the horns as they are. He will cause one to project forward and another backward, and he will train one to grow upright, and the other pointing to the ground ... Now and then an ox is seen in which a most singular effect has been produced. As the horns of the of the young ox sprout they are trained over the forehead until the points meet. They are then manipulated so as to make them coalesce, and so shoot upward from the middle of the forehead, like the horn of the fabled unicorn.⁴⁷

Wood even provides an engraving showing Kaffir cattle with multiple horns, others with horns split and trained into spirals or circles, and one where the horns have indeed been trained together to produce a bovine unicorn.

Another way in which artificial unicorns can be produced is through surgical manipulation of horn buds (sites in the flesh from which horns will later grow). In a paper published in 1936, W. Franklin Dove explains how he managed to manufacture a one-horned Ayrshire bull (photographs of this remarkable animal accompany the article).⁴⁸ Using a technique called pedicling, whereby horn buds are removed from their original positions on either side of the head while remaining attached to a strip of skin to ensure continuity of blood supply, Dove transplanted the buds one atop the other in the middle of the animal's forehead. Two years later the calf had become a bull complete with a single thick horn in the middle of its forehead. This technique may have been known to ancient Greeks and

⁴⁷J. G. Wood, *The Natural History of Man* 1 (London 1868) 66–67.

⁴⁸"Artificial Production of the Fabulous Unicorn," *Sci. Monthly* 42 (1936) 431–436.

Romans: Pliny writes of multi-horned oxen produced by a method of cutting (*incisa*) and twisting (*torqueantur*).⁴⁹

I am not aware of any examples of pedicling performed by African herdsmen, but there is one very likely example of the technique being used to produce unicorned animals in Nepal. The species typically used was the blue "sheep" (Schaller 94) of Tibet. Specimens even reached Britain as part of a large collection of Nepalese animals presented to King George V (then Prince of Wales) and exhibited at the London Zoological Gardens in 1906. Although it is not entirely clear how these animals were produced, examination of their skulls revealed that the horns were not trained around the head from their original starting positions and united to form a single horn, but were manipulated in such a way that they grew from the centre of the skull. Two bony horn cores were evident post mortem, but the outer horn sheath united these into a single structure in life.⁵⁰ The only way that this could have been achieved, it seems, is through the technique of pedicling.

Unfortunately, these are the only references I can find to this Nepalese tradition of horn manipulation. It is possible that the technique was only discovered in the nineteenth century and used to fleece the wealthy people of Nepal out of large sums of money,⁵¹ but Pliny's reference to oxen suggests that the practice of horn manipulation *per se* may have been known to the ancients. It is just possible that the tradition also has a long history in the highlands of Central Asia. If so, tales of one-horned animals in these mountains may once have had some vague basis in fact.

9. Conclusion

Some clarifications of Odell Shepard's thesis on the one-

⁴⁹HN 11 127, cited by Dove (*supra* n.48) 435.

⁵⁰W. Berridge, *Marvels of the Animal World* (London 1921) 47–49.

⁵¹Berridge (*supra* n.50) 49.

horned ass have been offered and one alteration proposed: the replacement of the Persian onager with the Tibetan kiang. Although only a minor change taxonomically, the implications are numerous and may be pleasing both to geographers and those who suspect that Ctesias and other natural history writers of antiquity were not quite as ignorant as is sometimes supposed (Shepard 26). If Ctesias's unicorned ass really was composed of the Indian rhinoceros, Tibetan chiru, and Persian onager as Shepard maintains, then the animal is a chimera both anatomically and geographically. Replace the onager with the kiang, however, and three animals sufficient to explain Ctesias's unicorn suddenly appear in the contiguous lands of northern India, Tibet, and Nepal. These are the regions that Ctesias had in mind, however vaguely, when he wrote *Indica* (Shepard 30). One animal is red and white, about the size of a horse, and exceedingly swift and fierce. It is also an ass, just as Ctesias claims. True it has an ox-like anklebone and a reservoir of gall in its body, but Ctesias recognises that these are odd things for an ass to have and he says so. The second animal has a horn used as a pharmaceutical and a defence against poison, and the third gave rise to ancient stories about an animal with a single horn growing from its forehead, to which pharmacological properties have also been, and continue to be, attributed (Schaller 297). Thus Ctesias could have received all the information he needed to construct his unicorned ass from a traveller or travellers to the court of Persia who had either visited the Himalayas and adjacent regions, or more likely heard rumours about these lands. He is then rather sophisticated in the way he presents this information, ensuring that key differences between the Indian ass and other types of horse-like animals are clearly spelled out.

