

V. BIRD-WATCHERS AND STORY-TELLERS

A subject related to physical geography is the knowledge of nature, and in this chapter we shall examine the Hellenistic accounts of Indian nature.¹ It did not, however, seem feasible to make a distinction here between the Hellenistic and the early Roman periods, as much of the information was common, and in many cases it is not possible to say whether part of it was already known in the Hellenistic period or only introduced in the first century A.D. Therefore I have to some extent discarded my chronological limits and fully included all information hailing from the early Roman period.

1. Marvels of Nature: Indian Plants

Familiar as well as unfamiliar plants of India were much discussed in the literature on Alexander and naturally by Theophrastus, too. Home-sick Macedonians were glad to find some familiar plants in the distant Paropamisadae and Northwest India. These included the vine, laurel, ivy, and myrtle. The Indian vine has been discussed in my earlier study.² Ivy was observed on Mount Nysa, and, as it was thought that it does not grow in other parts of India, it gave a kind of palaeobotanic argument in favour of the legendary Indian campaign of Dionysus.³ Therefore it also seems that the unnamed "mountains" of Megasthenes⁴ also refer to the Nysa.

The accounts of the botanical observations made during Alexander's campaigns mainly come from Nearchus, Onesicritus and Aristobulus. Theophrastus gave an account of Indian plants including much otherwise unknown information. With his early date, he

¹ As a matter of fact, this chapter could as well have formed a part of the preceding one (as it actually did in the first stage of my work), but an undivided chapter IV would have been far too long in comparison to other chapters.

² Karttunen 1989a, 207ff. (with further references). Strabo's (15, 1, 8) claim that the Nysan vines did not bring grapes (cf. Theophrastus *H. Pl.* 1, 13, 4 on barren vines) cannot be accepted in light of the Nuristani wine traditions attested in Western as well as in Indian literature and in archaeological evidence.

³ See e.g. Arrianus, *Anab.* 5, 1, 6 and 5, 2, 5f. and *Ind.* 5, 9; Strabo 15, 1, 8; Diodorus 1, 11f. (McCrindle 1901, 204); Curtius 8, 10, 13f.; Justinus 12, 7; Pliny, *N. H.* 6, 23, 79; 12, 13, 25f.; & 16, 62, 144; Philostratus, *Vita Ap.* 2, 8. McCrindle 1896, 80, note 1, confirms that ivy abounds in Hazara. On all these plants or their close relatives actually found in the area see Bretzl 1903, 237ff.

⁴ F 33 in Strabo 15, 1, 58.

may well have had oral eye-witness account in addition to written sources. In addition to Nearchus and Onesicritus, Pliny (*N. H.* 1, 12, 3) lists three further historians of Alexander's campaigns, Chares, Ephippus and Polycleitus, as authorities on foreign plants, but we have no fragments by them on the subject of Indian plants.

Indian forests are often mentioned in our sources. So early there was still very little deforestation and erosion to be seen in the Pañjab. Forests of the country near to the Indus were already mentioned by Scylax (F 4 in Athenaeus 2, 82). Pliny (*N. H.* 7, 2, 21) refers to the great size of Indian trees in general. Nysa was wooded and the tombs of its inhabitants were built of cedar.⁵ Strabo quoted Aristobulus about firs and pines being common in India, though not seen in Hyrcanian forests.⁶ In another passage he mentions firs, pines, cedars and other kinds of tree used in ship-building by the Hydaspes.⁷ These trees, familiar to the Greeks are (or were) common in the Himalayan foothills.⁸

Export of timber from Northwest India began as early as the ancient Mesopotamian and Achaemenid periods.⁹ A passage of the *Periplus* (36) lists several kinds of timber exported from Barygaza. They include sandalwood (ξύλων σανταλίνων, or teak as ξύλων σαγαλίνων), trunks and horns (δοκῶν καὶ κεράτων?), and logs of saminon and ebony (φαλάγγων σασαμίνων καὶ ἐβενίνων).¹⁰ It must be noted that there seems to be no certain account of teak (*Tectona grandis*) in classical literature.¹¹ But there are also several specifically Indian trees known in the West since Alexander's campaigns and their first historians.

Perhaps the greatest wonder among Indian trees seen during Alexander's campaigns was the **banyan** (*Ficus benghalensis*; OIA *nyagrodha* or *vaṭa*).¹² The tree which be-

⁵ Curtius 8, 10, 8 *Caesis quippe silvis, flammam excitaverunt, quae lignis alita oppidanorum sepulcra comprehendit. Vetusta cedro erant facta...* See Tucci 1977, 22.

⁶ Strabo 11, 7, 2 (Aristobulus F 19).

⁷ Strabo 15, 1, 29, on firs also 11, 7, 4 (from Eratosthenes). Cf. references in II.4 on building the navy. On the woods preferred for ship-building by the Greeks, see Theophrastus, *H. Pl.* 5, 7.

⁸ Bretzl 1903, 238 lists *Cedrus deodara*, *Abies webbiana* (probably the same as *A. spectabilis* or *A. densa*), *Abies smithiana*, and *Pinus excelsa* (now *P. wallichiana*).

⁹ Karttunen 1989a, 25f. and 52.

¹⁰ The first timber will be discussed below under sandalwood. Schoff 1912, 152f. identified "horns" as teak and "sesaminon" as *Dalbergia sissoo*. The latter was already imported by the Achaemenids and thus quite acceptable (so also Warmington 1928 (1974), 214), but teak is here no more than a guess. To make it acceptable Schoff even had to suggest a climatic change allowing a more northern occurrence for teak than it has, at the present day. Casson 1982 pointed out that there is no need to emend the manuscript σασαμίνων to σησαμίνων, with *a* it can as well refer to *Dalbergia sissoo*, the Arabic name of which is *sāsam*. As *sesamina* it seems to appear in Dioscurides 1, 98, where it is mentioned together with ebony.

¹¹ A confusion with teak is supposed in Onesicritus' account of the banyan (see below), because he claims that the tree has leaves as large as large shields (Pearson 1960, 101). Instead of teak, Bretzl (1903, 171f. followed by Brown 1949, 84) suggested the banana and Noehden (1827, 130f.) the great fan palm *Corypha umbraculifera*. Teak has been also suggested for Theophrastus' (*H. Pl.* 5, 4, 7) and Pliny's (16, 234) account of a tree of Tylus (Bahrain) used in shipbuilding as its timber did not decay in sea water (Hort's and Rackham's notes to their respective translations), but teak does not grow in Bahrain and there are other possibilities, too. See Casson 1982, note 13.

¹² The name *Ficus indica*, often mentioned in earlier literature, is now obsolete. The classical accounts of this tree are discussed by Noehden 1827, Lassen 1858, 310f. (on Pliny), McCrindle

comes a forest – understandably it was a great wonder to Alexander’s companions.¹³ The aerial roots growing into supporting trunks were a completely new phenomenon and attracted much attention. Accordingly, there are many (and partly exaggerated) accounts of it. Onesicritus called it “a tent with many supporting columns”¹⁴ and several other authors spoke of a forest. From its small fruits the tree was rightly recognized as a *Ficus* and accordingly called the Indian fig (ἡ συκῆ Ἰνδική). The tree grows wild on the lower heights of the Himalayas and in peninsular forests, but has been often planted especially in the neighbourhood of temples.¹⁵ The best account was given by Theophrastus, who is claimed to be more accurate and botanically more correct than any of the later accounts.¹⁶

The accounts of Onesicritus (F 22) and Aristobulus (F 36) are given by Strabo 15, 1, 21, who also adds some words from a third author, while Nearchus (F 6) is briefly quoted by Arrianus, *Indica* 11, 7. The brief account of Diodorus 17, 90, 5 is perhaps derived from Cleitarchus. Another brief account is found in Curtius 9, 1, 9f.¹⁷ Pliny mentions the tree briefly in *N. H.* 7, 2, 21 and gives his main account, partly derived from Theophrastus, in 12, 11, 22f.

Noting the absence of chlorophyll and leaves (λευκότεραι... καὶ ἄφυλλοι)¹⁸ Theophrastus (*H. Pl.* 4, 4, 4) rightly calls the aerial roots roots (ρίζαι) growing vertically down from horizontal branches (not shoots), while all others speak of branches bending down.¹⁹ A curious point already mentioned is the size of the banyan leaves. While the actual leaves are small, Theophrastus (with Pliny) compares them to the small shield of a peltast (πέλτη). Even this is clearly exaggerated and all the more Onesicritus’ large shield (ἀσπίς).²⁰ It was never noted that in its younger stages the tree is an epiphyte.

The measurements²¹ of a banyan are differently given in our sources. Theophrastus gave the trunk a thickness (the circumference must be meant) of 40, at most of 60 paces, and the whole tree gave a shade of two stadia in circumference. From Aristobulus we

1896, 217, note 1 and 1901, 27, note 2, Bretzl 1903, 158ff., Stadler 1916 (following Bretzl), Jacoby in his *FGrH* commentary on Nearchus F 6, Brown 1949, 81ff., Pearson 1960, 100f., 225, Marr 1972, 44, and Hinüber 1985, 1118f. On Indian sources, see Syed 1990, 389ff.

13 A nice echo of their accounts is quoted by Noehden (1827, 126f.) and McCrindle (1877, 210) from Milton’s *Paradise Lost*.

14 F 22 in Strabo 15, 1, 21 πολυστόλῳ σκηνῇ ὅμοιον. Tent also in Theophrastus.

15 Bretzl 1903, 159.

16 *H. Pl.* 1, 7, 3 and 4, 4, 4, also briefly referred to in the *Caus. Pl.* 2, 10, 2. For an evaluation see Noehden 1827, 121ff. and Bretzl 1903, 158ff. On insufficient grounds Bretzl derived this account from Nearchus and from secret expert reports made for Alexander (followed by Brown 1949, 79, but aptly criticized in Pearson 1960, 101 & 127).

17 Brown 1949, 82f. connected this with Onesicritus.

18 The MSS. actually read δίφυλλοι.

19 Thus e.g. Onesicritus F 22 in Strabo 15, 1, 21 τὸ κάτω νεύοντας ἔχον τοὺς κλάδους.

20 Onesicritus F 22 in Strabo 15, 1, 21 τὰ τε φύλλα ἀσπίδος οὐκ ἐλάττω. An aspis and a pelta are not “virtually the same” as claimed by Brown (1949, 164 note 29). The difference was first noted by Noehden (1827, 130, see also Pearson 1960, 101).

21 The following measurements can be converted according to the approximate values of 185 m for the stadion, approx. 30 m for the plethron, and approx. 50 cm for the cubit. For a pace 0.66–0.88 m is given.

unfortunately have no other figures than the claim that 50 horsemen could remain in its shade. Diodorus (perhaps following Cleitarchus) claims a height of 70 cubits, a shade of three plethra and a trunk hardly embraced by four men. Following his inclination to exaggerate, Onesicritus allowed 400 horsemen in the shade and five men embracing the trunk. An unnamed authority of Strabo's claimed a shade of five stadia, and Pliny (*N. H.* 7, 2, 21) spoke of squadrons of cavalry (*turmae equitum*). Nearchus allowed 10,000 men. To these can be compared numbers quoted by modern scholars. Perhaps the most best known still growing large banyan is that of the Calcutta Botanical Garden. At the end of the last century, its main trunk had a circumference of 14 m and the whole area of the tree 280 m. For some other individual trees still larger numbers are quoted. Describing a famous banyan on the lower course of the Narmada in 1680 Fryer claimed that no less than 30,000 men could remain in its shade, though later authors give much more moderate numbers.²² From these numbers we see that the Macedonians had really seen and correctly described a large banyan, though subsequently some authors exaggerated their accounts of it.

Theophrastus and Diodorus locate the banyan seen by Alexander's men by the Acesines, Aristobulus near the Acesines and the confluence of the Acesines and the Hyarotis. "Some others" known to Strabo locate the tree beyond the Hyarotis. According to Onesicritus, it grew in the land of Musicanus, which of course is not impossible, but Onesicritus has loaded his description of Musicanus' land with so many wonders mentioned by others in other parts of India that we still might have to do with the tree seen by the Acesines. According to Nearchus, the tree was used as a summer shade by Indian sophists, which rather seems to point to Taxila.

It remains to say a few words concerning Pliny's main account. He gives a circumference of two stadia, compares leaves to *peltae*, and locates the tree by the Acesines. Thus it is clear that he had used Theophrastus as elsewhere in his botanical accounts. But he also has some less accurate source when he speaks of branches (*rami*) bending down and calls the almost inedible fruits very sweet (*praedulcis sapore*). Unfortunately, there is no way to identify this second source; there is nothing in his account pointing to a contemporary source as has been suggested.²³

While *Ficus benghalensis* was thus well known to Greeks and Romans, its no less famous relative, *Ficus religiosa*, the pipal or bodhi tree (OIA *pippala* or *aśvattha*), was not mentioned at all.²⁴

The name **ebony** (ἔβενοϛ or ἐβένη, *ebenus*) refers to the fine black heart-wood of several different trees and has been a favoured trade ware from ancient times.²⁵

²² The reference to Fryer and the numbers for the Calcutta tree are given by Bretzl 1903, 159ff. Hinüber 1985 knows that the Calcutta tree has 477 aerial roots. I myself visited it in 1980.

²³ That Pliny derived from Theophrastus and from some less accurate source was early noted by Noehden (1827, 127f.). A contemporary Roman giving an account of his visit to India was suggested by Bretzl (1903, 182ff., followed by Stadler 1916 and by Brown 1949, 164, note 41).

²⁴ In India its holiness is not restricted to Buddhism. In a way it can be said that the pipal is not holy because the Buddha sat under it; he sat under it because it was holy.

Herodotus (3, 97; 3, 114) knew of the timber coming from Africa (Ethiopia), Theophrastus (*H. Pl.* 4, 4, 6) from India.²⁶ African ebony is also known from Egyptian finds, from the Bible, and from Old Persian inscriptions.²⁷ Theophrastus mentioned two kinds of Indian ebony, a rare and good one and a common, but inferior one. He rightly knew that the wood is dark by nature, but could not describe the tree. In later literature Strabo briefly quoted Megasthenes²⁸ mentioning ebony among the products of India beyond the Hypanis. In his account of ebony, Pliny,²⁹ referring to the verse of Vergil about ebony being found only in India,³⁰ pointed out that Herodotus (3, 97) knew the tree as being Ethiopian. At the end of his account he quoted without a reference Theophrastus on the two kinds of ebony in India. In an additional passage he mentioned an Indian thorn-bush resembling ebony. Dioscurides (1, 98), too, knew both Ethiopian and Indian ebony. According to the *Periplus* 36, Indian ebony was exported from Barygaza.

Commenting mainly on Theophrastus, Bretzl (1903, 206) noted that the Greeks probably only knew the timber, not the tree. This was never described, even in later sources. He also noted that the two kinds of Indian ebony are not two different species, but different stages, the inferior kind being young, the better kind more aged wood. As an identification he suggests the *Diospyrum ebenum* of South India. Noting the great distance of this from the countries traversed by Alexander, Joret thinks rather of *Dalbergia sissoo*, an ancient trade article of the Indus country.³¹

From the very beginning of classical knowledge of India the wool-bearing trees, the ἐριοφόρα δένδρα or *arbores lanigeræ*, were among the most famous wonders of the country.³² Archaeology is now said to have established beyond doubt the existence of cotton spinning and weaving at Harappan sites,³³ and at an early period it was probably imported from India to the Near East.³⁴ An independent supply was perhaps found in

²⁵ Ebony in classical literature has been discussed e.g. by Lassen 1858, 310; Watt, *Dictionary*; Bretzl 1903, 206 (with Joret 1904, 613); Schmidt 1905; Schoff 1912, 153; Warmington 1928 (1974), 213f.; André & Filliozat 1986, 340, note 10.

²⁶ Ebony and its characteristics are further briefly mentioned in the *H. Pl.* 1, 5, 4f.; 1, 6, 1; 5, 3, 1f.; 5, 4, 2; and 9, 20, 4.

²⁷ Laufer 1919, 486. The OP passage is DSf 40f. *ardatam utā asā dāruv hacā Mudrāyā abariya* – “silver and ebony were brought from Egypt” (on the name of ebony see Kent 1953 s. v. *dāruv*). Cf. Ezekiel 27: 15, and Herodotus 3, 97, on Ethiopian tribute.

²⁸ Strabo 15, 1, 37 (Megasthenes F 21a), with McCrindle 1901, 46, note 2.

²⁹ *N. H.* 12, 8, 17 – 9, 20, and 12, 10, 21, on an Indian thorn-bush resembling ebony. Ethiopian ebony briefly in *N. H.* 6, 35, 197.

³⁰ *Georg.* 2, 116f. *sola India nigrum fert ebenum*.

³¹ Joret 1904, 613. On *Dalbergia sissoo* see Gershevitch 1957 and Maxwell-Hyslop 1983.

³² See Schlegel 1829, 6f.; Lassen 1858, 23ff. & 1874, 682 (1852, 677); McCrindle 1896, 186, note 1; Wagler 1899; Bretzl 1903, 136ff.; King 1909; Schoff 1912, 71f. & 179f.; Warmington 1928 (1974), 210ff.; Winter & Youtie 1944; Brown 1949, 87ff.; André & Filliozat 1986, 347, note 79; and Hinüber 1985, 1125. In earlier sources references to cloths called *byssos* and *sindon* are accepted without criticism. On cotton and cotton manufacture in ancient India, see Schlingloff 1974.

³³ Ratnagar 1981, 79.

³⁴ See King 1909, Parpola 1975, and Karttunen 1989a, 26 & 52.

Africa.³⁵ In Greek literature Indian cotton (genus *Gossypium*, OIA *karpāsa*)³⁶ was first mentioned by Herodotus and Ctesias.³⁷ With Alexander's historians cotton became a standard curiosity, which is mentioned by most of our sources.

It has often been pointed out that the Macedonian experience of India was restricted to a certain part of the year. When Onesicritus claimed that the fibres were found in the flower (ἄνθος), around a stone (πυρήν), this has been explained by noting that in fact he never saw the plant with flowers and erroneously interpreted the pods as flowers.³⁸ Another description of the plant going back to Alexander's campaign is found in Theophrastus (*H. Pl.* 4, 4, 8). He said that the plant resembled a wild rose, its leaves those of a mulberry. It was cultivated on the Indian plains, where it was planted in rows resembling vineyards. This is copied by Pliny (*N. H.* 12, 13, 25), with the difference that to the wild rose is compared not the whole plant, but the woollen calyx. Eratosthenes (Strabo 15, 1, 20) mentioned woolly blossoms (ἐπανθεῖν ἔριον) among products caused by "heating".

In other sources Indian cotton is mostly only briefly referred to. In the fragments of Nearchus Indian cotton is mentioned twice.³⁹ It is also found in Mela (3, 62 *lanas silvae ferant*) and Curtius (quoted above) and, of course, in many later authors. Pliny mentioned Indian cotton in a number of passages.⁴⁰

In Alexander's time there were also cotton plantations nearer than India. These were on the island of Tylus (Bahrain) by the southern coast of the Gulf. Nearchus, following the northern coast, never saw it, but the island was visited by Androsthenes during his Arabian expedition and described in his work, which was then used e.g. by Theophrastus. His account of cotton is found in *H. Pl.* 4, 7, 7f. (closely followed by Pliny, *N. H.* 12, 21, 38).⁴¹ He claims that the plant has no fruit, but allows an apple-like wool pod. Its leaves resemble those of the vine. Pliny has added some information from other sources (in the next passage he quotes Juba by name) and makes a point of discerning cotton, containing wool in fruits, from the wool-bearing (*lanigeras*) trees of the Seres,

³⁵ For a possibility of independent cotton production in Africa, see Berzina 1982, 18f.

³⁶ This is very close to Greek κάρπασος, Latin *carbasus*, but these are usually rendered as 'linen, fine cloth'. Unmistakably for Indian cotton these words were used by Strabo (15, 1, 71), the *Periplus* (41 on cotton of Minnagara), and Curtius (8, 9, 21 *corpora usque pedes carbaso velant*). See Wagler 1899, 168 and Mayrhofer *KEWA* and *EWA* ss. vv. *karpāsa*.

³⁷ Herodotus 3, 106 & 7, 65 (εἴματα ἀπὸ ξύλων πεποιημένα); briefly 3, 47, perhaps on African cotton; Ctesias F 45, 41 ξύλινα ἱμάτια. I am still puzzled by Varro quoted in Servius on *Aen.* 1, 653. In earlier editions this was given as a fragment of Ctesias (e.g. Müller F 78), though not given by Jacoby for Ctesias, but as a fragment of Onesicritus (F 23; without any comment in the apparatus). André & Filliozat 1986 ignore this passage. – *Addition*: The answer was found in a last minute check from an additional note in Müller 1844, iii. Referring to Dübner, Müller explained that though *Ctesias* is the common reading the best manuscript has *tonescritus*.

³⁸ Onesicritus F 22 in Strabo 15, 1, 21 (in Jones' Loeb translation, and by some authors following him, erroneously ascribed to Aristobulus), thus explained by Bretzl 1903, 138, and Brown 1949, 87.

³⁹ Nearchus F 19 in Strabo 15, 1, 20 (fine-threaded woven cloths – αὐτηρίουσ ὑφαίνεται σινδόνας – used by Macedonians for pillows and as padding for saddles), and in F 11 in Arrianus, *Ind.* 16, 1f. (λίνου τοῦ ἀπὸ τῶν δενδρέων...). On Indian clothes see Hinüber 1985, 1125.

⁴⁰ *N. H.* 12, 8, 17; 12, 13, 25; 12, 22, 39 (with Juba F 62); 13, 28, 90; 19, 2, 15.

⁴¹ The passage has been analyzed by Bretzl 1903, 136ff. and Brown 1949, 88f.

supposedly having wool on its leaves.⁴² For cotton he gave the name *gossypinum*, from which we have the scientific name *Gossypium*. Both authors add that cotton was also found in Ethiopia and India.⁴³

Another source of a kind of clothing in ancient India was the so-called bark-cloth or *valkala*, specially used by ascetics for their clothes.⁴⁴ Was it, too, mentioned in Western sources? One possibility is the ξύλινα ἱμάτια of Ctesias (F 45, 41). Strabo mentions byssus made of bark, but this seems to be an erroneous reference to silk.⁴⁵ We are thus left only with the well-informed Megasthenes, who knew that the hermits called Hylobioi were clothed with the bark of trees.⁴⁶

Flax (*Linum usitatissimum*) in India is mentioned e.g. by Curtius,⁴⁷ linen cloth by Ctesias (F 45, 42), further by Curtius (9, 8, 1 *lineae vestis aliquantum*). But it might be cotton instead.⁴⁸ Nearchus, too, said that Indians wore linen garments (ἐσθῆτι λινέη χρέονται), but goes on to tell that the linen came from trees, and Pliny mentioned *vestes lineae* made of cotton.⁴⁹ The same may also explain Megasthenes' brief mention of linen garments in India.⁵⁰ In the annual rotation of crops, however, as told by Eratosthenes in Strabo, flax was one of those cultivated during the rainy season.⁵¹

According to Laufer (1919, 294), wild flax is common in parts of Iran, and the cultivated variety was early known in Iran and India, but only used for its seeds and oil, not for its fibres. However, in India words for flax are quoted as early as the Vedas in connection with cloth.⁵² Flax seeds have been found on prehistoric levels at Sahr-i Soktha in Seistan.⁵³

Fruit trees were important as we see from several accounts. According to Diodorus, "the fruits found in the wild and the roots that grow in marshy areas are of excellent savour and are available to man in profuse abundance."⁵⁴ Descriptions of indi-

⁴² *N. H.* 12, 21, 38 and 12, 8, 17. It was supposed that the Seric fibre or silk grew like a lichen on branches and leaves of the tree.

⁴³ Briefly also in *N. H.* 13, 28, 90 and 19, 2, 15. On cotton in 2nd-century Egypt see Winter & Youtie 1944.

⁴⁴ On this see Emeneau 1962.

⁴⁵ Strabo 15, 1, 20 τοιαῦτα [like cotton] δὲ καὶ τὰ Σηρικά, ἔκ τινων φλοιῶν ξαινομένης βύσσου.

⁴⁶ Megasthenes F 33 in Strabo 15, 1, 60 ἐσθῆτος φλοιῶν δένδρεϊων. When Arrianus, *Ind.* 11, 8 (either Nearchus F 6 or Megasthenes F 19a) claims that Indian sages eat the fruits and bark of the trees, which is as sweet as dates – it is possible that his source had actually said that they ate fruits sweet as dates and clothed in bark of trees.

⁴⁷ Curtius 8, 9, 15 *terra lini ferax; inde plerisque sunt vestes*.

⁴⁸ So e.g. Rolfe in his notes to the Loeb edition of Curtius and McCrindle 1896, 186, note 1.

⁴⁹ Nearchus, part of F 11 in Arrianus, *Ind.* 16, 1; Pliny, *N. H.* 12, 13, 25.

⁵⁰ Megasthenes F 32 in Strabo 15, 1, 58 σινδοφορεῖν.

⁵¹ Strabo 15, 1, 13 ἐν... τοῖς ὄμβροισι λίνον σπεύρεται.

⁵² OIA *kṣauma* in the *Maitrāyaṇīsamhitā* and *umā* in the *ŚB*. See Rau 1970, 13, and Mayrhofer, *KEWA & EWA* ss. vv. The word *kṣumā*, suggesting itself as the origin of *kṣauma*, is found only in lexicographers and late texts and is probably reconstructed from *kṣauma*. Another fibrous plant known in early India is OIA *śaṇa* 'hemp'.

⁵³ Ratnagar 1981, 79.

⁵⁴ Diodorus 2, 36, translation in Murphy 1989.

vidual fruits, however, are not always easy to identify. At least one would expect to find the mango (*Mangifera indica*; OIA *āmra*), banana (*Musa sapientium*; OIA *kadalī*), and perhaps jack-fruit (*Artocarpus heterophyllus* [*A. integrifolia*]; OIA *panasa*).⁵⁵ According to Pliny, the Macedonians described several Indian trees (and their fruits) without naming them,⁵⁶ and for us it is often as difficult to identify them as for Pliny, though we have a much better idea of possible Indian trees. After his account of the banyan tree Theophrastus (*H. Pl.* 4, 4, 5) briefly described four different Indian fruit-trees, himself asserting that these and others have been described without names (ἀνόνομα), perhaps thus being Pliny's source. All have been identified by Lassen, Bretzl and others, but not too convincingly.

The first of Theophrastus' unnamed fruits is that of a large tree with a very sweet and large fruit, eaten by the naked sages of India. The second has oblong leaves resembling bird's wings; it is about two cubits in length and Indians fasten it on their helmets. No fruits are mentioned. The third has a long and crooked fruit, which has a sweet taste, but causes stomach problems and dysentery. The fruit of the fourth is briefly compared to those of the cornelian cherry (*Cornus mas*). In his notes to the Loeb translation Hort identifies these as the jack-fruit, banana, mango, and jujube (*Zizypus jujuba*).

This account was paraphrased by Pliny (*N. H.* 12, 12, 24), who gives the first and second as a single tree. This led Bretzl to leave out the words ἕτερον δὲ from Theophrastus' account and to identify the whole as the banana.⁵⁷ This seems, however, to offer as many difficulties as it explains, and in any case it is much too violent a way of dealing with a text. The leaves could perhaps point to the plantain, but a banana is not really so large (μεγαλόκαρπον; *maiore pomo*) and it most certainly does not grow out of the bark (*fructum cordice emittit*), which is exactly the way the jack-fruit grows.⁵⁸ The banana is curved (σκολιός) but so is the mango, too. When ripe neither causes dysentery, as both can when unripe.⁵⁹ For his first fruit Pliny also gives Indian names, *pala* for the tree and *ariena* for the fruit.⁶⁰ The fourth tree of Theophrastus is not mentioned by Pliny.

⁵⁵ For these fruits in Indian literature see Yule & Burnell ss.vv. *Jack, Mango, and Plantain*, Watt, *Dictionary*, under Latin names, and Syed 1990, 162ff. (banana) and 420ff. (jack-fruit).

⁵⁶ *N. H.* 12, 13, 25 *genera arborum Macedones narravere maiore ex parte sine nominibus*.

⁵⁷ Bretzl 1903, 191ff. (with Joret 1904, 612), followed by Wecker 1916, 1302 and Warmington 1928 (1974), 217.

⁵⁸ Pliny's plant has been identified as the jack-fruit, without mentioning Theophrastus, by Yule & Burnell, s.v. *Jack*, and André & Filliozat 1986, 359, note 150.

⁵⁹ Yule & Burnell, s.v. *Jack*, and André & Filliozat 1986, 359, note 151, identify it as the mango and the latter suggest that the Macedonians must have eaten them to excess.

⁶⁰ Accepting an identification as the banana Lassen 1874, 683f. (1852, 678) explains *ariena* as OIA *vārana* and *pala* as *phala* 'fruit'. Though the first word, among numerous other and more common meanings, has been, in compounds *vāraṇabusā* and *vāraṇavallabhā* explained as the banana by a few lexicographers, I doubt if 'elephant's joy' in a late source gives us the right to suggest 'elephant' as an early name for the banana. See also Lassen 1858, 311 about Pliny's passage (taken as the banana). Filliozat (in André & Filliozat 1986, 359, note 150) remarks that *palā* is a name for the jack-fruit in Tamil, but rightly finds this too distant from the Pañjab and refers to Sanskrit *panasa/panasa/panasa*, instead. See further Marr 1972, 42f.

In this connection we must also mention some further accounts of Indian fruits, evading a certain interpretation. Thus Aristobulus mentioned a small tree with bean-like pods, ten fingers in length, full of honey, but apparently deadly poisonous.⁶¹ According to Megasthenes (F 29 in Pliny 7, 2, 25), the mouthless Astomi dress in cottonwool (*vestiri frondium lanugine*) and inhale the odour of wild apples. Arrianus, *Ind.* 11, 8 (Nearchus or Megasthenes) knew that the Indian sophists ate, among other seasonal products, a tree bark (τὸν φλοιὸν τῶν δένδρων, γλυκὺν τε ὄντα) that is no less sweet and nutritious than palm dates.⁶²

Phoenix or **date palm** (*Phoenix dactylifera*) was already mentioned by Ctesias (F 45, 28, then in Pseudo-Palladius 1, 6) as growing in India. According to him, the dates there should be three times larger than in Babylonia, which is clearly impossible.⁶³ Theophrastus (*H. Pl.* 4, 4, 8) knew that many dates were found in some parts of India. It might be that Ctesias was a victim of some misunderstanding (as he often was); a century later Theophrastus (*H. Pl.* 2, 2, 8 and 3, 3, 5) knew that the largest dates were grown nowhere else than in Babylonia, a country familiar enough to Ctesias.

In India the closely related wild date-palm (*Phoenix sylvestris*; OIA *kharjūra*) is commonly found in many parts of northern India. In literature, it is mentioned as early as the *Yajurveda* (*TS* 2, 4, 9, 2 and *KS* 11, 10), but the cultivated variety seems to be attested in the Islamic period only.⁶⁴ In Mohenjo-daro some date-stones (of normal size) are found, but they might have been imported from the West.⁶⁵ We know that dates were later imported to India (according to the *Periplus* 36f. from Oman and Gedrosia).⁶⁶

Nearchus several times mentioned dates on the Gedrosian coast.⁶⁷ Wild dates, especially mentioned by him in 29, 1, are perhaps also meant by Theophrastus, who stated that eating unripe dates from Gedrosia is dangerous.⁶⁸ Pliny mentions wine made from palm-dates in Parthia and India and all over the East.⁶⁹ It is further specified that the softer (*mitiorum*) dates are preferred for pressing. In another passage the same author

⁶¹ Strabo 15, 1, 21 (Aristobulus F 37). Ball 1885, 340 identified this as *Cassia fistula*, the purging cassia, which, however, is not poisonous. Pearson 1960, 174f. combines this with Theophrastus' crooked fruits and identifies both as bananas.

⁶² One asks whether this is really meant, when Wecker (1916, 312) lists *Ind.* 11 among sources supposedly dealing with the banana. His next two references to bananas – Curtius 11, 1, 10. and Pliny, *N. H.* 7, 2, 2 – I have not been able to verify.

⁶³ Still it is more probably an example of exaggeration concerning the exceptional fertility of distant places than a confused account of coconuts (cf. below).

⁶⁴ Lassen 1858, 312 (commenting on Pliny's date wine), and Laufer 1919, 391. Indian literary references to *kharjūra* are found in Syed 1990, 269f.

⁶⁵ Mentioned e.g. in Wheeler 1960, 67 and Ratnagar 1981, 80. Still earlier are finds in Eastern Iran and Baluchistan (Mehrgarh 6000/5000 B.C., see Costantini 1985). See also Southworth 1992, 83.

⁶⁶ On the *Periplus*, see also Schoff 1912, 157ff., on dates in general Steier 1941.

⁶⁷ F 1 in Arrianus, *Ind.* 26, 6; 27, 2; 28, 1.

⁶⁸ Nearchus F 1 in Arrianus, *Ind.* 29, 1; Theophrastus *H. Pl.* 4, 4, 13. According to Strabo 15, 2, 7, they are dangerous for beasts of burden.

⁶⁹ *N. H.* 14, 19, 102 *fiunt* [scil. *vina*] *et e pomis... primumque e palmis, quo Parthi, Indi utuntur et oriens totus.*

stated that some Arabian nomads press wine out of palms, like the Indians.⁷⁰ As a curiosity we can also mention that, according to Aelianus (*N. An.* 14, 13), the Indian king (Candragupta?) ate as a delicacy fried worms that are found in date-palms.

Among other palms of India we note the **tala tree** (τάλα) of Megasthenes (F 12 in Arrianus, *Ind.* 7, 3, see Steier 1932), said to have edible bark and clews of wool. While the former brings to mind Nearchus' above-mentioned tree-bark eaten by Indian sophists, the latter seems to suggest that cotton is here somehow confused with another plant. The name could contain OIA *tāla*, palmyra or wine palm, *Borassus flabellifer*.⁷¹ Its bark, however, is not edible, though the fruits and especially juice are consumed. One may also wonder whether Pliny's account of date wine made in India actually refers to palmyra wine.

Palmyra leaves were, later at least, the standard writing material in India, but the account of Curtius, who spoke of bark used for writing in India, refers more likely to the birch-bark traditionally used for the same purpose in the Northwest.⁷²

More spectacular, but also less known in the West because of its more southern distribution, is the **coconut palm** (*Cocos nucifera*; OIA *nārikela*) of tropical sea-coasts, mainly found in South India, Sri Lanka and the Maldives. Since ancient times it has been of great economic value, producing food, oil, water, toddy, palm sugar, and copra as well as shells used as various utensils, and timber and leaves variously used for building and other purposes.⁷³ In the West, certainly identifiable accounts seem to come only in late antiquity (the *argellion* of Cosmas, with the Indian name).⁷⁴

The old attempt to explain the Ctesianic large dates (F 45, 28) as coconuts is hardly relevant, as the size of real coconuts greatly in excess of three times that of dates.⁷⁵ It has been further suggested that the Ethiopian κόικας or κουκιάφορος of Theophrastus and the Arabian palm briefly mentioned in the *Periplus* might refer to the coconut.⁷⁶ Theophrastus' palm, however, has a forked stem and its sweet yellow fruit is small enough not quite to fill the hand and it contains a large and very hard stone. This hardly fits in with the coconut, but rather with the African doum palm suggested by Hort in his note on the passage. The palm of the *Periplus* is mentioned just because its leaves were used for girdles. It could well be the coconut, but this does not signify much. In the same text, chapter 17, a word (ναργίλιος) supposedly referring to the Indian coconut is occasionally quoted, but this is just a conjecture for the ναύπλιος of the manuscript,⁷⁷ which could well

⁷⁰ *N. H.* 6, 32, 161 *reliquos vinum ut Indos palmis exprimere.*

⁷¹ So identified by Lassen 1874, 682fr. (1852, 677), see also Dahlqvist 1962, 277f., Hinüber 1985, 1105, and Syed 1990, 308ff. On *tāla* in Indian tradition see Caraka, *Sūtrasth.* 27, 115 & 130.

⁷² Curtius 8, 9, 15 *Libri arborum teneri haud secus quam chartae litterarum notas capiunt.*

⁷³ On the coconut in India see Syed 1990, 363ff., and Watt s.v. *Cocos nucifera.*

⁷⁴ Cosmas 11, 11, identified by Lassen 1858, 312f.

⁷⁵ Ctesias F 45, 28 οἱ δὲ φοίνικες οἱ ἐν Ἰνδοῖς καὶ οἱ τούτων βάλανοι τριπλάσιοι τῶν ἐν Βαβυλῶνι. Identified as the coconut by Weyrauch 1814, 393, and Lassen 1874, 645 (1852, 640), and still by Wecker 1916, 1302.

⁷⁶ Wecker 1916, 1302 referring to Theophrastus *H. Pl.* 2, 6, 10 and 4, 2, 7, and to the *Periplus* 33.

⁷⁷ Suggested by Fabricius (?), accepted and discussed in Schoff 1912, 99, also Warmington 1928 (1974), 216f., and Miller 1969, 36, but well criticized by Casson 1980b. The Greek word

signify some kind of animal shell. As a reference to the coconut, however, we may take Aelianus' account (*N. An.* 16, 18) of planted palm-groves in Taprobane.

Bamboo or the Indian reed (κάλαμος ἰνδικός; various species of *Bambusa* and several related genera)⁷⁸ seems to have been first mentioned by Herodotus and Ctesias, then it was observed by companions of Alexander, who saw them growing by the Acesines.⁷⁹ Despite his wide exaggeration of its size, Ctesias knew that the plant is dioecious, and a more exact account was given by Theophrastus. Erroneous ideas about bamboo are partly explicable from the peculiarity of the plant, as its bloom occurs only rarely, and is therefore not so easy to observe. In giant bamboos it is said to bloom only after a long period of growth, ranging from 25 to 35 years and even more; after the bloom the reeds die and new stock develops from the seeds (Watt). In classical accounts it is also often difficult to differentiate between bamboo and sugar-cane.

Though a real bamboo is often large enough, there are many further exaggerated accounts of giant bamboos in the West (not only in Ctesias).⁸⁰ In his account of Ethiopia Strabo claimed that the Indian reed also grows in inner Ethiopia south of Meroe.⁸¹

In a passage of Pliny (*N. H.* 16, 65, 159f.) we read that Indians, like other eastern peoples, used reed arrows, and with them obscured the very rays of the sun (*his armis solem ipsum obumbrant*). The same image for good warriors has been much used in India, for instance in the *Mahābhārata*. The battle scenes in the great epic are full of such episodes.⁸² Indian archers with their reed bows and iron-headed reed arrows had already served in the invasion army of Xerxes,⁸³ and the skill of Indian archers was often admired in literature on Alexander.⁸⁴ Alexander himself experienced their skill at least

ναργίλιος is not mentioned in Liddell & Scott & Jones, and I wonder what Schoff means by his unspecified claim that "it appears in modified forms in other Greek geographers". Perhaps Cosmas' (ν)αργέλλιον?

- 78 According to Watt, the name *Bambusa arundinacea* is often used incorrectly to refer to several other species of bamboo, without taking botanical differences into account. The real *Bambusa arundinacea* is neither the commonest nor the most useful bamboo of India, but it is the main source of bamboo sugar (see below).
- 79 Herodotus 3, 98; Ctesias F 1b, 17, 5 and F 45, 14 and F 45c; Theophrastus, *H. Pl.* 4, 11, 13. See Yule & Burnell s.v. *bamboo*, Watt s.v. *bamboo*, Bretzl 1903, 203ff., and Stadler 1919.
- 80 Herodotus 3, 98; Megasthenes F 27b (Strabo 15, 1, 56); Mela 3, 62; Pliny, *N. H.* 7, 2, 21 and 16, 65, 161f.; Ptolemy 2, 17, 5 (giant reed in the country of the Seres). Ball 1885, 335f. tried to explain such references as palmyra palms (followed by Warrington 1928 (1974), 219f.). See also Karttunen 1989a, 188f.
- 81 Strabo 16, 4, 9. A similar passage in 17, 3, 5, is explained as papyrus by Wecker 1916, 1302. Indian reeds as well as Indian oxen in Ethiopia seem to have been part of the old confusion between the two countries. It was still current in the Hellenistic period, the tradition of Indian oxen in Ethiopia originating in Agatharchides.
- 82 See e.g. Mbh 7, 93. A little later (7, 95, 13) even the Yavanas are represented as archers (*śaru-bhāṣanadhara yavanāś ca prahāriṇaḥ*). As a curiosity I should like to mention that the account of Alexander's single fight against the Malli in Justinus (12, 9) is rather similar to some battle-scenes of the Indian epic.
- 83 Herodotus 7, 65 τόξα καλάμινα καὶ ὄστούς καλαμίνους ἐπὶ δὲ σίδηρος ἦν.
- 84 E.g. Nearchus F 11 in Arrianus, *Ind.* 16, Plutarch, *Sayings of Kings* 23, 181B. See further Himerius 61, 3 and Julianus, *Orationes* 7 (2, p. 77 Loeb).

twice, once when he was wounded among the Assaceniens and once when he was wounded more seriously among the Malli.⁸⁵

Another famous graminaceous plant of India of great economic importance is **sugar-cane** (*Saccharum officinarum*; OIA *ikṣu* 'sugar-cane' and *śarkarā* 'sugar'; MIA *sakkarā*).⁸⁶ It is easy to suppose, as has often been done, that the classical *sάκχαρ[ov]*/*saccharum* denotes sugar, too. The name, attested only in authors of the Roman period, is clearly derived from the Indian word for sugar, but it has been suggested that the accounts would better suit the so-called reed honey or bamboo manna or *tabāshīr* (OIA *vaṃśa-locana* or late *tvakkṣīra*), obtained from *Bambusa arundinacea* and used as medicine in India.⁸⁷ But while *tabashir* is a rather rare substance, one would expect to find knowledge of sugar-cane. But before we consider the evidence for *saccharum*, we must discuss a few earlier accounts.

In a passage of Strabo Eratosthenes is quoted for roots of large reeds, which are sweet both by nature and by heating, and Nearchus stated that these reeds produce honey, though there are no bees.⁸⁸ According to Diodorus, these sweet roots grow in marshy places and are much appreciated by people.⁸⁹ I find it difficult enough to connect this either with sugar-cane (though its root is sometimes used in the *Āyurveda*) or with *tabashir*. Thus it seems that there is no account of either by Alexander's historians. The next possible case for sugar is Megasthenes, whose sweet stones dug up in India have been explained as candy sugar.⁹⁰ From Megasthenes is perhaps derived Aelianus' account that in the country of the Prasii liquid honey rains in springtime and remains on the grass and leaves of reeds in the marshes.⁹¹

⁸⁵ Arrianus, *Anab.* 4, 26, 4, and 6, 10f. Instead of the Malli, the Vulgate speaks of the Oxydracae.

⁸⁶ On sugar-cane, see e.g. Watt, s.v. *Saccharum officinarum* (p. 33f. on early history), Yule & Burnell s.v. *sugar*, Laufer 1919, 376f., Blümner 1920, Warmington 1928 (1974), 208ff., and Hinüber 1971.

⁸⁷ This was suggested centuries ago by Salmasius and accepted by such scholars as Sprengel and Humboldt. Their arguments have been summarized by Watt, s.v. *Bamboo*, p. 383f. See also Lassen 1858, 30, and Yule & Burnell s.v. *Tabasheer*.