In turn, Aelian's account, while profoundly confused in zoological terms, is geographically consistent with that penned by Ctesias six hundred years earlier. One might expect stories of

a mysterious, fabulous, and unknown landscape to have accumulated equally mysterious and fabulous detail over such a long period of time and at such remove, but Aelian's additions to Ctesias's tale are geographically entirely appropriate. In fact they are, for the most part, geographically spot on. Particularly impressive is Aelian's bestiary of mountain-dwelling, wild, "domestic" animals, a clear reference to the large mammal fauna of the highlands of Central Asia. And his descriptions of the unicorn's horn and voice fit the Tibetan chiru so minutely that this animal must surely have formed the basis of his account. True, Aelian compounded Ctesias's error by throwing in further details of the Indian rhinoceros, but this is understandable given the literary lineage of the tale and the geographical provenance of its elements. One is led to the tentative conclusion that Aelian may have had a rather definite notion of the region about which Ctesias wrote and selected information to report within an appropriate geographical context.

With hindsight it is clear that the accounts of the unicorn offered by Ctesias and Aelian lack any zoological coherence, but the apparent geographical coherence of their writings is surprising. Lowland India was a dimly perceived, mysterious and magical place to Europeans in the period spanning Ctesias to Aelian;⁵² the Himalayas and lands beyond were assuredly just imagined landscapes (as they remained for sixteen hundred years after Aelian). What I find most surprising about Ctesias's and Aelian's accounts of the one-horned ass is not how confused and ill-informed these authors were (Shepard 26), but how much they managed to get right.

Ancient Greek and Roman accounts of the one-horned ass are usually lined up in historical order and interpreted as little more than a tale, originating in a tall one, that develops and grows in

⁵²See Bunbury (*supra* n 5) for the development of geographical knowledge of Asia at this time.

the telling.⁵³ Scant consideration is given to the zoological details and even less to the possible geographical underpinnings of the literary tradition. Of course one would not want to grant too much geographical competence to these ancient authors, but one is tempted by the clues and coincidences in their writings to take seriously the idea that they may have been more aware of the geographical sources of their information and less ignorant of the "facts" than is commonly assumed, at least where the mysterious, mountainous lands of India were concerned.

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The Byzantine Component of the Relic-hoard of Constantinople

John Wortley

Many of our men, I may say, went to visit Constantinople, to gaze at its many splendid palaces and tall churches and view all the marvellous wealth of a city richer than any other since the beginning of time. As for the relics, these were beyond description, for there were as many at that time in Constantinople as in all the rest of the world.¹

At the time in question (A.D. 1203) that city may well have housed even more relics than the phlegmatic Marshall of Champagne allows, for relics were then the greatest treasure of the richest city known to western man. For centuries its relics had been the wonder of the world, drawing people to reverence them from the four corners of Christendom. They provided the city which owned and cherished them with an attraction surpassing that of Jerusalem itself. It has been argued, not implausibly, that it was because of this sacred opulence that Geoffrey de Villehardouin and his companions came to be sitting over against (and visiting) the City of Constantine at the time of this Fourth Crusade, rather than fighting in the Holy Land. The relics (it is alleged), having as it were consecrated Byzantium as a New Jerusalem, deflected the Crusade in their direction like some gravitational force diverting an object travelling through space.²

As we now know, at the time of which Villehardouin wrote, both the city and her riches were doomed. Within a few months,

¹ Geoffrey de Villehardouin, *La conquête de Constantinople* 192, transl. M. R. B. Shaw, *Joinville and Villehardouin: Chronicles of the Crusades* (Harmondsworth 1963) 76.

² A. Frolov, "La déviation de la 4^e Croisade vers Constantinople: problème d'histoire et de doctrine," *RHR* 145 (1954) 168–187, 146 (1954) 67–89, 194–219, especially the last part.

⁵³ Shepard; Beer (*supra* n. 11); Gotfredsen.