⁸⁸ Eratosthenes and Nearchus (F 19) in Strabo 15, 1, 20 Ἐρατοσθένης ἔφη... γεννᾶσθαι καὶ τὰς ρίζας τῶν φυτῶν, καὶ μάλιστα τῶν μεγάλων καλάμων, γλυκείας καὶ φύσει καὶ ἐψήσει... Νέαρχος... εἶρηκε δὲ καὶ περὶ τῶν καλάμων, ὅτι ποιοῦσι μέλι, μελισσῶν μὴ οὐσῶν. This is accepted as sugar by Lassen 1874, 681 (1852, 676), McCrindle 1901, 26, note 3, and Wecker 1916, 1302.

⁸⁹ Diodorus 2, 36, 5 αἱ κατὰ τοὺς ἐλώδεις τόπους φυόμεναι ρίζαι διάφοροι ταῖς γλυκύτησιν οὔσαι πολλὴν παρέχονται τοῖς ἀνθρώποις διαψίλειαν... καὶ τὰς ἐν τοῖς ἔλεσι ρίζας ἔψοντος τοῦ καύματος, καὶ μάλιστα τῶν μεγάλων καλάμων. It is worth mentioning that Diodorus, supposedly excerpting Megasthenes, is here very close to Eratosthenes (both referring to heat and boiling, OIA *pāka*, as ripening), while Strabo asserts that Eratosthenes and Nearchus spoke of the same plant.

⁹⁰ Megasthenes F 21a in Strabo 15, 1, 37. Accepted as sugar by Ball 1885, 309 and Bevan 1922, 363.

⁹¹ Aelianus, *N. An.* 15, 7. The same source seems to have been used by Seneca, who ascribes this honey found on reed leaves either to rain ("dew of heaven") or to the moisture of the reed itself: *aiunt inveniri apud Indos mel in arundinum foliis, quod aut ros illius caeli aut ipsius arundinis umor dulcis et pinguior gignat* (*Ep.* 84, 4, quoted and identified as sugar-cane by André & Filliozat 1986, 66f.).

The word σάκχαρ[ον]/*saccharum* occurs for the first time in Dioscurides and Pliny.⁹² Both know it as a white, brittle substance collected from Indian reeds and used only as medicine. It is a kind of concrete honey (Dioscurides), collected like gum (Pliny). While André & Filliozat (1986) here accept the old explanation as tabashir, they see real sugar-cane in a fragment of Varro Atacinus. This, however, seems to be just another instance of the Eratosthenian sweet root.⁹³ The *Periplus* 14, too, asserts that reed honey is called sugar.⁹⁴ According to Aelianus (*N. An.* 13, 8), referring to some unknown Hellenistic author, wine made of rice or of cane (ἐκ καλάμου) is given to war elephants. Ptolemy's honey (μέλι) in Taprobane (7, 4, 1) probably refers to sugar, too.

Still, I cannot consider arguments for tabashir very convincing.⁹⁵ Both Dioscurides and Pliny assert that their sugar is also found in Arabia, but this seems to suit neither possibility. Tabashir does not seem to be remarkably sweet, though it is described as white or bluish white (Watt). It is certainly rare⁹⁶ and small (*amplissimum nucis abellanae magnitudine* in Pliny) and used as medicine, but then it is quite likely that real sugar, too, was imported only in small nuggets and used only as medicine, like many exotic products. This excludes Blümner's argument that sugar was only introduced in the West by the Arabs. In the Āyurveda real sugar was certainly used as a medicine.⁹⁷ It is considered good for the stomach in India as well as in the West (Dioscurides εὐκοίλιον).

There are two further kinds of **Indian reeds** mentioned in classical literature. We cannot really say whether the κύπειρον mentioned twice by Theophrastus⁹⁸ in lists of aromatics (ἀρώματα) came from India, though according to Theophrastus the majority of aromatics came from India or Arabia. It has been identified as *Cyperus rotundus*⁹⁹ by Hort. Centuries later Dioscurides and Pliny mentioned Indian *cypira*, a ginger-like product tasting like saffron.¹⁰⁰ In this scholars like to see an early reference to turmeric

⁹² Pliny, *N. H.* 12, 17, 32. Dioscurides 2, 82, 5, then e.g. Galenus and Isidorus. Aelianus in *V. H.* 3, 39, stated briefly that Indians ate reeds like Arcadians ate nuts and Carmanians ate dates. We cannot pinpoint the exact source of a short reference to sweet Indian reeds in Lucanus 3, 237, though it is located in the Northwest.

⁹³ Varro Atacinus, *Chorographia* F 20 (from Isidorus, *Etym.* 17, 7, 58): *Indica non magna minor arbore crescit harundo, / illius et lentis premitur radicibus humor, / dulcia cui nequeant suco contendere mella.* Quoted in André & Filliozat 1986, 22f., see further 339 note 3 and 360f. note 160 (on Pliny).

⁹⁴ μέλι τὸ καλάμινον τὸ λεγόμενον σάκχαρι. This is accepted as sugar-cane by McCrindle 1879, 23f., and Schoff 1912, 90.

⁹⁵ In this I side with the authors who take Pliny and Dioscurides as referring to sugar-cane. They include Ball 1885, 334f., Yule & Burnell s.v. *sugar*, Wecker 1916, 1302, and Laufer 1919, 376.

⁹⁶ I find it somewhat curious that Blümner (1920, 1813f.) finds it likely that the Greeks and Romans could have had only a vague idea of sugar-cane, but at the same time seems willingly to accept that tabashir was an accepted part of their pharmacopoeia.

⁹⁷ Watt s.v. *Saccarum*, 6 & 29f., Hinüber 1971, 106f., Caraka, *Sūtrasth.* 27, 237ff.

⁹⁸ Theophrastus, *H. Pl.* 9, 7, 2, and *De odoribus* 33.

⁹⁹ It has been described by a modern botanist as "the world's worst weed", but also contains edible roots (information obtained from Krister Karttunen).

¹⁰⁰ Dioscurides 1, 5 ἰστορεῖται δὲ καὶ ἕτερον εἶδος κυπέρου ἐν Ἰνδίᾳ γεννώμενον, προσεοικὸς ζιγγιβέρι, ὃ διαμασηθὲν κροκῶδες, πικρὸν εὐρίσκειται, καταχρισθὲν δὲ παραχρῆμα ψιλοῖ τὰς τρίχας, and Pliny, *N. H.* 21, 70, 117f. *est et per se Indica herba quae cypira vocatur, zingiberis effigie; commanducata croci vim reddit.*

(*Curcuma longa*), but André and Filliozat point out that this is perhaps not quite warranted by our texts.¹⁰¹ A saffron-like taste does not necessarily mean saffron-like appearance. As a second possibility they offer the less well-known Indian aromatic, the *Curcuma amada* with a ginger-like taste (and sometimes called mango ginger). Κύπερος is further mentioned in the *Periplus* (24), but this was imported to Mouza in South Arabia and is probably not an Indian product.¹⁰²

Another aromatic reed of India, called κάλαμος ἀρωματικός, is again described by Dioscurides (1, 18). It is said to be of a beautiful reddish tawny colour (κιρρός), having whitish hair and consisting of many nodes. When broken, it divides into splinters, and its taste is sticky, astringent and somewhat acid.¹⁰³ This has been connected with the scented *calamus* of Arabia, India, and Syria described by Pliny,¹⁰⁴ and identified with *Acorus calamus*.¹⁰⁵ Again the evidence seems to be rather slight for any certainty.

Before leaving graminaceous plants¹⁰⁶ we must discuss various crops of India mentioned in Western sources. The most important among them is of course rice (ὄρυζα, also ὄρυζον; *Oryza sativa*, OIA *vrihi*).¹⁰⁷ It was cultivated in Northwest India, too, already in prehistoric times (e.g. in Swat and in Baluchistan), and of course also in other parts of India.¹⁰⁸ In literature, it has been amply attested since the Yajurveda Samhitās.¹⁰⁹ In India there were many different varieties of rice.¹¹⁰

¹⁰¹ André & Filliozat 1986, 363f., note 182. Miller 1969, 62ff. & 78f. was more positive, as often. More evidence possibly referring to turmeric will be discussed below.

¹⁰² The list contains nothing specifically Indian, but such clearly un-Indian products as saffron and wine. Probably all these imports were carried to Mouza from Egypt. Nevertheless, McCrindle 1879, 21, hesitatingly suggested turmeric, identifying it with the *cypera* of Dioscurides and Pliny. Dismissing this Schoff 1912, 111f., offered several Mediterranean and Near Eastern possibilities.

¹⁰³ Dioscurides 1, 18 (then also quoted by Oribasius, Galenus, Isidorus *et al.*).

¹⁰⁴ Pliny, *N. H.* 12, 48, 104 *calanus quoque odoratus in Arabia nascens communis Indis atque Syriae est, in qua vincit omnes.*

¹⁰⁵ André & Filliozat 1986, 424, note 588. For other possibilities, see McCrindle 1901, 125 note 3.

¹⁰⁶ In conclusion of my discussion of reeds I should like to mention a passage of Lassen (1852, 633 = 1874, 638) which has puzzled me for a long time. In order to explain Herodotus' account (3, 98) of clothes and canoes made of a giant reed, he refers to the *kana* reed of the lower Indus described by early 19th-century travellers. From Ball 1885, 335, I learn that this plant is Roxburgh's *Typha elephantina* (and still known under this name) which is actually used for huts, mats, baskets and the like, but is certainly not thick enough to provide the canoes made of one internodium (and of course a *Typha*, bulrush, has no nodes). This must thus belong among the fabulous accounts of giant bamboos quoted above.

¹⁰⁷ For rice in India see Watt s.v. *Oryza sativa*, Hehn 1911, 502ff., and especially Kumar 1988 (with further references), for the history of western knowledge of rice e.g. Bretzl 1903, 200ff., Yule & Burnell s.v. *Rice*, Schoff 1912, 176, Stadler 1920, Bloch 1925 (important on the name), Marr 1972, 48f., André & Filliozat 1986, 363, note 175, Southworth 1992, 82.

¹⁰⁸ Kumar 1988, 56ff. mentions only such Indus sites as are found within the boundaries of the present-day country of India. For Neolithic-Chalcolithic evidence of cultivated rice from India see Kumar 1988, 58ff., for early historical levels *ibid.* 79ff.

¹⁰⁹ Literary evidence from the Vedas to classical Sanskrit literature is summarized in Kumar 1988, 9ff. (see also 48ff. on inscriptional evidence).

¹¹⁰ McCrindle 1901, 24 (quoting Hewitt). That this variation is old can be seen in the elaborate classification in Caraka, *Sūtrasth.* 27, 8ff. and Suśruta, *Sūtrasth.* 46, 4ff.

In the West, however, there is only one uncertain reference before Alexander, in a fragment of Sophocles.¹¹¹ An Indian crop (or, rather, a pulse) mentioned in Herodotus 3, 100, cannot be connected with rice with any certainty,¹¹² but following Alexander's campaign and its reports rice soon became well known.

It is convenient again to begin with Theophrastus.¹¹³ In the *Historia plantarum* 4, 4, 10, he gave, as usual, a good botanical description of rice. It grows in water and has no ears, but resembles millet. It is also compared to rice-wheat. From Eratosthenes we have only the statement that rice was mainly cultivated during the rainy season.¹¹⁴ According to Strabo,¹¹⁵ Aristobulus gave an account of the manner of its cultivation. It grows in standing water to a height of four cubits and has many ears (!). To this Strabo adds from the otherwise completely unknown Megillus that it is sown and planted before the rainy season and watered from tanks. Diodorus (2, 36, 3f.) briefly listed rice among Indian summer crops.

If the last part of Aristobulus' fragment really hails from him and is not Strabo's additional information, it seems that rice, after all, was not quite so exotic to the Greeks arriving in India. Here it is claimed that rice also grows in Bactria, Susis, Babylonia, and even in lower Syria. In his account of the history of Alexander's successors, Diodorus (19, 13, 6) also mentions rice in Susiana.

With Megasthenes we return to original information culled in India. He knew that Indians make a beverage of rice, instead of barley, and that rice is the staple food in India.¹¹⁶ In another fragment he explained that an Indian dinner consists of boiled rice and various curries.¹¹⁷ Aelianus (*N. An.* 13, 7) had heard that war elephants were given "wine" prepared of rice or cane.

Dioscurides (2, 95) included rice among exotic medicines. Pliny rightly knew (perhaps from Megasthenes) that rice was the favourite food in India and was also used for a beverage, but his botanical description is rather fantastic.¹¹⁸ Stadler (1920, 518) compared it to an orchid. The (supposedly medical) rice beverage was also familiar to Horace.¹¹⁹

¹¹¹ ὀρίνδον δ' ἄρτον in Sophocles F 609 [Radt = 552 Nauck] in Athenaeus. Cf. Bloch 1925, 45.

¹¹² Lassen 1874, 640 sees in it a kind of wild *Panicum*; it has been accepted as rice by e.g. Stadler 1920, 517, and Ziegler (*KP* s.v. *Reis*). I have discussed these early references to rice in Karttunen 1989a, 52 & 87.

¹¹³ A conjectural occurrence in Aristoteles *H. An.* 8, 25 is rejected by Stadler 1920, 518.

¹¹⁴ Eratosthenes in Strabo 15, 1, 13.

¹¹⁵ Aristobulus F 35 in Strabo 15, 1, 18. Cf. Pearson 1960, 174.

¹¹⁶ Megasthenes F 32 in Strabo 15, 1, 53. In F 33 (Strabo 15, 1 60) he mentions rice and barley-groats offered to physicians. Rice porridge was also mentioned by Theophrastus in his account.

¹¹⁷ F 2 in Athenaeus 4, 153d.

¹¹⁸ Pliny, *N. H.* 18, 13, 71 *maxume quidem oryza gaudent, ex qua tisanam conficiunt quam reliqui mortales ex hordeo. oryzae folia carnosa, porro similia sed latiora, altitudo cubitalis, flos purpureus, radix gemmeae (v.l. geminae) rotunditatis.*

¹¹⁹ Horace, *Sat.* 2, 3, 155.

In the Roman period rice was an item of international trade, mentioned several times in the *Periplus*. It was exported from Barygaza and could be obtained from middlemen in East African and Soqotran marts (*Periplus* 14 and 31). It was produced in Gedrosia and in the interior beyond Barygaza (37 & 41). In an account that is otherwise not too convincing (mentioning gold, silver and other metals) Ptolemy (7, 4, 1) counted rice among the products of Taprobane.

Though many of the authors quoted above well knew that rice was a staple food in India, in the West it seems to have been used only as a medicine. Cultivation of rice was introduced in Southern Europe only in the Middle Ages.¹²⁰

Beside rice the grasses known as **millet**s have always occupied an important place in South Asian agriculture. In modern India (in the early 1960s) they make up nearly 45 % of the acreage planted for food grains (Weber 1990, 333). Archaeobotany has established that most of the various millets grown today in India were already found in the second millennium B.C., viz. common millet (*Panicum miliaceum* [*P. miliarium*]), little millet (*Panicum sumatrense* [*P. miliare*]), Italian millet (*Setaria italica*), finger millet (*Eleusine coracana*) and jowar or large millet (*Sorghum vulgare*).¹²¹ Kodo millet (*Paspalum scrobiculatum*) and saw millet (*Echinochloa colonum*) are rare, but not non-existent in prehistoric levels.¹²²

With such a variety, it is no wonder that a clear distinction cannot always be made in literary sources. In Greek κέγχρος and ἔλυμος mainly refer to *Panicum*, while μελίνη or μέλινος seem often to refer to *Setaria* and *Sorghum* as well.¹²³ For India, an attempt to define the various OIA and MIA names of crops and pulses has been made by Johnson (1941). According to her, *priyaṅgu* and *kaṅgu* refer thus to *Setaria*, *kodrava* to *Paspalum*, *yavanāla* to *Sorghum*, and *cīna* to *Panicum miliaceum*, while *śyāmaka* is the inferior *Panicum frumentaceum*. For *Eleusine* she has found no name. Millets are also listed in Caraka (*Sūtrasth.* 27, 16–18)¹²⁴ and Suśruta (*Sūtrasth.* 46, 21ff.) among Indian crops. They are generally known as *kudhanya*, inferior crops (in comparison to rice).

As a large proportion of millets (*Panicum*, *Setaria* and *Sorghum*) was common to India and the West, we have just passing mentions of Indian millet culture in classical sources and no means beyond the name for the identification. In addition to millet, the historians of Alexander also mentioned a crop they called **bosmoron** (βόσμορον). Erato-

¹²⁰ Stadler 1920, 518. As the only reference to rice consumed as food in the West he quotes the late cookery book of Apicius.

¹²¹ The English name sorghum is not used in South Asia. Finds like these supersede the earlier idea (e.g. in Watt s.v. *Sorghum vulgare*) of sorghum being a rather modern introduction in South Asia. Its Indian name (OIA *yavanāla*) is probably not related to *yavana* 'Greek', but to *yava* 'barley'. See further Yule & Burnell s.v. *jowaur*.

¹²² On the prehistoric data see Weber 1990. For the millets grown in India at the end of the 19th century see Watt ss.vv. *Eleusine*, *Panicum* (with *Echinochloa*), *Paspalum*, *Setaria*, and *Sorghum*.

¹²³ Moritz, *KIP* s.v. Hirse. Less convincingly, Bretzl 1903, 202 identified ἔλυμος and μέλινος as *Panicum miliaceum*, and κέγχρος as *Setaria italica*.

¹²⁴ The translators here identify *śyāmaka* as *Setaria italica* and *koradūṣa* as *Paspalum scrobiculatum*, but give no explanation for the remaining sixteen OIA names.

sthenes knew that millet (κέγγρος) and bosmoron, like rice, sesame and flax, were cultivated during the rainy season.¹²⁵ Onesicritus says that bosmoron is smaller than wheat and grows in lands between rivers. After threshing it is immediately roasted in order to prevent unroasted seed from being removed and exported.¹²⁶

Diodorus 2, 36, twice lists rice, "bosporos" (βόσπορος) and millet (κέγγρος) as Indian crops (in the second passage also sesame). Millet, he says, is irrigated from rivers.¹²⁷ As there are no botanical details, the bosmoron/bosporus evades identification. It might be a kind of millet or one of the many different kinds of rice.¹²⁸ Theophrastus' "wild barley", which makes sweet bread and good porridge, is identified by Hort as *Sorghum halepense*.¹²⁹ According to Watt, this variety is poor food and mainly used as fodder. This was perhaps in the mind of Hort as Theophrastus told that Macedonian horses learned to consume it. Pliny mentions a black Indian millet (*milium*) recently introduced into Italy.¹³⁰

Wheat (*Triticum vulgare* and related ssp., OIA *godhūma*) and **barley** (*Hordeum vulgare*, OIA *yava*) are both well known in India,¹³¹ and in the Northwest their history extends far back to prehistory. Both are also amply attested in Indian literature.¹³² For Westerners they were understandably no cause of wonder and therefore only occasionally mentioned in accounts of agriculture. Theophrastus (*H. Pl.* 4, 4, 9) briefly mentioned both, and in addition a kind of wild barley, mentioned above under millets. Cultivated and wild barley in India in Pliny, *N. H.* 18, 13, 71 seems to be derived from this. Eratosthenes (in Strabo 15, 1, 13) knew that in India wheat (πυροί), barley (κριθαί) and pulses were cultivated in the winter, and Nearchus¹³³ found these two crops cultivated on the Gedrosian coast. According to Megasthenes (F 32), rice was used in India for beverages instead of barley, but both were used as food (F 33). Wheat is also briefly mentioned by Diodorus as one of the crops sown in the winter.¹³⁴ The *Periplus* (14 & 32) mentions Indian wheat twice.

¹²⁵ Eratosthenes in Strabo 15, 1, 13.

¹²⁶ Onesicritus F 15 in Strabo 15, 1, 18.

¹²⁷ Diodorus 2, 36, 3f. According to Weber 1990, 339, the harvesting season for all millets is the summer, and most of them need three to five months to mature.

¹²⁸ Pédech 1984, 149 identifies it as finger millet (*Eleusine coracana*).

¹²⁹ *H. Pl.* 4, 4, 9 γένος ἀγρίων κριθῶν.

¹³⁰ Pliny, *N. H.* 18, 10, 55, Warmington 1928 (1974), 219, and André & Filliozat 1986, 362f. note 174 hesitatingly suggest sorghum. But though it is really thought to be originally an African crop, its early occurrence in India mentioned above seems to be enough to settle their doubts.

¹³¹ For Indian account, see Caraka *Sūtrasth.* 27, 19 on barley and 21f. on wheat.

¹³² It is here not so important that in early Veda *yava* perhaps meant not only barley, but grain in general.

¹³³ F 1 in Arrianus, *Ind.* 28, 8.

¹³⁴ Twice, in 2, 36, 3 & 4. According to Lassen 1858, 309, by barley is meant sorghum, but this is an unnecessary conclusion. See Schoff 1912, 177f.

An ancient crop of South Asia early known in the West, too, is **sesame** (σήσαμος, -μων; *Sesamum orientale* [*S. indicum*]; OIA *tila*, with *taila* for its oil).¹³⁵ Sesame seeds have been found at Harappa, and ever since the plant has had an important place both as food and as a component of religious ceremonies in India.¹³⁶ It was early introduced into Mesopotamia.¹³⁷ Mesopotamian sesame was known to Herodotus (1, 193) and its Greek name is amply attested before Alexander's campaign.¹³⁸ Sesame oil used in India is briefly mentioned by Ctesias (F 45, 25).

Though sesame was thus already known from the Near East, its importance in Indian agriculture was duly noted by Alexander's companions. Theophrastus (*H. Pl.* 8, 5, 1) knew that the kind with white seeds is the best in India.¹³⁹ Eratosthenes (Strabo 15, 1, 13) counted it among the crops cultivated during the rainy season, and Diodorus 2, 36, 4, mentioned sesame among the summer crops of India. According to Watt, at the end of the 19th century sesame was cultivated as a winter crop in tropical parts of India, but in the north during the summer. The ascetics of Taxila in Aristobulus used sesame oil and made cakes of honey and sesame.¹⁴⁰ Pliny knew that sesame comes from India, where it is used for oil, and in another passage he counts among the Indian sources of oil chestnuts (*e castaneis*), sesame, rice and, in Gedrosia, fish oil.¹⁴¹ The *Periplus* 41 mentions sesame oil exported from Barygaza, and some of it was sold in ports of the southern Red Sea (*ibid.* 14 & 32).

Sesame and especially its oil was used as medicine both in India and in the West.¹⁴² The uses, however, are not similar enough for a common origin. While the Greek doctors prescribed it, for instance, in ear inflammations, eye diseases, burns and snake-bites, the

¹³⁵ See e.g. Watt s.v. *Sesamum indicum*; Schoff 1912, 176f., Laufer 1919, 288ff., Steier 1923; Warmington 1928 (1974), 206, Mehta, 1967, and Miller 1969, 87. Przyluski & Regamey 1936, 707f., contain some etymological considerations. While they claim that Watt accepted de Candolle's hypothesis of the Indonesian origin of the plant, which they themselves hesitatingly accept, Watt has actually shown that de Candolle's grounds for this were quite insufficient (cf. Laufer 1919, 290).

¹³⁶ Southworth 1992, 83, see also Ratnagar 1981, 52 and 80. In Indian literature, sesame is often mentioned, beginning with the *Atharvaveda*. For early references see Macdonell & Keith s.v. *tila*. In later times *taila*, a derivation of *tila* 'sesame', has been used as a general name for all kinds of 'oil'.

¹³⁷ According to Tikkanen 1987, 282 Sumerian *ilu/īli*, Akkadian *ellu, ūlu* 'sesamum oil' could be derived from Dravidian **e(l)lu* 'Sesamum indicum'. Before the Indus civilization was discovered, it was often supposed that sesame was introduced from Mesopotamia into India (so Watt).

¹³⁸ See references in Liddell & Scott & Jones. Here we restrict our discussion to instances connected with India.

¹³⁹ In Suśruta the white-seeded variety holds the middle position after the black-seeded, but here their medical value was appreciated (*Sūtrasth.* 46, 40 *tilaṣu sarveṣv asitaḥ pradhāno madhyaḥ sito hīnatarās tathā 'nye*).

¹⁴⁰ Aristobulus F 17a in Strabo 15, 1, 62.

¹⁴¹ Pliny, *N. H.* 18, 22, 96 *sesima ab Indis venit; ex ea et oleum faciunt*. 15, 7, 28 on oil-plants in India. In 6, 32, 161 he refers to sesame oil in Arabia.

¹⁴² For India, see e.g. Caraka, *Sūtrasth.* 27, 30 & 286–289 (on sesame oil) and Suśruta, *Sūtrasth.* 46, 39f.; for the West, Lassen 1858, 309 (with several references to Pliny and medical authors).

Āyurvedic authorities set great value on it as being healthy for hair, skin, teeth and digestion, as a demulcent and tonic, conducive to general health.

As Ctesias (F 45, 25) and Pliny (*N. H.* 15, 7, 28 *e castaneis*) in the above-mentioned passages both mention **nut oil** together with sesame oil among products used in India, perhaps these two belong together. Such oil as well as Pliny's rice oil remain without confirmation from the Indian side.¹⁴³

A great variety of **pulses** have been cultivated in India since early times. They include e.g. the chick-pea or gram (*Cicer arietinum*, OIA *caṅaka*), the horse gram (*Dolichos biflorus*, OIA *kulatha*), the mung bean or green gram (*Vigna mungo* [*Phaseolus mungo*], OIA *mudga*), and the urd or black gram (*Vigna radiata* [*Phaseolus radiatus*], OIA *māṣa*).¹⁴⁴ Of these the first was common in the West, too, known in Greek as ἐρέβινθος, Latin *cicer*, but the rest are peculiar to India. In Western sources we do not hear much of them. Theophrastus, again, is most exact, mentioning both the chick-pea and lentil and other kinds unknown to the Greeks.¹⁴⁵ According to Eratosthenes (Strabo 15, 1, 13), various pulses and vegetables (ὄσπρια καὶ ἄλλοι ἐδώδιμοι) formed a part of the winter crop in India, while Diodorus (2, 36, 3) briefly mentioned many different pulses of India. The "Egyptian beans", however, seen by Alexander's men on the banks of the Acesines were an entirely different plant.¹⁴⁶

Indian origin has been also suggested for the **cucumber, melon and calebas** (the pumpkin probably being of American origin),¹⁴⁷ but like sesame, they were known long before Alexander and their supposed Indian origin had been forgotten.¹⁴⁸ Referring to Euthydemus of Athens, a botanical author, and to Menodorus, Athenaeus claims that κολοκύνθη was also called Indian σικύα because of its Indian origin.¹⁴⁹

¹⁴³ André & Filliozat 1986, 362, note 170.

¹⁴⁴ See Watt's articles under these (Latin) names, Yule & Burnell s.v. *moong*, for OIA names also Johnson 1941. The history of the chick-pea in India was discussed by Gode in several articles republished in Gode 1961. In Indian literature various pulses are listed in Caraka, *Sūtrasth.* 27, 23ff., and Suśruta, *Sūtrasth.* 46, 27ff.

¹⁴⁵ ἐρέβινθος μὲν γὰρ καὶ φακὸς καὶ τὰλλα τὰ παρ' ἡμῶν οὐκ ἔστιν in *H. Pl.* 4, 4, 9. In *H. Pl.* 4, 4, 10, he mentioned a kind of lentil resembling fenugreek, tentatively identified by Hort as *Phaseolus mungo*.

¹⁴⁶ κύαμος Αἰγυπτίους in Nearchus F 20 in Strabo 15, 1, 25, without reference in Arrianus, *Anab.* 6, 1, 2. Bretzl 1903, 203 identified this as *Nelumbium speciosum*, now called *Nelumbo nucifera*. It was described in connection with Egypt by Herodotus 2, 92 and Theophrastus, *H. Pl.* 4, 8. See Bosworth 1995, 34f.

¹⁴⁷ The names are somewhat difficult to define, but it seems possible that the cucumber is σίκυος or σικυός, Latin *cucumis*, the watermelon *πέπων/pepo*, the melon *σικύα/melopepo*, and the bottle-gourd *κολοκύνθη*, -τη, *κολόκυνθα*, -τα/*cucurbita* (Latin names in Pliny, according to *RE*). For the apparent confusion in Greek see the passage of Athenaeus mentioned below and the notes in its Loeb translation.

¹⁴⁸ Hehn 1911, 314ff.; *RE* s.v. Gurke.

¹⁴⁹ *Deipnos.* 2, 58. Wecker (1916, 1302) connected this and Galenus *De al. fac.* 1, 317 with Alexander's campaigns.

The fame of India as the country of spices and medicines, already mentioned by Ctesias,¹⁵⁰ was now established and has endured ever since. Notwithstanding the clear idealization seen in Onesicritus' account, dealing especially with the land of Musicanus,¹⁵¹ this was also the plain truth. But the full extent of this truth was ascertained only slowly. Most of the spices grew in distant South India or even in countries beyond. From Pliny (*N. H.* 16, 59, 135) we know that Seleucus (we do not know which of them) attempted to cultivate Indian drugs and spices in Arabia but without success.

India was famous for its medicinal plants, aromatics, and plant dyes.¹⁵² Theophrastus knew that most aromatics came (by sea!) from India and Arabia.¹⁵³ However, quite a number of spices and drugs are mentioned only by Pliny and other (especially medical) authors of the Roman Imperial period. Therefore it can be thought that they perhaps arrived in the West only with the flourishing sea-trade of this period (cf. VII.2 below). But we can never be quite sure. Similar sources from the Hellenistic period are no longer preserved, and as these products were mostly light and easy to carry, they might have arrived earlier, too. Therefore I have decided to include them all here, and my next study will contain no chapter on botany. Many spices were also used as medicines, and there was no clear differentiation between them. After those certainly known in the early period, the rest are discussed in alphabetical order.

Cinnamon and **cassia**, the two related spices obtained from *Cinnamomun verum* (*C. zeylanicum*) and *Cinnamomum aromaticum* (*C. cassia*), were known very early,¹⁵⁴ but it was never fully understood in the West that they were Indian products. Like Herodotus, Theophrastus, too, thought them to be products of Arabia.¹⁵⁵ According to Strabo, Arabia, Ethiopia and India all produce cinnamon, and in another passage he located the cultivation of cassia in Arabia and, "according to some, also in India".¹⁵⁶ In 16, 4, 19 he quoted Artemidorus to the effect that the Sabaeans use cinnamon and cassia as sticks and firewood because of their abundance.¹⁵⁷ Pliny often claims that many spices and aromatics were common to India and Arabia.¹⁵⁸ Dioscurides knew only Arabian cinnamon (1, 13) and cassia (1, 14 and 1, 61).

¹⁵⁰ Ctesias F 451 in Aelianus *N. An.* 4, 36.

¹⁵¹ Onesicritus F 22 in Strabo 15, 1, 22. Cf. Brown 1949, 59.

¹⁵² See Strabo 15, 1, 22; Pliny, *N. H.* 24, 1, 5, and Philo of Alexandria, *De somniis* 2, 59 on medicines, Pliny 35, 32, 50 on fine Indian dyes. An important discussion, though often rather daring with hypotheses, is Miller 1969.

¹⁵³ *H. Pl.* 9, 7, 2 τὰ ἀρώματα... τὰ μὲν ἐξ Ἰνδῶν κομίζεται κακείθεν ἐπὶ θάλατταν, τὰ δ' ἐξ Ἀραβίας (also briefly in 4, 4, 14).

¹⁵⁴ Mentioned in the Bible (*Ex.* 30:23, *Prov.* 7:17, *Cant.* 4:14) and by Sappho F 44 and Herodotus 3, 111. This and other early evidence has been discussed in Karttunen 1989a, 20ff. On cassia and cinnamon in general see also Warmington 1928 (1974), 185ff., and Miller 1969, 42ff. & 74ff.

¹⁵⁵ *H. Pl.* 9, 4, 2; 9, 5, 1-3; and 9, 7, 2.

¹⁵⁶ Strabo 15, 1, 22 (Onesicritus F 22) and 16, 4, 25.

¹⁵⁷ A comparison to the similar account in Photius shows that the ultimate source was Agatharchides, and the passages of Photius and Strabo are accepted as his F 103ab. In a note *ad l.* Burstein 1989 says that in the case of frankincense this was actually true.

¹⁵⁸ E.g. 12, 36, 72. His main account of cinnamon and cassia is found in 12, 42, 85 - 12, 44, 98.

Real cinnamon could hardly ever have grown in Yemen or Somalia. Both are dry lands entirely unsuitable for it.¹⁵⁹ Both cinnamon and cassia, however, came to the West by the Red Sea route, and, although not cultivated, they were often carried by Indian and Arabian vessels to the marts of South Arabia and Northeast Africa, and bought only there by Greek merchants.¹⁶⁰

However, many other spices were brought directly from India and were also known to be Indian. The most important among them was undoubtedly **pepper**. Pepper (πέπερι, *piper*; *Piper nigrum*, and probably also *Piper longum*; OIA *marica* and *pippalī*)¹⁶¹ seems to have been imported to Greece in small quantities (and through middlemen) already before Alexander. It is attested by its Indian name¹⁶² in the Hippocratic corpus, and called the Indian or Median medicine.¹⁶³ In a passage of great significance it is styled the “Indian medicine, called by Persians pepper” (τὸ Ἰνδικόν, ὃ καλέουσιν οἱ Πέρσαι πέπερι). The reference to Persia seems to bear out the hypothesis that our passage refers to times before Alexander. Hippocrates himself belongs to the fifth century B.C., but the *Hippocratic Corpus* transmitted under his name contains works of different ages. Of some 130 texts ascribed to Hippocrates, 58 are accepted as part of this Corpus, because of their good manuscript tradition and Ionic dialect. But even these include works of the Hellenistic period.¹⁶⁴ The use of pepper to treat eye diseases is also attested in Indian medical

¹⁵⁹ One attempt to explain this has been to claim that it was not the same spices that were meant by the term as nowadays (e.g. by Schoff 1920, 260ff., and recently De Romanis, *forthcoming*).

¹⁶⁰ See the *Periplus* 10 and Schoff 1912, 82ff. & 87.

¹⁶¹ Watt s.v. *Piper* (264f. on the early pepper trade), Yule & Burnell s.v. *pepper*; on pepper in the West e.g. Schoff 1912, 213ff., Warmington 1928 (1974), 181ff., Steier 1938, and Miller 1969, 80ff.

¹⁶² Greek πέπερι probably from MIA equivalent to OIA *pippalī* (this refers to *Piper longum*, while *Piper nigrum* was known as *marica*) perhaps through Iranian (with *r*). See Karttunen 1989a, 88, and Mayrhofer, *EWA* s. v. Filliozat 1964, 254 and André & Filliozat 1986, 359f., note 153 suggest that both kinds of pepper are meant in the *Hippocratic Corpus*, *Piper nigrum* when it is especially described as round, *Piper longum* when not. Later on, *Piper longum* became obsolete in the West, while *Piper nigrum* was constantly imported from India.

¹⁶³ I list here all references in the *Corpus* according to the *Concordantia in corpus Hippocraticum*:
 – *De victu acutorum (spuria)*: 34 Pepper (in a receipt).
 – *Epidemiarum libri VII*: 4, 40 Pepper; 5, 67 Musk and pepper in a receipt; 6, 13 Pepper (in a receipt); 7, 64 Musk and pepper in a receipt.
 – *De morbis (Περὶ νοσῶν)*: 3, 12 Pepper (in a receipt); 3, 16, lines 82 & 93 Pepper twice in receipts.
 – *De morbis mulierum (Περὶ γυναικείων)*: 1, 34 Pepper (in a receipt); 1, 37 Pepper (in a receipt); 1, 81 An Indian eye medicine called pepper used in a purificative medicine; 1, 84, lines 21 & 40 Pepper corns for medicines: five corns; four small or ten large corns; 2, 158 An Indian medicine (pepper) mixed in human milk and used as a mollifier; 2, 185 A mouth-wash for bad breath is called the Indian mixture; 2, 201 Pepper (in a receipt); 2, 205, lines 13 & 31 Indian medicine, by the Persians called pepper, twice mentioned.
 – *De natura muliebri (Περὶ γυναικείης φύσεως)*: 32, l. 172 A Median eye medicine called Pepper.

¹⁶⁴ See Lesky 1971, 548ff. This chronological difficulty with the Hippocratic texts has been pointed out in a review of my earlier book (De Jong 1992), but for reasons stated here I still date the introduction of pepper in Greece to before the time of Alexander.

sources.¹⁶⁵ Pepper is also mentioned by Antiphanes of Athens in the 4th century (still before Alexander).

Theophrastus gave his account of pepper, not among Indian plants, but in his chapter on medical plants, in *H. Pl.* 9, 20, 1. He described two kinds of *πέπερι*, one a round reddish berry and the other elongated and black. These have often been identified as *Piper nigrum* and *Piper longum*. The former, however, is said to resemble bitter vetch (*όροβοσ*) and have a case (*κέλυφος*) and flesh like bay (*δάφνη*). Bitter vetch and case led Steier (1938) to think of a pulse or another plant with pods and to suggest the so-called African pepper (*Xylophia aethiopica*), the seeds of which are contained in a pod. "Libyan pepper" is actually mentioned in a few later sources. For a rare product like the real pepper a substitute is very possible, and still in the times of Pliny and Dioscurides the Greeks had no clear idea of the pepper plant. This leaves us with Theophrastus' elongated variety, which I think really denoted *Piper longum*.

Theophrastus' account is quoted by Athenaeus 2, 66ef with a few additions. In these accounts the country of origin was not mentioned, and more particularly they do not connect pepper with observations made during Alexander's campaign. Pepper is also never mentioned in fragments of histories of Alexander. It was known, however, as a medicine called by a name derived from India and in one source specified as coming from India and even used in the same way as in India. Although it might also have been substituted by an African product, I see no way to deny an early import of real pepper from India to Greece.¹⁶⁶

Pliny gave a confused account, perhaps partly influenced by Theophrastus.¹⁶⁷ The Indian pepper tree is here said to resemble a juniper, but the seeds are contained in small pods like kidney-beans (*parvulis siliquis, quales in phasiolis videmus*). These pods, when collected unripe and dried in the sun, give long pepper (*piper longum*), when ripe in pods, white pepper (*candidum piper*), and black pepper (*nigrum*) is the white dried in the sun. He goes on to call empty husks by the name *bregma*, which should mean 'dead' in the Indian language. It grows on the southern slopes of the Caucasus. One error, at least, Pliny was able to correct. This was the assertion that ginger is a different plant and not the root of pepper as had been claimed by some unnamed authority (12, 14, 28). He also stated the prices of his three kinds of pepper (long 15, white 7 and black 4 Denarii a pound) and wonders how such a pungent product could have become so fashionable (12, 14, 29). In his account it is repeatedly stated that India was the country of origin of peppers. Dioscurides 2, 159 is very close to Pliny, mentioning pods and different varieties (including *βρέγμα*). In modern usage black pepper means unripe berries of the *Piper nigrum*, while white peppers contain ripe berries from which the dark outer layer is removed.

¹⁶⁵ Filliozat 1964, 253ff. (with references). Both kinds briefly in Caraka, *Sūtrasth.* 27, 297f.

¹⁶⁶ This seems to be done by Tarn (1951, 370f.), who also ignores the Hippocratic evidence. On his African pepper see Steier 1938, 1422.

¹⁶⁷ Pliny, *N. H.* 12, 14, 26f. (and 12, 15, 30f. on a thorn-bush resembling pepper).

For a long time, pepper was only a rare and exotic medicine. As a kitchen spice it became known only in the Roman Imperial period. Plutarch (*Mor.* 733E) could still claim that elder people generally disliked its taste. As a spice it is mentioned e.g. by Pliny, Athenaeus, Petronius, and Martialis.¹⁶⁸

A clear reference to *Piper longum* seems to be the “long pepper” (πέπερι μακρόν) mentioned in the *Periplus* among products exported from Barygaza, while plain pepper comes from South Indian marts.¹⁶⁹ The latter passage thus rightly locates pepper cultivation in Kerala, a fact also mentioned by Pliny (*N. H.* 6, 26, 105).

In the literature of late antiquity a legend arose about Indian pepper forests guarded by snakes, which were driven away by fire, which also burns originally white pepper black.¹⁷⁰ But this as well as Cosmas’ account of pepper goes well beyond the scope of our present study.

Indian origin has been also suggested for **black mustard** (σίναπι; *Brassica nigra* [*Sinapis nigra*], OIA *sarṣapa*),¹⁷¹ but according to Watt, this plant is commonly found wild in Southern Europe. As early as the fifth century B.C. mustard was mentioned by Aristophanes (*Eq.* 631 *ῥᾶπυ*, then described by Theophrastus), but this seems to refer to white mustard (*Brassica hirta* [*Br. alba*]), which is a western plant unknown in India. It is possible that *σίναπι*, too, though only attested from the Hellenistic period on, but apparently related to *ῥᾶπυ*, refers to this plant. In this case there perhaps are no classical references to black mustard. In India the word *sarṣapa* is attested as early as the Vedic *Brāhmaṇas*. Przulski and Regamey (1936) suggest an Austro-Asiatic etymology for both Greek (and Latin) and OIA names, but the case is far from confirmed, and in any case I see no reason to believe in the introduction of either black or white mustard in either way during our period.

Most spices were produced only in South India (or even in Southeast Asia), and therefore remained unmentioned in the literature dealing with Alexander’s campaigns. They then became known as trade articles, and Western authors often had no idea of the plant itself. This is true for cassia, cinnamon and pepper, discussed above, and now it is time briefly to discuss the rest of them.

The names **agallochum** (ἀγάλοχον) and **aloe** (ἀλόη) refer to two different products, the Indian wood of *Excoecaria agallocha* (so-called eagle-wood, also known as *Aloëxylon agallochum* and *Aquilaria agallocha*, OIA *agaru*, *aguru*, MIA *agalu*) and the

¹⁶⁸ A great number of references in Steier 1938, 1424. For late and mediaeval sources see Aalto 1949.

¹⁶⁹ Long pepper in the *Periplus* 49. Thus identified by McCridle 1879, 27f. and Schoff 1912, 194f. Pepper in the *Periplus* 56

¹⁷⁰ In Pseudo-Palladius (1, 7, in the account of the Theban Scholasticus), Isidorus et al. Among these, Ioannes Lydus, *De mens.* 4, 14 is given by Jacoby as an uncertain fragment (F 63) of Ctesias, but soon it was shown by Diller (1969) that it comes in fact from Pseudo-Palladius. We can here see the old motif of wild, often fabulous beasts guarding a treasure, and the great dangers involved in winning it. The gold-guarding ants and griffins and the giant birds making their nests of cinnamon can be pointed out as parallels. See also Karttunen 1988.

¹⁷¹ Watt ss.vv. *Brassica alba* and *Brassica nigra*.

Arabian leaf of *Aloe vera* (*A. barbadensis*) and *Aloe perryi*, also called medicinal aloe.¹⁷² The name aloe, however, was occasionally used for both. In fact, the very first attested occurrence of the word aloe, in the Old Testament (Graecized Hebrew form ἀλώθ in the LXX) refers to agallochum. The word agallochum is attested from Dioscurides (1, 22, wood from India and Arabia) on. As to ἀλόη, Dioscurides (3, 22) described the aloe leaf, but claimed that it grows both in India and Arabia. Pliny, *N. H.* 27, 5, 14 also described the leaf, asserting that it came from India and Asia Minor. In Ptolemy (7, 1, 86) Ἀλόη is a town in South India. The question of aloes has been dealt with by Filliozat (1958) and Greppin (1988). In his article Filliozat mainly deals with the use of the inner bark of agallochum, OIA *agaru*, *aguru*, as a writing material in India instead of the common palm-leaf. The Indian name is first attested in the Jaina MIA *Sūyagadaṅga*, in the Pāli *Vimānavatthu* and *Jātaka*, and in Sanskrit medical treatises (Caraka and Suśruta). He derives the classical agallochum from the Indian name, which has also been borrowed by many SEA languages, and supposes that the Biblical 'ahâlîm' *ahâlôt* is perhaps the same. Greppin derives Greek, Semitic (Hebrew 'ahâlîm, 'ahâlôt, Syriac 'alwây, 'alwâ' etc.) and OIA words from a Dravidian original (Tamil *akil*).

This Hebrew word, *'âhâl, 'ahâlîm as masculine plural and 'ahâlôt as feminine plural became ἀλώθ in the LXX.¹⁷³ This was merely a rendering of a Hebrew word not understood by the translators. Greppin (1988, 39) supposes that Greek ἀλόη, too, was originally a name for agallochum and explains by a semantic shift the fact that in most instances it was used for the aloe leaf, but it seems possible to me that ἀλόη was always the name of the leaf, and that ἀλώθ was wrongly identified with it.

Amomum (ἄμωμον) and **amomis** (ἀμωμίζ) are described as Indian products by Pliny (*N. H.* 12, 28, 48f.). In a rather long account of the former he describes its appearance, various kinds (of different colours), and their prices. He claims that though the best quality (Rackham's 'clustered amomum', *amomi uva*) comes from India, an inferior kind is also obtained from Armenia, Media and Pontus. Dioscurides (1, 15) also mentions amomum of Armenia, Media and Pontus. In another passage Pliny (16, 59, 135) explains that amomum and spikenard do not thrive elsewhere than in India, Seleucus having made an unsuccessful attempt to introduce their cultivation. Of amomis Pliny briefly stated that it is either unripe amomum or a related plant. Dioscurides (1, 15) knew that it grows in Armenia and is used as a substitute for real amomum.

Amomum is not often mentioned in literature, but it was known long before the first century A.D. Theophrastus in *H. Pl.* 9, 7, 2 claims that amomum and cardamomum come, according to some, from Media, according to others from India. This seems to be enough

¹⁷² Watt ss.vv. *Aloe* and *Aquilaria*, Yule & Burnell ss.vv. *aloe* and *eagle-wood*, Laufer 1919, 480f., Schoff 1922a, Warmington 1928 (1974), 202 (aloes) & 215f. (agallochum), Filliozat 1958, Miller 1969, 34ff. & 65ff., Marr 1972, 50, and Greppin 1988. According to Greppin (1988, 43, note 1) *Aloe perryi* was the original aloe leaf. For *aguru*, see also *KA* 2, 11, 57–60.

¹⁷³ According to Greppin 1988, 39 (and Hebrew Bible lexicons) 'ahâlîm is attested in *Prov.* 7, 17 and *Num.* 24, 6, 'ahâlôt in *Ps.* 45, 8 and *Cant.* 4, 14, always in connection with trees or aromatics. The Greek word was used in the latter passage, others were rendered with different Greek words, all meaning something else.

to show that the two were considered different species. Some have identified amomum as the large or Nepal cardamon (*Amomum aromaticum* [*A. subulatum*]) and cardamon as the lesser or Malabar cardamon (*Elettaria cardamomum*),¹⁷⁴ while others reject both, accepting Pliny's and Dioscurides' testimony that they also grow in Armenia and Pontus.¹⁷⁵ This is, however, easy to explain away with many substitutes used to adulterate rare medicines coming from far away, and accept real Indian products known and sold in the West as the two kinds of cardamon. In India the Nepali cardamon used to be a cheaper substitute for the real cardamon.¹⁷⁶

There are several kinds of the gum resin called **bdellium** (βδέλλιον), coming from different species of the genus *Commiphora* (also called *Balsamodendron*) growing in dry regions from northwestern South Asia to Africa. Thus *Commiphora kataf* comes from East Africa, and *C. mukul* from Northwest India.¹⁷⁷ Their relatives contain such famous Near Eastern aromatics as myrrh (*C. myrrha*) and balsam (*C. opobalsamum*). In India bdellium (OIA *guggulu*) was known since the *Atharvaveda*; it has also been suggested that its several kinds could have early included bdellium imported from the West.¹⁷⁸ For Greeks Arabia was the main source of bdellium; even its name is probably of Semitic origin. Bdellium of Arabia is mentioned e.g. in Dioscurides 1, 67. But this was not the only source. In several cases we are probably dealing with *Commiphora mukul*.

Thus it has been reasonably suggested that the Gedrosian myrrh (σμύρνα) described by Aristobulus actually refers to *Commiphora mukul*.¹⁷⁹ The Phoenician traders who followed the army collected the gum which was abundantly secreted from large trunks. Without indicating his source Strabo, too, mentions these Gedrosian myrrhs (15, 2, 3), and the same seems to be also the thorny (ἄκανθα) Indian shrub resembling the myrrh of Theophrastus.¹⁸⁰

Commiphora mukul was perhaps also meant in Pliny's account (*N. H.* 12, 19, 35f.) as referring to a bdellium growing in Bactria.¹⁸¹ From this he soon expanded his account to comprise all kinds of bdellium, claiming that it is also found in Arabia, India, Media and Babylon. He also knows several special names for different varieties and substitutes

¹⁷⁴ Thus Hort in his notes on Theophrastus and André & Filliozat 1986, 361, note 165.

¹⁷⁵ See Watt s.v. *Elettaria cardamomum*.

¹⁷⁶ Watt s.v. *Amomum subulatum*. The OIA name *elā* probably refers to both. On amomum see also Warmington 1928 (1974), 184f., and Miller 1969, 67ff. (and 37f. on related Southeast Asian species).

¹⁷⁷ See Watt ss.vv. *Balsamodendron kataf* and *mukul*. There are several further inferior kinds also described by Watt. See also Yule & Burnell s.v. *bdellium*, Warmington 1928 (1974), 201, and Miller 1969, 69ff.

¹⁷⁸ The *samudriya* ('of the sea') *guggulu*, while the *saindhava* came from Sind. See Filliozat 1976, 21 commenting on *AV* 19, 28. For the early history of bdellium in the Near East and India see now Potts et al. 1996.

¹⁷⁹ Aristobulus F 48a in Arrianus, *Anab.* 6, 22, 4, identified as *C. mukul* by Ball 1885, 338, Bretzl 1903, 282ff., and Eggermont 1975, 120.

¹⁸⁰ *H. Pl.* 9, 1, 2. In *H. Pl.* 4, 4, 12, a similar brief description is given, but located in Aria (the same in Pliny, *N. H.* 12, 18, 33). Both accepted as bdellium by Miller 1969, 70.

¹⁸¹ Thus identified by Miller 1969, 70, and André & Filliozat 1986, 361, note 162 (see also note 161).

for them. In 12, 35, 71 he says that adulteration of Indian myrrh is easy, because this myrrh, unlike all other Indian products, is inferior to other kinds.

The *Periplus* lists bdellium among the products of Gedrosia (chapter 37) and among the exports of Barbaricum (39) and Barygaza (49). As *Commiphora mukul* is also found in drier parts of Rajasthan and Kathiawar, there is no difficulty as regards identification.¹⁸²

Although so important in India, **camphor** (OIA *karpūra*, MIA *kappūra*)¹⁸³ seems to have come to the West only at a late period. In Asia, there are several kinds of camphors. The most important camphor of the modern period is obtained from the camphor laurel or *Cinnamomum camphora*, but this originates in Southern China and arrived late even in India, where the original camphor came from the tree *Dryobalanops camphora* of Sumatra and Borneo.¹⁸⁴ In the West, camphor first appears only in late Greek and Syriac medical works of the 4th to 6th centuries, in India in the *Suśrutasaṃhitā*. It has been suggested that the earliest Greek references may well be interpolations, as the name *καφοῦρά* seems to be borrowed from Arabic *kāfūr*.¹⁸⁵

Cardamon (*καρδάμωμον*; *Elettaria cardamomum*; OIA *elā*) was already mentioned in connection with amomum. Theophrastus (quoted above) mentioned it as different from amomum. Pliny, *N. H.* 12, 29, 50 states that *cardamomum* resembles amomum and comes from India, Arabia, and Media. Dioscurides 1, 6, however, says that the best cardamomum comes from Commagene, Armenia and Bosphorus, though it is also native to India and Arabia. Probably he was again dealing with substitutes as in the case of amomum, or perhaps these places were marts for spices brought from the east. The real cardamon is native to South India and could thus easily be included in early Indo-Roman trade (though not mentioned in the *Periplus*).¹⁸⁶ Miller also attempts to identify the “pepper-pods” of Theophrastus and Pliny (see above under pepper) as cardamon and further (but probably falsely) refers to the *siliquastrum* or *piperitis* of Pliny.¹⁸⁷

The **clove** (*καρύφυλλον*; *Syzygium caryophyllus* [*Eugenia caryophyllata*]; OIA *lavaṅga*)¹⁸⁸ is supposed to originate in the distant Moluccas and perhaps came to the West only late, as Pliny’s account of *caryophyllon* seems to refer to some other plant. The

¹⁸² It has been thus made by McCrindle 1879, 16f. and Schoff 1912, 163ff.

¹⁸³ On camphor(s) see Watt s.v. *camphor*, Yule & Burnell s.v. *camphor*, Pagel 1922, Schoff 1922b and Miller 1969, 40ff.

¹⁸⁴ In addition, Watt knows two lesser kinds from China and Burma.

¹⁸⁵ In his eagerness to find early evidence for international trade of every known aromatic, Miller (1969, 41) suggests that the supposed interpolator has just substituted the new word for an earlier name also referring to camphor.

¹⁸⁶ Watt s.v. *Elettaria cardamomum*; Warmington 1928 (1974), 184f.; Miller 1969, 68 & 71ff.; Wojtilla & Wojtilla 1977 deal with both classical and Indian evidence.

¹⁸⁷ Pliny, *N. H.* 19, 62, 187 (Miller wrongly 87) and 20, 66, 174. But though Miller claims so, Pliny does not speak of India, or of any distant country. In the first passage he spoke of substitutes resembling exotic products, such as *piperitis* pepper, and though much later the Portuguese might have called cardamon *siliquaestro* Pliny’s plant might well be, as has been suggested, the dittander (*Lepidium latifolium* [*L. laterita*]), called in Old Italian *piperita*, ‘little pepper’.

¹⁸⁸ Watt s.v. *Caryophyllum aromaticum*, Yule & Burnell s.v. *clove*, Orth 1912, Warmington 1928 (1974), 199f., and Miller 1969, 47ff.

caryophyllon is a berry resembling peppers, but larger and more fragile, and it grows in Indian lotus.¹⁸⁹ According to Orth, only late medical works give a correct description of the clove. In the 7th century, Paulus of Aegina knew that it comes from India. As to the origin of the name, Indian *kaṭukaphala* has been suggested, but Greek *καρυόφυλλον* 'nut-leaf' can easily be explained otherwise (*κάρυον* 'nut' and *φύλλον* 'leaf').

Costus (*κόστος*), the aromatic root of *Saussurea costus* (*S. lappa*), OIA *kuṣṭha*,¹⁹⁰ is described in Pliny, *N. H.* 12, 25, 41. He states that it is of two kinds, white and black, the latter being inferior, and that it comes from the island of Patale at the mouths of the Indus. Theophrastus (*H. Pl.* 9, 7, 3) briefly mentioned it in a list of aromatics. Diodorus (3, 49, 3) listed it as an Arabian product, Dioscurides (1, 16) as Arabian, Indian and Syrian. Horace (*Carm.* 3, 1) called it Achaemenid, i.e. Persian.¹⁹¹ Occasionally it was called simply *radix*. According to Watt, the plant grows in Kashmir and on neighbouring mountains and might thus have caught the notice of Alexander's men (and through them of Theophrastus). The *Periplus* mentions costus as an export of Barbaricum (39) and Barygaza (48f.), where it is brought from inland. Patale, Arabia and Persia can perhaps be explained as providing marts for true costus (or even substitutes). In India its use as a perfume and medicine is ancient; it is already mentioned in the *Atharvaveda* (6, 102, 3).

Ginger (*Zingiber officinalis*) was probably introduced in the Hellenistic period and called by its Indian name, OIA *śṛṅgavera*, MIA (Pāli) *siṅgivera*, (Prākrit) *siṅgabera* (cf. Tamil *iñci*) as *ζιγγίβερι*.¹⁹² Ross 1952 contains an attempt to discuss "most of the world's words for 'ginger'".¹⁹³ The plant seems originally to have come from as far afield as Southeast Asia or even the Melanesian islands, but it was early cultivated in South India, later also e.g. in Kumaon and Bengal (Ross 1952, 31). Dioscurides (2, 160) and Pliny (*N. H.* 12, 14, 28f.) claim that it grew in Troglodytike and Arabia, where it is also used fresh, and the same is repeated by a few Arabic and Western authors (e.g. Forsskål in the 18th century), but according to Ross, Arabia in general, and Yemen in particular, would be completely unsuited for ginger cultivation. According to him, the claim might have arisen because Indian ginger often came via these lands. Ptolemy (7, 4, 1) listed ginger among the products of Taprobane, while the author of the *Periplus* did not mention it at all.

¹⁸⁹ Pliny, *N. H.* 12, 15, 30 *est etiamnum in India piperis granis simile quod vocatur caryophyllon, grandius fragiliusque. Tradunt in Indica loco id gigni*. It has been accepted as the clove e.g. by Lassen 1858, 37, Miller 1969 and André & Filliozat 1986, 360, note 156.

¹⁹⁰ See Watt s.v. *Saussurea lappa*, Yule & Burnell s.v. *putchok*, McCrindle 1879, 20, Ball 1885, 341, Schoff 1912, 168f., Warmington 1928 (1974), 197f., Miller 1969, 84ff., André & Filliozat 1986, 361, note 163. Delbrück 1956, 37f. referred to a Seleucid inscription mentioning costus, cassia and cinnamon.

¹⁹¹ Certainly we are not entitled here to think of Kashmir as an Achaemenid province (as Miller has erroneously been led to think). However, I care neither to point out every error committed by Miller nor to collect every passing reference to aromatics in Roman poetry.

¹⁹² Watt s.v. *Zingiber officinalis*, Yule & Burnell s.v. *ginger*, Stadler 1916, Warmington 1928 (1974), 184, Miller 1969, 53ff. & 107f., Marr 1972, 49, and André & Filliozat 1986, 360, note 155. On its Indian name see further the discussion in *JRAS* 1904–14

¹⁹³ On Indian words and their Western borrowings see Ross 1952, 17ff. (on Greek *ζιγγίβερις*, Latin *xingiber(i)* and other European languages 19ff.).

According to Pliny (*N. H.* 12, 14, 28), some incorrectly think that ginger comes from the root of pepper. The origin of this idea is seen in the variant he mentions for its Greek name, *zinpiberi*. It is easy to connect *-piberi* with *peperi*, and in Greek it is easy to read ΖΙΠΠΙΒΕΠΙ instead of ΖΙΠΤΙΒΕΠΙ, especially as the right-hand vertical stroke of Π was often left shorter than the left one. In the same way it is also explained by Dioscurides (2, 159, 4), who claims that the pepper root is called ginger.

Dioscurides 1, 68 mentions **libanos**, frankincense, of Arabia and India. This is an Arabian plant (*Boswellia sacra* [also called *B. thurifera* and *B. carterii*]), and famous as such since the most ancient times, so that the South Arabian country of Hadhramaut was known as the Χώρα λιβανωτοφόρος. As so many Indian plants were said to be growing in Arabia, too, it seems only fair to have one case of the opposite confusion.¹⁹⁴

The **lycium**, a kind of barberry (*Berberis lycium*),¹⁹⁵ was another Indian product often found as an astringent ingredient in the pharmacopoeia of the Imperial period. It was used for cosmetic and medical purposes, and the root also yielded a yellow dye. Pliny knows it as the root of a spiny shrub of India.¹⁹⁶ According to Dioscurides (1, 100), a kind of lycium comes from a spiny tree growing in Lycia and Cappadocia,¹⁹⁷ but he also mentions the Indian kind, rightly as coming from a spiny shrub. In the *Periplus* lycium is mentioned among the exports of Barbaricum (39) and Barygaza (49), ports where it could easily be brought from its native Western Himalayas.

Other Indian drugs known in the West, at least in the early Imperial period, include the aromatic **macir** bark (μάκειρ). Since the Middle Ages this name has been used for (and gave the English name of) **mace**, the aromatic core of the **nutmeg**, but the identification of ancient macir has been a matter of controversy.¹⁹⁸ If we do not follow Miller and on slight evidence accept long-distance trade relations (like those between Southeast Asia and the Mediterranean *via* Madagascar), it becomes difficult on geographical grounds to accept that macir was mace from the very beginning, as the tree *Myristica fragrans* (*M. aromatica*), the source of both, grows in the distant Moluccas. Even in India this dark brown nut covered with the crimson mace seems to have become known rather late, as its Sanskrit name (*jātiphala* 'nutmeg', *jātikośa* 'mace') is only quoted in medical glossaries around 1000 A.D. According to Yule & Burnell, the first mention in the West is found in Idrisi c. 1150. Nevertheless, macir has been accepted as mace e.g. by Miller and André & Filliozat. Let us have a closer look at the evidence.

According to Pliny (*N. H.* 12, 16, 32), macir is the cortex from the large *root* of an Indian tree known by the same name. This cortex, when cooked with honey, is described

¹⁹⁴ On frankincense see e.g. Warmington 1928 (1974), 200f.

¹⁹⁵ See Watt s.v. *Berberis lycion*, McCrindle 1879, 22, Ball 1885, 338 (both: *Berberis tinctoria* and *B. lycion*), Schoff 1912, 169, Warmington 1928 (1974), 205f., and André & Filliozat 1986, 360, note 159, and 364, note 183.

¹⁹⁶ Pliny, *N. H.* 12, 15, 31 (further 24, 77, 125).

¹⁹⁷ As the name lycium seems to be related to Lycia, this tree seems to be the original lycium, though the similar Indian product was apparently found to be better.

¹⁹⁸ See Schoff 1912, 80f., Warmington 1928 (1974), 216, Miller 1969, 58ff., André & Filliozat 1986, 360, note 159. On nutmeg see Watt s.v. *Myristica fragrans*, Yule & Burnell s.v. *mace*.

as an excellent remedy for dysentery. According to Dioscurides (1, 82), it is a yellowish-brown thick cortex of astringent taste, used for dysentery and stomach problems. It comes from the barbarian country (ἐκ τῆς βαρβάρου). The *Periplus* (8) knows macir as being transported through Ethiopian ports.

If Pliny knew what he said, then macir cannot be mace, and if not, it could be anything. In addition to real mace, Miller (1969) mentions the related *Myristica malabarica*, which grows in South India, has been much used as medicine and was later used to adulterate nutmeg and mace. But it seems that there was a long period when no macir was known at all, and when the name was then given to mace, nobody really knew what the ancient macir had been like. Therefore it is not really necessary to look for a similarity to mace, particularly when we think of Pliny's account of it.¹⁹⁹ On the other hand, it is not too remarkable to have unreliable and fantastic accounts of the origin of exotic products. In addition to the ancient stories about cinnamon and pepper I should like to mention that several Arabian and European authors until the early 18th century believed that mace was the bark of clove and that cinnamon, too, came from the same tree (references in Yule & Burnell).

Another explanation has been offered by Schoff. Referring to Lassen, who explained macir as the macre cortex of Kerala, and to the botanical account in Watt, he explained macir as *Holarrhena pubescens* (*H. antidysenterica*).²⁰⁰ This plant grows all over India and is known as an old medicine against dysentery, the *herba malabarica* of the Portuguese.

In connection with mace, Miller (1969, 59) also mentions the comacon (κόμακον), an aromatic fruit known since Theophrastus (*H. Pl.* 9, 7, 2), who mentioned it as an Arabian product. Pliny knows it as a nut growing in Syria and related to cinnamon.²⁰¹ It has been tentatively identified as nutmeg in the LSJ (and readily accepted by Miller), while Hort suggested *Ailanthus malabarica*.

Malabathrum (Latin *malobathrum*) comes from Greek *μαλάβαθρον*, also known as *φύλλον Ἰνδικόν*, the Indian leaf.²⁰² It seems that a form like **ταμαλαβαθρα*, corresponding to OIA *tamālapatra*, was wrongly divided as a neuter plural *τὰ μαλάβαθρα*, for which the corresponding singular *μαλάβαθρον* was then natural.²⁰³ As far as we know, these aromatic leaves became known only in the early Roman Imperial period and after late antiquity we hear no more of them. As our accounts of it are not too consistent, either, its

¹⁹⁹ The difference between Pliny's macir and Moluccan mace was noted as early as the 16th century, by Garcia d'Orta and Cristóvão da Acosta (Yule & Burnell).

²⁰⁰ See Lassen 1858, 31, Watt s.v. *Holarrhena antidysenterica*, and Schoff 1912, 80f. Lassen's etymology, however, OIA *makara*, seems to be wholly conjectural.

²⁰¹ Theophrastus, *H. Pl.* 9, 7, 2; Pliny, *N. H.* 12, 63, 135 in *Syria gignitur cinnamomum quod comacum appellant*.

²⁰² Yule & Burnell s.v. *malabathrum*, Ball 1885, 338f., Laufer 1918, Schoff 1920, 268, Warmington 1928 (1974), 186ff., Steier 1930, Stein 1937b, 1031ff., Miller 1969, 23, André & Filliozat 1986, 361f., note 168.

²⁰³ This was noted as early as the 16th century by Garcia d'Orta, then again by Lassen. That an Indian singular may have been interpreted as neuter plural in Greek is also attested in the case of *Pāṭaliputra*, *τὰ Παλίβοθρα* of the Greeks (e.g. Strabo 15, 1, 36).

real identity has been a matter of competing theories and is perhaps likely to remain without a definitive answer.

Malabathrum leaves are mentioned several times in literature and receipts, but the main sources of information are again Pliny and Dioscurides.²⁰⁴ According to Pliny, malabathrum comes from Syria and Egypt. Perhaps he is talking of substitutes or rather confusing middlemen with producers, and in any case the best malabathrum of all came from India. In India it grows in marshes, like lentils (*in paludibus ibi gigni lentis modo*), only in connection with Syria does he speak of a tree. Its leaves have a salty taste and an aroma similar to spikenard; it smells stronger than saffron. The best quality is dark, inferior quality is whitish.

Dioscurides ascribes the plant to India and remarks on the erroneous opinion that it is the leaf of the spikenard. He mentions medical and other uses for these aromatic leaves, but also gives an interesting account of the plant. It grows in marshes, but it is not a tree, but an aquatic plant with floating leaves and no roots.

More information about the malabathrum is given in the *Periplus*. In chapter 56 Seric cloth (silk), spikenard of the Ganges and malabathrum brought from inland,²⁰⁵ and in chapter 63 malabathron and Gangetic spikenard are mentioned among the exports of Gange, the great mart on the mouth of the Ganges. In chapter 65 we have a confused account of the origin of malabathrum. It is collected by the short-built and broad-faced Sesatai,²⁰⁶ who bring it to the annual fair held on the boundary of their own country and that of the Thinai. The deal is made through the age-old method of mute commerce.²⁰⁷

The origin of malabathrum is also commented on by Ptolemy. In 7, 2, 15, describing India beyond the Ganges, he mentioned among the peoples living between the Imaus and the Bepyron mountains the hairy, white-skinned Piladai or Saesatai, who are further described as short-built and broad-faced, using the very same words as the author of the *Periplus*.²⁰⁸ The next sentence (§ 16) mentions the country of Kirrhadia, where the best malabathron is obtained.²⁰⁹

²⁰⁴ Pliny, *N. H.* 12, 59, 129 (see further 13, 14 & 18; 14, 108; 23, 48, 93), Dioscurides 1, 12, and 1, 63 on malabathrum oil. Among other references e.g. Horace, *Carm.* 2, 7, 8 on a pomade made of Syrian malabathrum.

²⁰⁵ φέρεται δὲ... καὶ ὀθόνια Σηρικὰ καὶ νάρδος ἡ Γαγγιτικὴ καὶ μαλάβαθρον ἐκ τῶν ἔσω τόπων εἰς αὐτήν. I cannot accept McCrindles "brought from countries further east" for ἐκ τῶν ἔσω τόπων.

²⁰⁶ Thus is the MS. reading in Frisk's edition instead of Schoff's Besatai.

²⁰⁷ This was a well-known τόπος in classical literature, and though ethnology has been able to give real examples of it, it may here be merely literary embellishment. The earliest example of it is told by Herodotus (4, 196) about Carthaginians trading on the West African coast. The same motif was also used to explain the way the silk was bought from the Seres.

²⁰⁸ Laufer's (1918, 9) attempt to deny the identity between our two accounts can thus be ignored (cf. also the criticism in Stein 1937b, 1030). Note the lections Πιλάδαι and Σαησάδας accepted by Renou against Τιλάδαι/Τιλαῖδαι/Τιλέσαι/Τιλαῖσαι and Βησάδαι/-δας/Βισάδας/Βηγάδας/Βησεῖδας in some manuscripts.

²⁰⁹ A people named Kirrhadai is mentioned in the *Periplus* 62 as living on the eastern coast of India south of the mouths of the Ganges as neighbours of the cannibal Hippiprosopoi (horse-faced). While the name Kirrhadai has been commonly connected with OIA Kirāta, this need not bring us to the Himalayas, the traditional home of the Kirātas. In the 6th century A.D. Varāhamihira, *BS* 14, 6 mentions the horse-faced people (aśvavadana) together with the Orissans, and Kirāta is often

It often happens that we have to start with much less information (and I have not even mentioned every detail in my summary), and it is rather tantalizing that the secret of malabathron still defies explanation. It is not that there had been no attempts to provide one. In the 16th century, Garcia d'Orta, a Spanish physician in the service of the Portuguese, who studied Indian medicinal plants *in situ*, was already able to criticize earlier opinions. Unfortunately, his own explanation, a medical leaf obtained from a tree and sold by Indian pharmacists, is described in such vague terms that subsequent scholars have been unable to identify it any more than to identify the malabathrum itself.²¹⁰

Part of the problem is that while the derivation of malabathrum from OIA *tamālapatra* seems plausible, it is not at all clear what the ancient Indians meant by *tamāla* leaves. The best-attested meaning seems to be genus *Garcinia*, but their leaves are not at all aromatic. André and Filliozat quote the medical lexicon *Rājanighaṇṭu*, where *Cinnamomum iners* is also mentioned as a possibility. They further examine Tamil sources, where again *Garcinia* is the normal equivalent for *tamālam*, but in some cases both *tamālam* and *ilai* 'leaf' seem to be referring to patchouli or *Pogostemon hayneanus* (*P. patchouli*). Having thus covered the two leading theories with respect to the identification of malabathrum with at least some (though slight) Indian evidence the authors untie the Gordian knot and accept both.²¹¹

The poorest theory attempted to identify our leaves with betel leaves, conspicuous enough in India. But while *tāmbūlapatra* is not the same as *tamālapatra*, it is also difficult to understand how *tāmbūla* could give Greek *mala-*. This betel theory was already dismissed by Garcia d'Orta, but has been occasionally revived.²¹² The most common theory has been put forward by Christian Lassen.²¹³ Accepting, on the *Rājanighaṇṭu*'s testimony, that *tamālapatra* signified cinnamon leaf and analyzing the *Periplus* passage he suggested a wild relative of cinnamon growing in the Eastern Himalayas.²¹⁴ As the classical and Indian evidence seems insufficient (and the Arabians merely repeated classical accounts) Laufer (1919) sought the help of Chinese sources. Lassen's cassia leaves he dismissed, because Lassen's evidence was slight and because the Chinese knew cassia and *tamālapatra* (mentioned by its Indian name) as different products. The plant *tamālapatra* is identified in Chinese as *ho hiang* (Laufer's orthography), a name referring to two different plants, named by him *Lophantus rugosus* and *Betonia officinalis*. Unfortunately, neither corresponds to the description of malabathrum. Instead, Laufer suggests a third

vaguely used of eastern peoples, as in the well-known Purāṇic definition defining the extension of the earth by Kirātas in the East and Yavanas (Greeks) in the West (Kirfel 1954, 3, Textgruppe II, 9 *pūrve kirātā hy asyānte pāścīme yavanāḥ smṛtāḥ*, cf. Textgr. I, 6).

210 See Laufer 1918, 10ff. The passage is quoted by Yule & Burnell s.v. *Malabathrum*.

211 André & Filliozat 1986, 361f., note 168: "En définitive, le *malabathrum* peut avoir consisté tantôt en feuilles de cannelier, tantôt en celles du patchouli."

212 E.g. by Heeren and still McCrindle 1879 commenting on the above-mentioned *Periplus* passages.

213 Lassen 1858, 37ff. accepted e.g. by McCrindle 1885, 219f., Yule & Burnell, Schoff 1912, 281., Warmington 1928 (1974), 186f., and Miller 1969, 23.

214 *Cinnamomum tamala*, see Watt s.v.

possibility, patchouli or *Pogostemon hayneanus* (*P. patchouli*, with some related species), a relative of mint growing in Assam and Southeast Asia.²¹⁵

After all this I refuse to give an identification. The evidence suggested on behalf of cassia leaves or patchouli is in both cases rather slight. Nevertheless, we may note some pertinent points. The unanimous testimony of the *Periplus* and Ptolemy locates the cultivation in Eastern India, if not beyond. The name malabathrum (containing an OIA word) as well as the word πέτρονος (OIA *patra*) used in the *Periplus* 65 prevent us from following Laufer too far to Southeast Asia (this was already noted by Stein). There seems to be a consensus of scholars that Pliny's reference to marshes and Dioscurides' description of a water plant must be erroneous. As the results arrived at with this method are, however, as slight as we have seen, one is bound to ask whether we should not, after all, take the evidence a little more seriously.

The **mastich** or *laina* is a kind of thorn-bush producing a gum resembling myrrh, found in India and Arabia, according to Pliny, *N. H.* 12, 36, 72, but the meagre account allows no identification.²¹⁶ The preceding passage stated that **myrrh** is also obtained from India, but only of inferior quality. Better myrrh was imported from Arabia and East Africa.²¹⁷

Myrobalanus (μυροβάλανος)²¹⁸ seems to be another newcomer with the new flourishing of trade in the early Imperial period. It is described by such authors as Dioscurides (1, 109, of Arabia), Celsus and Pliny. There is furthermore a difficult passage in Theophrastus (*H. Pl.* 4, 2, 1 & 6 on the balanus tree of Egypt), which might refer to myrobalanus. It is also the only case where the tree itself is mentioned; later authors knew only of the drug. Its supposed Indian origin, however, is never mentioned in classical sources.

From modern sources such as Yule and Burnell we learn that several different products go by the name of myrobalan. Thus the emblic myrobalan comes from *Phyllanthus emblica* (*Emblica officinalis*), the belleric myrobalan from *Terminalia bellerica* (OIA *vibhītaka*), the chebulic myrobalan from *Terminalia chebula* (OIA *harītakī*) and two further products of the last-mentioned tree are known as the black or Indian and the yellow or citrine myrobalan.²¹⁹ In India, however, these astringent fruits and kernels have no common name better than *triphalā* 'three fruits', and according to Yule and Burnell the ancient myrobalan was "entirely unconnected" with them. Under the latter were included several different products coming from different countries, but what was understood as the Indian myrobalan has been identified as the nuts of the *Moringa oleifera* (*M. pterygosperma*).²²⁰

The problems of identification vanish when we now arrive at one of the most famous Indian aromatic products known and used in the West during classical antiquity. This is

²¹⁵ Laufer 1918 was accepted e.g. by Steier 1930, 822f. and Stein 1937b, 1031f.

²¹⁶ Cf. André & Filliozat 1986, 361, note 166.

²¹⁷ Cf. Warmington 1928 (1974), 201, and above under bdellium.

²¹⁸ See Yule & Burnell s.v. *myrobalan*, Steier 1935.

²¹⁹ See also Watt under these names.

²²⁰ As *Moringa* identified by Yule & Burnell and by Steier 1935, as chebulic myrobalan by Watt.

of course the **nard** or **spikenard** (νάρδος /νάρδον, *nardus/nardum*, also specified as ναρδόσταχυς or *spica nardi*). What was already assumed by Garcia d'Orta, was definitively demonstrated by Sir William Jones in two articles discussing both classical and Arabic evidence:²²¹ real Indian nard was obtained from the plant *Nardostachys grandiflora* (*N. jatamansi*) growing in the Central and Eastern Himalayas.²²² Spikenard is described as “the fibre-covered root-stock of a tall-growing Valerian” (Schoff 1923, 217). In Indian literature it is known from the *Atharvaveda* (6, 102, 3) and the *Āraṇyakas* onwards. The Greek (and Latin) name seems to be derived from Semitic; in Hebrew spikenard is mentioned as *nêrd* in the *Canticum* (1, 12 & 4, 13f.); to the Greeks it seems to have become known at least in the time of Alexander. The ultimate origin seems to be the Indian name of the *Nardostachys grandiflora*, OIA *nalada*, Pāli *narada*,²²³ later it was also called OIA *māmsī*, *jaṭāmāmsī*. However, though the *etymology* of the word thus seems to go back to the name of the true nard, it seems that the name in the West was often used to designate several different aromatic plants.

The first classical references to nard are found in Theophrastus. In *De odor.* 33 he says that spikenard has a biting quality as well as heat, and in *H. Pl.* 9, 7, 2f. Indian spikenard is briefly mentioned among aromatics. Strabo, referring to Onesicritus, claimed that the plant grows in the south of India like cinnamon and other aromatics. Aristobulus told how plenty of nard root, νάρδου ῥίζα was found and collected in Gedrosia.²²⁴ The references to nard become more common only in the literature of the Roman Imperial period, when we also read of several different kinds. The true or Gangetic (γαγγίτις) spikenard was described by Pliny and Dioscurides, though both only had a poor idea of the plant.²²⁵ Pliny even committed the error of calling its aromatic product leaves, though Dioscurides calls it more appropriately the root. The importance of the spikenard trade is shown by the frequency with which it is mentioned in the *Periplus*. It was exported from Barbarike at the Indus mouths (39); three kinds of nard with difficult names²²⁶ were

²²¹ In Arabic and Persian sources nard is equated with *sumbul* ('spike'), and *sumbul hindī* or *sumbul al-Hind* is *Nardostachys jatamansi*. See also Schoff 1923, 224ff.

²²² See Jones 1799 (1790) and 1798 (1795; the same volume also contains a botanical description of the plant by Roxburgh). Further information in Lassen 1858, 41ff., McCrindle 1879, 25f., Ball 1885, 340, Watt s.v. *Nardostachys jatamansi*, Yule & Burnell s.v. *Nard*, Schoff 1912, 170 & 188f. and Schoff 1923, Warmington 1928 (1974), 194ff., Stier 1935, Miller 1969, 88ff. and André & Filliozat 1985, 361, note 163.

²²³ Mayrhofer, *KEWA* and *EWA* s.v. *nalada*-. On Hebrew see Schoff 1923, 220.

²²⁴ Onesicritus F 22 in Strabo 15, 1, 22; Aristobulus F 49a in Arrianus, *Anab.* 6, 22, 5

²²⁵ Pliny, *N. H.* 12, 26, 42–46 (main account), and 12, 20, 35; 16, 59, 135; Dioscurides 1, 7, further 1, 62 (nard oil) and 1, 99, 3. Further references, according to Schoff 1923, 222f., are Horace, *Carm.* 4, 12 & 2, 11, *Ep.* 13; Mark 14: 3–4, Matt. 26: 6–9, Luke 7: 36–38, John 12: 1–8; *Digesta* 39, 15, 5–7. Briefly also Aretaeus and Plutarch, *Gryllus* (*Moralia* 7, 990B). Their information is also summarized by Steier 1935.

²²⁶ νάρδος ἢ Καττουβουρίνη καὶ ἡ Πατροπαπίγη καὶ ἡ Καβαλίτη καὶ ἡ διὰ τῆς παρακειμένης Σκυθίας. These names have been transmitted in a rather corrupt form, but as Προκλαίς (Ποκλαίεις in Ptolemy 7, 1, 44) seems to be another Greek form for OIA Puṣkalāvatī (beside Peucelaotis) and as the adjacent Scythia in any case refers to the Northwest of India, we can perhaps accept Πατροπαπίγη as Παροπανισή. For Καττουβουρίνη, however, the emendation Κασσαπυρηνή (Müller) or Καππαβουρίνη (Herzfeld) with the only parallel as early as Hecataeus and Herodotus, seems too

brought from Proclais to Barygaza (48) and exported from there (49). Gangetic nard (νάρδος ἡ Γαγγητικὴ) was exported from South India (56) and from Gange at the mouths of the Ganges (63). Ptolemy (7, 2, 23) briefly mentions spikenard in Randamarta somewhere in the Eastern Himalayas.

The possibilities of nard production, however, are thus not exhausted. Steier (1935) gives references (Dioscurides, Pliny et al.) to nard called *πυρίτις* and obtained from Syria and Cilicia, and the so-called Celtic nard grows in the Ligurian Alps.²²⁷ In Roman times real spikenard was both expensive and popular, and therefore often adulterated. We can here leave out the Celtic nard, obtained from *Valeriana celtica* and acknowledged by the ancients to be a different product. There are also several valerians in the Near East, which can explain the Syrian nard (Steier 1935, 1710). Even for Indian nard we must accept two different products, as was already seen by Jones. While *Nardostachys grandiflora* corresponds to the Gangetic spikenard, it is not found in the Northwest, where the local nard must be another plant. In the South spikenard was probably just an article of commerce, obtained from the north. Since Jones it has been generally accepted that the Northwestern and Gedrosian nard was the aromatic root of various species of *Andropogon* such as *A. schoenanthus* and *A. jwarancusa*. In South India and Sri Lanka grows the *A. nardus* or citronella.²²⁸

For **sandalwood** (*Santalum album*, OIA *candana*)²²⁹ no reliably identifiable early reference is found in the West. However, in the *Periplus* 36 it seems to have been mentioned as an article of transit trade of Oman, and much later Cosmas knew it as tzandana. The *Periplus* passage seems to have gone unchallenged, and only Casson in 1982 pointed out that ξύλον σανταλίνον, though accepted even by Frisk, is merely an old emendation (by Salmasius in 1629) for the manuscript's σαγαλίνο. However, his criticism is partly unfounded. The word tzandana (τζανδάνα) in Cosmas 11, 15 does *not* prove that OIA (or MIA) *ca* could not be given the Greek equivalent σα. Cosmas in the 6th century gave new evidence from actual experience and his way of writing Asian words and names was unaffected by earlier usages. His name for China, the silk country, Τζινίστα, corresponds to Ptolemy's Σίναι and probably to Θίνα of the *Periplus*. In the Hellenistic period σα was used as an equivalent for Indian *ca*, as is seen in such cases as Σανδράκοτος for *Candragupta* and Σανδαβάλλ or Σανδαροφάγος for *Candrabhāga*. Σανταλίνον as *candana* is thus possible, but it remains a conjecture. As Casson pointed out, there has been certain feeling that as sandalwood is so important in India, it *should* also be included among the Indian imports to the West. However, there is another "should be" never indisputably mentioned in classical sources – teakwood. Now the name for teakwood, OIA *śāka*, is at least as

conjectural. See Steier 1935, 1709, Treidler 1957, 171ff. (both accept Κασπαπυρηνή without thinking of the difficulties) and Karttunen 1989a, 43f.

²²⁷ This is ἡ Κελτικὴ νάρδος of Dioscurides 1, 8.

²²⁸ Jones 1798, Laufer 1919, 455, Schoff 1912, 170 & 1920, 268, Warmington 1928 (1974), 196, Steier 1935, 1707, Miller 1969, 90. See further Miller 1969, 89 on *Ferulas* of Central Asia, also identified as the *sumbul* of the Arabs. I have been unable to confirm the validity of the genus *Andropogon* in modern botany; it seems that at least *A. nardus* is now called *Cymbopogon nardus*.

²²⁹ Yule & Burnell s.v. *sandal*, McCrindle 1879, 28f., Schoff 1912, 152, Warmington 1928 (1974), 215, Miller 1969, 60ff. & 86f., and Casson 1982.

good an explanation for our σαγαλινο (i.e. ξύλον σαγαλίνον) as *candana* and has several times been suggested as such.²³⁰ So it seems that we must leave both sandal and teak out of the list of the certain Indian imports of the Roman period.

The botanical observations made during Alexander's campaign are again involved in the account of the **silphium** (σίλφιον) of the Hindukush. According to Aristobulus, this and a kind of terebinth (see below) were the only plants commonly growing in the part of the Hindukush crossed by Alexander.²³¹ This eastern silphium was as much favoured by cattle as the common silphium (*Ferula tingitana*) of Cyrenaica.²³² It has been explained by McCrindle as the plant yielding asafoetida.²³³ In his account of *laserpicium*, which is the Latin name for the Greek σίλφιον, Pliny comments that the African product, which had become very rare, could be substituted by Iranian silphium.²³⁴

In the same part of the Hindukush, Aristobulus also mentioned a kind of **terebinth**, which was the only tree seen in these barren mountains. The common Greek τερμίνθος or τερέβινθος is the tree *Pistacia terebinthus*. Both this Western kind and the Eastern plant observed by the Macedonians were mentioned by Theophrastus.²³⁵ Referring to Macedonian accounts, but actually quoting Theophrastus, Pliny (*N. H.* 12, 13, 25), too, mentions a kind of terebinth (*terebintho similis*) with fruit resembling almonds and growing in Bactria. The plant has been identified as the closely related *Pistacia vera*, the pistachio, which is actually commonly found in the locality.²³⁶

Turmeric is the yellow aromatic root of *Curcuma longa* or *Curcuma amada*, OIA *haridrā*.²³⁷ Miller suggested that the χρώμα of Theophrastus is turmeric,²³⁸ but a tropical plant was hardly known so early, and the short sentence of Theophrastus contains nothing really peculiar to turmeric. With the South Indian sea trade turmeric could have be-

²³⁰ Yule & Burnell s.v. *Teak*, Mayrhofer, *KEWA* s.v. *sāka*, Casson 1982. On teak see further the discussion of timbers at the beginning of this chapter. That sandalwood was imported to the West in the time of Cosmas is supported by the somewhat later account in the *Tang Annals* (quoted by Laufer 1915, 45) that India traded her diamonds, sandalwood and saffron with Ta Ts'in (Daqin, Rome) and Southeast Asia.

²³¹ Aristobulus F 23 in Arrianus, *Anab.* 3, 28, 6f., without reference also in Strabo 15, 2, 10.

²³² On this see Hort's "Index of plants" to Theophrastus, and *H. Pl.* 6, 3, and André's note on *N. H.* 19, 15, 38 in his edition of Pliny. Theophrastus did not mention the Eastern silphium.

²³³ McCrindle 1901, 90, note 3. This plant, *Ferula foetida* (*Scorodosma foetidum*), a relative of *F. tingitana*, is common in Eastern Iran and Afghanistan (and the closely related *F. asafoetida* in Western Iran), and has been discussed by Bretzl 1903, 284ff. Bretzl, however, combines this with Theophrastus, *H. Pl.* 4, 4, 12 (followed by Hort and Eggermont 1975, 121), which is said to be poisonous for cattle. *Ferula* is not poisonous and the few details given by Theophrastus hardly correspond to it, as was soon noted by Laufer 1919, 355 (for a full discussion of asafoetida see *ibid.* 353ff.). Asafoetida seems to fit well enough and I see no reason to accept Pédech's *Peucedanum alsaticum* (1984, 382f.) as the Hindukush silphium.

²³⁴ *N. H.* 19, 15, 38ff. See also Miller 1969, 100.

²³⁵ On Western terebinth see Hort's "Index of plants" to *H. Pl.*, on Eastern terebinth *H. Pl.* 4, 4, 7.

²³⁶ Bretzl 1903, 245ff. followed by Hort, Laufer 1919, 246, and Pédech 1984, 382f.

²³⁷ It is perhaps worthy of note that OIA *kuṅkuma* is saffron (imported from the West), never turmeric. On both, see Watt ss.vv. and Laufer 1919, 309ff.

²³⁸ Theophrastus, *Od.* 33 τὸ δὲ μάρον καὶ τὸ χρώμα τὸ εἰς τὸ ἀμαράκινον ἐμμιγνόμενον θερμαντικά. Miller 1969, 4

come known, but apparently there are no certain references in classical antiquity. It has been suggested that turmeric was meant by the Indian *cypira* in Pliny, resembling ginger and tasting like saffron, but we have already seen that it can also be explained otherwise.²³⁹ We must thus do without turmeric, although in South Asia it has for a long time been very popular as a medicine, spice and dye.²⁴⁰

India was also famous for its superb dyes. Even before Alexander's campaigns Ctesias knew of a flower giving excellent red dye and of another red dye of animal origin (F 45, 38 and 45, 39). We can hardly follow Herrmann (1938, 19), who explains both simply as indigo without stating his grounds. While the latter was probably the lac dye (see below under insects), for the former we have insufficient evidence to attempt more than guesses, and here we shall refrain from guessing. In Pliny (*N. H.* 35, 32, 50) a reference is made to fine Indian dyes. Of these only two have been frequently mentioned by classical authors, namely cinnabar and indigo.

The Greek word κιννάβαρι²⁴¹ is mentioned as early as Ctesias, referring to the colour red. Later **cinnabar** was also called dragon's blood, and it was a famous red dye. The true cinnabar is a mineral product (red mercury sulphide, perhaps also red ochre), but in classical times the name was applied to a plant dye (*Dracaena* ssp. of South Arabia and East Africa and *Calamus draco* of India). Its real origin, however, remained unknown, and an utterly fantastic explanation was offered instead. The inherent mutual hatred of elephants and dragons (giant snakes, see V.5 below) led the two animals into mortal combat, ending in a lethal embrace where their blood intermingled. This mixed blood was collected by Indians or Ethiopians (the old confusion again) and sold as dragon's blood or cinnabar.²⁴² The *Periplus* 30 mentions cinnabar in Soqatra (*Dracaena cinnabari*).

Indigo, the famous "Indian dye", which in the West was simply called Ἰνδικόν or *Indicum* (OIA nīlā 'dark blue'). It is obtained from the Leguminose plant *Indigofera tinctoria* (and several related species).²⁴³ It was first mentioned in the West in the early Imperial period by Vitruvius (7, 9, 6 and 7, 14, 2) and Dioscurides (5, 92). In the *Periplus* (39) indigo is mentioned among the exports of Barbaricum in Sind. Pliny knew that it was only recently imported (33, 57, 163), that it was one of the few (and expensive) really bright colours used by painters (35, 12, 30), that it was brought from

²³⁹ *N. H.* 21, 70, 117, also Dioscurides 1, 5, both quoted above under reed. Pliny emphasizes that this is not the same as the common *cyperos* or sweet rush, described in the same passage, but it seems that modern authors (such as McCrindle and Schoff) have often forgotten this difference.

²⁴⁰ Watt s.v. *Curcuma* (on plant and its uses).

²⁴¹ Some early Indologists (Weber 1870, 624) derive Greek κιννάβαρι from OIA **khinnavāri*. This could rather be the opposite, but I have been unable to find any such word in any dictionaries (*pw*, MW, Mayrhofer, *EWA*, Rhys Davids & Stede, index to the *Rājanighaṇṭu*).

²⁴² See e.g. Pliny, *N. H.* 33, 38, 116 (also 29, 8, 26 and 35, 12, 30). On cinnabar and dragon's blood see e.g. Lassen 1858, 33, Watt s.v. *Mercury* (he is not sure if it is found in South Asia at all), Schoff 1912, 137ff., Warmington 1928 (1974), 202f., and André & Filliozat 1986, 366, note 198.

²⁴³ Watt and Yule & Burnell ss.vv. *indigo*, Schoff 1912, 172f., Stadler 1916, Laufer 1919, 370f., Warmington 1928 (1974), 204f., André & Filliozat 1986, 368, note 203, and Zarins 1992. On the Greek and Latin names see also Karttunen 1995a.

India, and that its composition was unknown (35, 25, 43). His main account of the Indian dye is found in *N. H.* 35, 27, 46, and this time he pretends to know its origin. It is "slime that adheres to the scum upon reeds", and another kind is scum floating on the surface of purple pans.²⁴⁴ This corresponds well to Dioscurides' account, but hardly to the real method of indigo production. The plant itself thus remained unknown in the West, where it was only mentioned for the first time by Marco Polo. Pliny also warns against the adulterated product and explains that true indigo, when put on glowing coal, gives a purple flame. Stadler asserts this to be true.

Though rather beyond my competence, I must here briefly comment on Zarins' arguments (1992) about the African origin of indigo cultivation. While the main argument, supposing prehistoric distribution to Asia as in the case of several other plants (such as sorghum), does not affect our evidence about the Indian origin of indigo imported to Rome, and while it seems clear that several species of dye-yielding *Indigoferas* are original to Africa (as others are to India!), his hypothesis of indigo cultivation in ancient Egypt, used as an important argument on behalf of this African origin, seems to me rather arbitrary. Blue-dyed linens are attested in Egypt since the third millennium, but as Zarins himself confirms, there is no way of discerning between woad (*Isatis tinctoria*) and indigo as dyes. Chemically they are identical. He prefers to have African indigo introduced early from the southern end of the Red Sea and cultivated in Egypt as woad's "cultivation beyond Coptic times in the Egyptian delta is speculative", but soon he admits that he "cannot prove that *Indigofera* was cultivated beyond the Medieval period in Egypt". His only classical reference is to the *Periplus* and he does not seem to know the etymology of the name *indigo*.

* * *

As the material discussed in this rather lengthy chapter was not given in any chronological order, it is perhaps useful to give a summary according to the introduction of knowledge of Indian plants and plant products in the West. The decisive point here is, what was known to Alexander and Megasthenes, and what came only in the first century A.D. or so? There is also a difference in sources. While Alexander's historians (with Theophrastus deriving from them) and Megasthenes described actual observations made in the Northwest and North of India, understandably concentrating on plants of spectacular or curious appearance or of noted economic value, the new information connected with the Indian trade in the early Roman period deals with products of tropical India and often without any reliable knowledge of actual plants.

Those among Alexander's historians who were interested in nature, such as Aristobulus, Nearchus and Onesicritus, and the unknown source of Theophrastus, provided

²⁴⁴ *harundinum spumae adhaerescence limo... alterum genus est in purpurariis officinis innatans cortinis, et est purpurae spuma.* All these passages are also translated in McCrindle 1901, 128f.

much information about the trees and forests of Northwest India. Their accounts included the familiar species seen in Nuristan, the flourishing forests of the Pañjab yielding valuable timbers, date-palms and several fruit-trees, Indian ebony, and such marvels as cotton and banyan. Among the extant remains of Megasthenes, who knew much more of India than the historians of Alexander, we have little botanical information. Of trees there are references to the tala palm, cotton and ebony. At the same time, during the whole of classical antiquity there is no certain account of such important species as teak, and the first certain accounts of coconut and sandalwood only came with Cosmas in the 6th century A.D.

Other useful plants of Northwest India, though not so remarkable in Greek eyes, have rarely escaped attention. Wheat and barley, rice, various millets and pulses, sesame, flax and even the vine are mentioned by historians of Alexander, as were bamboo and other reeds and probably also sugar-cane. Megasthenes again yields much less, though we at least find brief references to rice and barley, to vines, flax and perhaps to sugar-cane. More generally he mentions that the great fertility of India produces large and frequent crops of grains and fruits.

While all these were known since the days of Alexander, we can actually point out rather few references to substantiate the claims of Onesicritus and Theophrastus that India was the home of a great number of aromatics, plant medicines and dyes. Of the real origin of cinnamon and cassia there was no idea in the West, and pepper remained a rarity until the first century A.D. There were other rarities, probably obtained through middlemen, mentioned by Theophrastus. In Megasthenes we have only a general reference to Indian spices (F 2). The majority of Indian aromatics known from Dioscurides, Pliny and other authors of the Roman period apparently became familiar only through the sea trade between Roman Egypt and peninsular India. The majority of these plants also belong to tropical India, while in the Northwest only asafoetida, pistachios, bdellium and *Andropogon nard* were observed by Alexander's men. Some names in our often brief accounts remain unidentified, while there are also well-known spices not reliably found in classical sources.

We have actually not exhausted the botanical information of Alexander's histories, though the rest belongs only to the very confines of India. The account of Gedrosian plants, already referred to in connection with bdellium and spikenard, given by Aristobulus (F 49) in his description of Alexander's march through the country, is preserved by Arrianus and Strabo.²⁴⁵ In addition to the myrrh-tree or bdellium and *Andropogon nard* – these were collected by Phoenician traders following the army – the list includes a thistle poisonous to cattle (see above under silphium) and the mangroves of the tidal zone.²⁴⁶

Underwater marine vegetation is variously mentioned in Gedrosian and Carmanian coasts and even in the Gulf. Accounts like Theophrastus *H. Pl.* 7, 4, mainly go back to the works of the participants in the naval venture headed by Nearchus, but not necessarily

²⁴⁵ Arrianus, *Anab.* 6, 22, 4ff. and Strabo 15, 2, 3–7; see also Theophrastus, *H. Pl.* 4, 4, 13, Pliny, *N. H.* 12, 18, 33f. and 21, 36, 62.

²⁴⁶ These have been discussed by McCrindle 1896, 170, note 1 and 171, note 1, Bretzl 1903, Pearson 1960, 177f., Eggermont 1975, 116ff.

to Nearchus himself. One brief note also ascribes a similar account to Megasthenes (F 25); it is preserved by Antigonus, *Mirab.* 132, who is perhaps not the most reliable of sources.²⁴⁷

2. *Marvels of Nature: Mammals of India*

With animals, there is one major difference in our sources in respect to plants. On the one hand, while Alexander's men obtained a restricted idea of the numerous vegetable products of India in the very Northwest of India, Indian drugs and spices soon obtained an important position in the flourishing international trade of the early Roman period and many new products were introduced into the West. On the other hand, living animals were keenly observed by Alexander's companions, but were not well suited to maritime trade. The *Periplus* hardly mentions animals among Indian products, though a few products of animal origin are included, such as ivory, silk and pearls.²⁴⁸ It seems possible that the few instances recorded of Roman emperors displaying Indian animals (when they really were Indian and not Ethiopian) were indeed not the tip of the iceberg, but a sensation, worthy of record just because it was a rare exception. After all, many Roman historians were rather keen on recording the most remarkable sights in the public games.

Whereas with plants we very often had evidence only from the Roman period and had to ask ourselves whether this particular plant or plant product was known in the Hellenistic age at all, with animals even the records of the Roman period often contain clear references to Hellenistic authors. It seems that for the major part the knowledge of Indian animals originated with the historians of Alexander and the Hellenistic ambassadors to the Mauryas, in some cases even with Herodotus and Ctesias.

When Alexander entered India zoology was something quite new. His old mentor Aristoteles was the first to attempt a scientific classification, and in his *Historia animalium* he had already included some information obtained from the Macedonians, albeit he still depended heavily on Ctesias for information about India. Beside this scholarly approach we must take into account the general predilection of the Greeks for fantastic and curious animals, especially in distant countries. In comparison to plants we have the difficulty that after Aristoteles we must depend on authors of the Roman Imperial period

²⁴⁷ Further Strabo 16, 3, 6; Pliny, *N. H.* 13, 48, 135 & 13, 51, 140f.; Plutarch, *De facie in orbe lunae* 939D and *Quaest. nat.* 1, 911E. The account has been very fully dealt with in Bretzl 1903, 23–114, but see also the remarks in Joret 1904, 500f. and Pearson 1960, 142, note 104 (but Pédech 1984, 203). On the history of accounts of mangrove see Yule & Burnell s.v. *Mangrove*.

²⁴⁸ This has been noted by Warmington 1928 (1974), 145ff., and he concluded that what was imported, came overland *via* Parthia.

(e.g. Pliny and Aelianus). There are not always references, and there is no Theophrastus to indicate that the information must come from the companions of Alexander. Much certainly does come from them, but often it is difficult to attain any certainty. Often we also have references to the histories of Alexander, but the exact source is not specified.²⁴⁹

A conclusion drawn from the supposedly exceptional fertility of the country (cf. IV.5 above), originating in the old *τόπος* about the rims of the inhabited world, was that in India all animals are larger than in other countries. The idea was an old one, found already in Herodotus (3, 106) and Ctesias, and now the Macedonians revived it.²⁵⁰ The same was also applied to humans.

Another general idea was the similarity to Egypt (cf. IV.5 above). Similar kinds of plants as well as crocodiles were found both in the Indus and the Nile, their alluvial deposits were compared, and both rivers were rightly also considered to be the origin of life in their respective countries.²⁵¹ With his usual predilection for exaggeration Onesicritus claimed that even hippopotami were seen in the Indus, but he mainly received deserved criticism for this.²⁵²

The animals of India attracted much attention from Alexander's companions (and from Megasthenes, too) and accounts of them are therefore numerous in classical literature. The most detailed come from Pliny and Aelianus. To quote the latter, Ἴνδοι γὰρ οὐκ ἐκφαυλίζονται ζῶον οὔτε ἡμερον οὔτε μὴν ἄγριον οὐδέν (*N. An.* 13, 25).

Exotic animals were not only described by those who accompanied Alexander or went to India on a diplomatic mission. Some of them the Greeks could see with their own eyes. After Gaugamela Alexander had apparently sent an elephant to Athens, where the animal was then observed by Aristoteles, and through the favour of Seleucus the Athenians were soon able to see a living tiger, too. Poultry and peacocks were bred in the West as early as the fifth century, and soon parrots were, too. The early Ptolemies started the first Hellenistic animal collection, which mostly contained curiosities from Africa, but also some Asian species (such as a Bactrian camel). These were occasionally displayed in magnificent processions.²⁵³

The lion (λέων, OIA *siṃha*) was the Aryan royal animal, and as such it migrated, though of course not physically, as far as Sri Lanka²⁵⁴ and China.²⁵⁵ It was the royal em-

²⁴⁹ Pearson 1960, 111 suggested that such references in Aelianus mostly hail from Onesicritus.

²⁵⁰ See Strabo 15, 1, 22. Later the same idea was repeated e.g. by Columella, *De re rust.* 3, 8, 3.

²⁵¹ See Strabo 15, 1, 13 & 16 and 15, 1, 45; Diodorus 1, 35; Arrianus, *Ind.* 6, 8; and Pausanias 4, 34.

²⁵² Onesicritus F 7 in Strabo 15, 1, 13 and 15, 1, 45; Arrianus, *Ind.* 6, 8. Among contemporaries, he was criticized by Aristobulus (F 38 in Strabo 15, 1, 45), then e.g. by Strabo 15, 1, 13 (quoting Eratosthenes), and the only author to accept his claim seems to have been Philostratus, *V. Ap.* 2, 19.

²⁵³ Best attested in the famous *pompa bacchica* of Ptolemy Philadelphus. See Kamp 1864, Jennison 1937, 28ff., and Coarelli 1990.

²⁵⁴ Perhaps the non-existence of lions in eastern India can be used as an additional argument for the Sinhala tradition, that the Sinhalas had originally migrated from western India. On this migration, cf. Schwarz 1976, 244ff., on lions as royal animals in early Sinhala and India, Schwarz 1978, 1131ff. In India the lion is connected with royalty as early as the Atharvaveda.

²⁵⁵ Laufer 1909, 236ff. He also gives a number of examples of a realistic tradition of depicting lions in Chinese art, then ousted by the conventional Buddhist representation, and mentions that in

blem, soon transferred to the Buddha, as happened with other signs of royalty, too. Therefore lions have always been important in Indian literature. In narrative literature, the lion is the king of the animals in India as well as in the West. As the royal animal, the lion is also rather often depicted in Indian art, and not only in regions where the animal was actually seen.²⁵⁶

The real lion belongs to the fauna of northern India. However, we must here note a difference of distribution in ancient times and now. In the Mughal period and until the early 19th century lions were encountered (and shot) quite often in northwestern and western India.²⁵⁷ At the same time the lion and tiger are said to be more or less mutually exclusive in their habitats.

In ancient Western sources on India lions play no great role, as the animal was well known from nearer countries, though already extinct in Greece.²⁵⁸ In the Indus country, they are mentioned as opponents of the brave Indian dogs.²⁵⁹ Tame lions and tigers were presented to Alexander by the Malloi,²⁶⁰ and lions marched in a procession along with tame leopards.²⁶¹ Tame lions were also reported elsewhere as in a shrine of Anaitis in Elymais (Aelianus, *N. An.* 12, 23). Aelianus (*N. An.* 17, 26) mentions large lions in India. They are said to be fierce, but rather easily tamed. The male has a black mane, which stands erect when it is charging. This does not very well fit in with the small mane of modern Indian lions, but it seems that some of the extinct lions in India had more prominent manes.²⁶²

518 A.D. the Buddhist pilgrim Sungyung, seeing living lions in Gandhāra, noted how much this conventional lion differed from its origin (Beal 1884, *cif.*).

- 256 That there are lions in Gandhāran art, could be merely Western influence (Jairazbhoy 1963, 130ff.), but there are many well-carved lions outside the possible sphere of influence of Western art. The lion-capital of Aśoka, the works of Sañci and Mathura school, Pallava pillars supported on lions, Sinhala art, etc. – there are plenty of examples (see e.g. Coomaraswamy 1927, Index s.v. Animals: lion). For a recent summary of lions in ancient Near Eastern and Iranian art see Litvinskiy & Pichikyan 1980, 38ff. For classical lion-lore see Keller 1909, 24ff., and Toynebee 1973, 61ff.
- 257 According to Burton 1933, 269, at the beginning of the 19th century lions were still common in India from Haryana in the north to Allahabad in the east and Gujarat in the south. In c. 400 A.D. Faxian reported the existence of lions in the region of Kapilavastu (ch. 22 in Legge 1886) and in the hills south of Gaya (33). In the west lions were also found in Persia, Syria and Arabia, in prehistoric Greece and southern Spain, though now extinct in these countries.
- 258 There was thus no reason for Lassen (1858, 322), to be surprised that lions and gazelles, both so frequently mentioned in Indian literature, are so subordinate in Western accounts of India. Cf. also Lassen 1874, 648 (1852, 643) on the absence of lions and cows in Ctesias (same again in Kumar 1974).
- 259 First by Ctesias F 45, 10, then e.g. Strabo 15, 1, 31, Curtius 9, 1, 31ff., and Aelianus, *N. An.* 4, 19 & 8, 1. See in the passage about dogs (below) and in Karttunen 1989a, 163ff.
- 260 Curtius 9, 8, 1. In the fourth century B.C. tame lions were not unknown in Greece either (Jennison 1937, 24). Philostratus (*V. Ap.* 7, 30) refers to lion-tamers in Taxila.
- 261 Strabo 15, 1, 69.
- 262 The common claim that the Indian lion is maneless is unfounded, see Burton 1933, 268 & 274f., and Prater 1973, 67f. In Indian art and literature lions certainly are maned (*kesara*). Keller (1889, 155 and again 1909, 87) supposed that Aelianus' tamed lions were in fact cheetahs, but hunting with lions is actually not entirely unheard of (Egyptian and Mesopotamian evidence in Brentjes 1962, 597f.) and thus also not impossible in India, and in India there is no more evidence of hunting with cheetahs before the Islamic period.

We need hardly pay much attention to Philostratus (*V. Ap.* 2, 6) who claimed that lion's flesh was eaten in the Kabul valley. The custom as such could easily be explained from magic – lion's flesh is eaten in order to obtain some of the lion's strength – but Philostratus is not an adequate authority for making it an Indian custom. In the Indian Āyurveda (medicine) the real and supposed medical virtues and vices of various kinds of flesh are carefully explained. In Suśruta the lion is grouped together with other beasts such as the tiger, wolf, hyaena, bear, leopard, cat etc. as a cave-dweller (*guhāśaya*), and their flesh is characterized as sweet, heavy, fatty and fortifying and recommended for disorders of the eyes and genitals.²⁶³

Next we have to ask, what were the spotted tigers? The difficulty of distinguishing between tigers and leopards seems to have been common to the Greeks and Indians.²⁶⁴ In Western literature we often hear that a tiger (τίγρις) has spots, and not stripes, though real striped tigers were occasionally depicted in works of art.²⁶⁵ In India the OIA word *śārdūla* often signified both (there were other words, too; *vyāghra* for tiger and *dvīpin* for leopard). It would seem that the big cats, though different in appearance and habits, were so much dreaded, and therefore referred to in the same way. In the following discussion of the tiger it must therefore always be borne in mind that occasionally leopards, too, may have been meant. Nevertheless, I see no reason to think that the classical accounts of tigers in India were false. When Nearchus²⁶⁶ was able to claim that while the Greeks were accustomed to calling tigers large dappled jackals, he himself had an idea of the real animal. Later both tigers and leopards were at least to some extent known and occasionally seen in royal parks and the Roman arena.

In order to see leopards and even tigers it was not necessary to go as far as India. Leopards were hunted even in the southern parts of Asia Minor, and Hyrcania was famous as tiger country (but so was India, too).²⁶⁷ Both animals were closely associated with Dionysus. The very name of tiger (τίγρις) was explained by Strabo as the Iranian word for 'arrow' and is probably related to the adjective 'sharp' (Avestan *tiyra*).

In India the tiger (OIA *vyāghra*) was known as the source of horror, as the personification of the hostile wilderness (and thus the animal of Rudra and Durgā). A kind of

²⁶³ The chapter discussing the *māṃsavarga* is Suśruta, *Sūtrasth.* 46, 53ff. (with 72f. on lion flesh). The corresponding passage in Caraka, *Sūtrasth.* 27, 35ff., briefly mentions lion among the *prasaha* group of animals, but does not deal with its flesh.

²⁶⁴ Keller 1887, 129ff. & 1909, 61f., Jennison 1937, 76f. & 147f. & 168 & 183ff., Toynebee 1973, 69ff.

²⁶⁵ Examples from works of art are quoted by Keller 1889, 133 & 135 (with notes in 382f.), Warming-ton 1928 (1974), 148 & 359f. (note 10), Steier 1936, 951f; and Jennison 1937, 168. In Kádár 1968, 264, illustrations from late classical mosaics clearly depicting both a tiger and a leopard are given.

²⁶⁶ F 7 in Arrianus, *Ind.* 15, 3. Pédech 1984, 171 suggests that cheetahs were meant here.

²⁶⁷ Pliny, *N. H.* 8, 25, 66 *tigrim Hyrcani et Indi ferunt*. For further references on Hyrcanian and Armenian tigers see Keller 1889, 130 & 380, and Jennison 1937, 24. It is, however, hard to believe in Diodorus 2, 50, 2, that tigers were also found in Babylonia. When the geographical perspective declined, this caused some confusion. Thus Lactantius (5, 204 quoted by Steier 1936, 947) spoke of *hyrcania Indiae regio, in qua tigrides generantur*. On the distribution and habits of the tiger see Brandt 1856, Burton 1933, and Prater 1971, 65f.

extension of the terror of tigers is the belief in were-tigers, analogous to the werewolves of Europe. Such were-tigers, however, were unknown in the West, rare in India,²⁶⁸ and often mentioned only in Southeast Asia and China. In other parts of the world, were-leopards and even were-jaguars have been feared.

It might be that the first knowledge of tigers in the West is contained in the fabulous martichora of Ctesias (F 45, 15 and 45d α - δ). So it was at least interpreted by Pausanias and several modern scholars.²⁶⁹ However, with its triple rows of teeth, human face, and a tail shooting darts the martichora could hardly convey to the reader an identifiable idea of a tiger, although the size of a lion and its reddish colour are fairly correct.

Unfortunately, there is no good description of a tiger in the literature inspired by Alexander's expedition, although the animal was known. Among other things, tigers, too, were presented to Alexander by the Malloi, and tame tigers and leopards brought to the Indian king are mentioned by Aelianus in a passage perhaps going back to Megasthenes.²⁷⁰ Nearchus, however, had himself only seen the skin of a tiger, and heard an exaggerated account of its ferocity. According to him, Indians claimed tigers to be equal in size to the largest horse and much stronger than elephants.²⁷¹ This is hearsay and does not thus much affect Nearchus' reliability. It is, however, probably not true that tigers were not found in the countries visited by Alexander.²⁷²

In addition to the martichora of Ctesias, Aristoteles knew no more of tigers but the hearsay account that the brave race of Indian hounds (see below) had its origin in the cross-breeding of tigers and bitches.²⁷³

²⁶⁸ The only possible reference in ancient Indian literature, to my knowledge, is the man-tiger (puruṣa-vyāghra) mentioned in the VS 30, 8 and the SB 13, 2, 4, 2, but stories about were-tigers have been quoted from Munda and Dravidian folklore. See e.g. Enthoven 1948 and Pinnow 1965. Roscher 1897, 19 & 82 on a similar belief among the Garos of Assam (quoting sources inaccessible to me). For Southeast Asia and China, see e.g. Burton 1933, 257ff. (also on were-leopards in India) and Eichhorn 1954, 147ff.

²⁶⁹ Pausanias 9, 21, 4f. (F 45d γ of Ctesias); accepted e.g. by Ball 1885, 280f., Keller 1889, 139; Jacoby 1922, Steier 1936, 948f. On martichora as a fabulous motif in classical and mediaeval literature see Bartelink 1972.

²⁷⁰ Curtius 9, 8, 1 *Indorum legati... cum donis revertuntur, ... erant... leonesque rarae magnitudinis et tigres, utrumque animal ad mansuetudinem domitum*. Aelianus, *N. An.* 15, 14 κομίζουσι δὲ ἄρα τῷ σφετέρῳ βασιλεῖ οἱ Ἴνδοι τίγρεις πεπωλευμένους καὶ πιθανοὺς πάνθηρας καὶ...

²⁷¹ F 7 in Arrianus, *Ind.* 15. See also Jacoby's commentary ad l., Pearson 1960, 124f. and Hinüber 1985, 1122f. In Indian literature, lions are described as attacking elephants rather than tigers (e.g. the *Kumārasambhava* 1, 6 and the *Mudrārākṣasa*, act 1).

²⁷² According to Brandt 1856, 9ff., tigers were found in Armenia, Azerbaidzhan, Northern Iran, Turkestan, Afghanistan, the Pañjab, and as a rarity in the Indus country (more eastern distribution does not interest us here). Burton 1933, 67ff., confirms Transcaucasia, Northern Iran, Middle Asia and Afghanistan. In the Indus country and the Pañjab it had become extinct, but had been still common some 80 years earlier. In the 16th century Babar hunted tigers near Peshawar. Prater 1971, 65, excludes tigers in the Pañjab and Sind. As to middle Asia, in an interview for the Finnish Broadcasting Company in 1986 Dr. Islam Abdussaljamov, a Tadjik biologist, claimed that tigers were still found in Afghanistan, Uzbekistan, Turkmenistan and Kazakhstan, but were extinct in Tadjikistan. The Transcaucasian tiger seems to be extinct, and in Iran the last tigers have been restricted to the Elburz Mountains, but may now be extinct, too.

²⁷³ Martichora in *H. An.* 2, 1, 501a (F 45d α of Ctesias), Indian dogs in *H. An.* 2, 1, 499b & 8, 28, 607a, and *Gen. An.* 2, 7, 746a.

Megasthenes, too, gave an account of tigers (F 21a in Strabo 15, 1, 37). They are nearly twice the size of lions. He also mentioned a tame tiger. To Hellenistic sources also goes back Pliny's reference to the *tigri fera scatentes* (scil. *asmagi*, 6, 23, 73). The swift tigers of Hyrcania and India are also mentioned in Pliny 8, 25, 66.

Athenaeus, quoting two comedians, mentions the tiger of Seleucus, who caused great enthusiasm in Athens, while Cassius Dio claims that the tiger brought by the Indian embassy to Augustus in 19 B.C. was the first ever seen in Rome and probably also in Greece. Nicolaus Damascenus, too, described this embassy, which he had seen himself, but his list of the gifts does not include tigers.²⁷⁴ It is still possible that both Seleucus and Augustus obtained lions as presents from India. There were certainly also Indian embassies to the West (as there were by Megasthenes and others to the East), although our meagre sources on early Hellenistic history remain silent. As the tiger was a royal present in India, Seleucus could well have obtained his animal from India (though Hyrcania is of course another possibility). Keller (1889, 131) suggested Diodorus' Babylonian lions, but as was stated above, I do not quite believe in their existence.

Though there probably were tigers in the Transcaucasia, in Northern Iran and Middle Asia, they remained rare in the Hellenistic West. After all, a living tiger is not easy to capture and transport over long distances.²⁷⁵ Between Seleucus and Augustus we hear of no tigers and in Imperial times, too, we rarely find more than poetic references.²⁷⁶ A description was attempted by Oppianus, who, again, was unable to tell stripes from spots.²⁷⁷ According to Steier, the only author to make an express and clear difference between striped tigers and spotted leopards was Solinus (17, 4ff.).

Tigers were imagined as drawing the chariot of Dionysus,²⁷⁸ and, according to the *Historia augusta*, Elagabalus showed himself dressed as Bacchus in a chariot drawn by tigers.²⁷⁹ Occasionally tigers were also ascribed to Cybele (usually drawn by lions) and, as a mount, to Eros.

In Roman literature, we several times meet the motif of a tigress deprived of its whelps.²⁸⁰ A fantastic method was explained for catching its whelps. One cub was left behind and the hunter escaped with the rest, while the tiger rescued this one. Poets further referred to the great speed of tigers (*animal velocitatis tremendae* of Pliny) and to their solitary life. Some claimed that there were only female tigers, who were impregnated by the Zephyr wind.²⁸¹

²⁷⁴ Athenaeus 13, 590; Cassius Dio 54, 9, 8–10; Nicolaus Damascenus *FGrH* 90, F 100 (Strabo 15, 1, 73). Cf. Toynbee 1973, 70f.

²⁷⁵ This was familiar to Varro, quoted by Steier 1936, 949.

²⁷⁶ Numerous references given in Steier 1936, some of these quoted in André & Filliozat 1985.

²⁷⁷ *Cyneg.* 3, 340ff. quoted by Steier 1936, 950.

²⁷⁸ See e.g. Vergil, *Aen.* 6, 805; Statius, *Thebais* 7, 569. Keller 1889, 137f. (& 383, notes 74–78 references) and Steier 1936, 951f.

²⁷⁹ *Hist. aug.* 28, 2 quoted by Keller 1889, 138 and Steier 1936, 949.

²⁸⁰ Seneca, *Med.* 862–865; Pliny, *N. H.* 8, 25, 66. Cf. Ovidius, *Metam.* 6, 636f. For another simile, see Juvenalis 15, 163f.

²⁸¹ References for all these in Keller 1889, 132f. and 138 (Zephyr), Steier 1939, 950f., Jennison 1937, 147f., and Toynbee 1973, 70ff. According to Keller 1889, 134, there are more than twenty references to tigers in Vergil, Horace and Ovidius and still more in Statius.

In the Roman arena, a tiger is said to be presented for the first time in 11 B.C., but we cannot be certain if it was a real tiger and not a leopard. After this, tigers were occasionally mentioned in games and processions of the first and second centuries A.D. A large number of tigers have been said to have been presented by Claudius, Domitian, Antoninus Pius and Elagabalus.²⁸² In Greek and Roman art tigers were rare, but Toynebee knows a few unquestionable striped examples, the earliest hailing from the Hellenistic period.²⁸³

The *Periplus* 50 briefly mentions tigers among the animals of the west coast of India. Ptolemy in 7, 2, 21 knew of tigers in Southeast Asia and in 7, 4, 1 in Taprobane. In Sri Lanka there are no tigers, at least not any longer, but the reference could here be explained as meaning leopards, which are still found on the island. Tiger hunts in Taprobane were also mentioned by Pliny (6, 24, 91), but we have seen that his account of Taprobane contained many reminiscences of earlier accounts of India.

Of **leopards** there is not much to say. The Greeks knew them from the Near East as early as the archaic period,²⁸⁴ when the nearest leopards were living in the southern parts of Asia Minor, and the Romans obtained their leopards mainly from Africa. There is some uncertainty about the names, and the readiness to accept cross-breeding between different species confused things still further. An interesting attempt to explain it has been made by Jennison in an appendix to his book (1937, 183ff.) and it seems to be worthy of a brief summary.

According to Jennison, the word *πάρδαλις* (with its abbreviation *πάρδος*) is the original name for the leopard and as such also borrowed into Latin as *pardus*. The now common name, *λεόπαρδος* or *λεοντόπαρδος*, was explained by Pliny (18, 42f.) as a hybrid born of an adulterous relationship between a leopard and a lioness, and, according to Jennison, it seems to be a maneless lion. Still more difficulty is presented by the word *πάνθηρ*, Latin *panthera*. In early sources it seems to be a small animal living in the neighbourhood and as the only such animal with the characteristic spots Jennison suggests the genet (*Genetta genetta*). In later sources, however, the word was also used for the cheetah or leopard.²⁸⁵

²⁸² References in Keller 1889, 134f., Steier 1936, 949, Jennison 1937, 76f., and Toynebee 1973, 70ff.

²⁸³ Toynebee 1973, 70ff., with notes and several illustrations

²⁸⁴ A leopard's skin, *παρδαλή* (scil. *δορά*), is twice mentioned by Homer, in *Il.* 3, 17 & 10, 29. On leopards in classical literature see Keller 1889, 140ff. & 1909, 63f., and Toynebee 1973, 82ff. Keller 1889, 140f. gives some examples from early Greek art, and Toynebee discusses Roman art.

²⁸⁵ Aelianus, *N. An.* 15, 14, on "tame panthers" brought to the Indian king. Jennison interprets them as cheetahs, but leopards are not impossible. According to Jennison, Latin *panthera* was also used for all three (genet, cheetah and leopard). To confuse things still further, there is also the possibility that some reference is actually made to the caracal or serval. On the genet see further Keller 1909, 157f. In India the genet and serval are not found, but the cheetah and caracal as well as several species of small spotted cats and civets are found (Prater 1971). Perhaps we should also repeat from Jennison that the English word *panther* has no independent zoological signification. There has been a tendency to call African representatives of *Panthera pardus* leopards and the Indian, especially the "black" variety, panthers, but they all belong to the same species *Panthera pardus* and in zoology they are called leopards.

It was known that there were leopards in India, too, but they are mainly referred to only in the context of Dionysus.²⁸⁶ Aelianus' reference to tame leopards (or cheetahs) presented to the Indian king has been mentioned above. According to Strabo, Nearchus compared the skins of the "gold-digging ants" he had seen to those of leopards (δέρματα... παρδαλέαις ὅμοια), and it has been suggested that what he actually saw was leopard's skins.²⁸⁷

There certainly were **cheetahs** (OIA *citraka*) in India as well as in the Near East and North Africa, and at least in some cases the word πάνθηρ/*panthera* seems to refer to them. There is, however, not a single reference in classical literature that we could accept without hesitation as the Indian cheetah. The art of hunting with the cheetah seems to have its origin in Arabia, and in India it became known only in the Islamic period.²⁸⁸ Therefore, it is not so clear that references to tame lions, tigers, or leopards should be understood as references to cheetahs,²⁸⁹ as all these animals can be tamed, too, at least when captured as cubs.

The strong and fierce breed of **Indian dogs** was said to hail from successive copulations between bitches and tigers (Aristoteles).²⁹⁰ I have already discussed them on an earlier occasion,²⁹¹ and now have only a little to add. In the West, they were known long before the expedition of Alexander, as they had been mentioned by Herodotus and Xenophon.²⁹² It has been suggested that these early Indian dogs were the ancestors of the Molossians, a breed which seems to have been introduced during or after the Persian wars and was ever since famous for its extraordinary strength.²⁹³ But there seems to be no indication that the Molossians were *known* to be of Indian origin and therefore I cannot follow Lilja's suggestion that "Indian" and "Molossian" should be treated as synonyms. Even if Herodotus and Xenophon were speaking of the same breed which became known as Molossians, there was soon another breed known as Indian.

Alexander saw them in India, in the land of Sopeithes, where an animal fight, dogs against a lion, was arranged before him. He was greatly fascinated by their valour, and his historians did much to enhance their fame.²⁹⁴ But these dogs of the Pañjab were

²⁸⁶ Keller 1889, 150f. & 143 (in art), 1909, 63.

²⁸⁷ Nearchus F 8b in Strabo 15, 1, 44. Arrianus (F 8a) did not mention the comparison. Real leopards' skins suggested e.g. by Pearson 1960, 125, note 144.

²⁸⁸ The first reference seems to be in the *Mānasollāsa* (Wilhelm 1987, 359).

²⁸⁹ As has been often done e.g. by Keller. To the cases quoted above must be added Keller 1909, 86, referring to Nearchus in Arrianus, *Ind.* 15, 3. When Nearchus stated that the Greeks were erroneously using the word tiger for jackals, Keller thinks that by these "jackals" cheetahs were actually meant.

²⁹⁰ Aristoteles, see above, then e.g. Pliny, *N. H.* 8, 61, 148, and Aelianus *N. An.* 8, 1. In a poetic simile they were said to hail from the hounds of Actaeon (Nicander F 37).

²⁹¹ Karttunen 1989a, 163ff. (see also IV.1 above on Aristoteles). Cf. Keller 1889, 132, Orth 1913, Steier 1936, 950, and Toynebee 1973, 103.

²⁹² Herodotus 1, 192 & 7, 187; Xenophon, *Cyneg.* 9, 1 & 10, 1.

²⁹³ Lilja 1976, 11 & 79f.

²⁹⁴ Strabo 15, 1, 31; Diodorus 17, 92; Curtius 9, 1, 31ff.; Plutarch, *Pro nobil.* 19 (Aristobulus F 40); Pliny, *N. H.* 8, 61, 148f. (apparently using an early version of the Alexander Romance); Aelianus, *N. An.* 4, 19; 8, 1 & briefly in 15, 14. See Ball 1885, 282f., McCrindle 1896, 363f.

considered a novelty. The Molossians were already famous in the West, and these Indian dogs were of a different breed. A pack of 150 such hounds were presented to Alexander, who probably brought them to the West, and from this seems to start a new race of Indian dogs different from the Molossians. Even before Alexander, Ctesias' account of Indian dogs and their great valour (F 45, 10) also refers directly to India.

In Ptolemaic Egypt Indian hounds were shown in the procession of Ptolemaeus (Athenaeus, *Deipn.* 5, 200), and the *Pap. Zenon.* 48, also of the 3rd century B.C., contains two metrical epitaphs for Indian hounds of Zeno.²⁹⁵ In India they were mentioned again by Megasthenes, though his account may derive from Alexander's historians.²⁹⁶ Wild dogs in India are briefly mentioned by Aelianus (*N. An.* 16, 20) in a passage probably going back to Megasthenes. The brave dogs were further mentioned among Indian wonders by Pliny (*N. H.* 7, 2, 21), who certainly was not thinking of the familiar Molossians.

The **hyena**²⁹⁷ was mostly known as an African animal, and a clear distinction was made between the two species: the striped hyena (*Hyaena hyaena*, Greek ὑαίνα, Latin *hyaena*, OIA *tarakşu*) of India, Southwest Asia and North Africa, and the spotted hyena (*Hyaena crocuta*, κοροκότ(τ)ας, *c(o)rocotta*) of Africa. In a few sources (Pseudo-Ctesias, Dio) the latter is also mentioned in an Indian context, but this might perhaps be explained by the vague geographical sense that we often see observe with respect to India.²⁹⁸ In the third century A.D. Cassius Dio (77, 1, 3f.) called corocotta an Indian animal, and described it as resembling a mixture of the lion, tiger, dog, and fox. It was seen for the first time in Rome in the games arranged by Severus in 202 A.D. This or a similar account was also given in Porphyrius, *De abstinentia* 3, 4, 5. The *Historia augusta* (Antoninus Pius 10, 9) claims that the first corocottas were exhibited by Antoninus Pius. According to Pliny (8, 21, 30), this animal is a hybrid of the dog and wolf, but he rightly locates it in Ethiopia. The striped hyena was known from closer locations, and nobody seems to mention it as an Indian animal.

That Ctesias should have mentioned Indian **jackals**, as is sometimes stated in secondary literature, is an error founded on the above-mentioned wrong identification of the Pseudo-Ctesian κοροκόττα (African spotted hyena) as the jackal. The only reference to Indian jackals that I have found is Nearchus' brief statement that they are often mistakenly

²⁹⁵ Lilja 1976, 113.

²⁹⁶ Megasthenes F 21a in Strabo 15, 1, 37. On the early history of dogs in India see Conrad 1968, 234ff.

²⁹⁷ There are several references to hyenas and/or corocotas in classical literature in connection with Ethiopia (e.g. Diodorus 3, 35, 10) or at least without any reference to India (e.g. Aelianus, *N. An.* 7, 22). On African hyenas see Keller 1909, 152ff., Jennison 1937, 84f., and Toynbee 1973, 92.

²⁹⁸ Pseudo-Ctesias actually called his κοροκόττα an Ethiopian animal, but the passage is transmitted as a part of Ctesias' *Indica* (Photius) in the notorious and textually worthless Codex M (Monacensis). In the 19th century it was still given with the text of Ctesias (e.g. by Müller and, following him, by McCrindle). This apparently led Lassen (1852, 645 = 1874, 650) to identify it erroneously as the Indian jackal (*koṭṭharaka*). The error has been corrected i.al. by Ball (1885, 281). The *leucrocota* of Pliny (8, 30, 72) seems also to be a kind of hyena; in any case it belongs to Ethiopia and thus cannot be the Indian nilgau antelope of Ball (1885, 286).

identified as tigers by the Greeks. *Lynxes* in Ovidius (Metam. 15, 413) are just a part of Dionysian mythology and thus have nothing to do with real Indian fauna.

The Indian maned wolf or the *lycaon* of Pliny changed its colour like the chameleon mentioned in the preceding passage. Lassen thought that it was the cheetah (his *Felis jubatus*), while McCrindle quotes Cuvier claiming that it should be the tiger! André & Filliozat, however, say that Cuvier actually identified this animal with the cheetah (now *Cynailurus jubatus*).²⁹⁹ Sometimes also spotted hyenas have been suggested. Perhaps André & Filliozat are right in supposing that real chameleon-like changing of colour is not really meant here (although perhaps thought so by Pliny), but a seasonal change of colour. In any case the short passage does not really warrant any identification.³⁰⁰

Next we take up Indian apes and **monkeys**, satyrs and fabulous races.³⁰¹ Sometimes they are difficult to distinguish (for us as well as for the ancients). Vague information about Anthropoid apes was often interpreted as referring to satyrs, but this does not much concern us now as there are no Anthropoids in India.³⁰² Greek κυνοκέφαλος signified both a fabulous people of India (the dog-heads) and a species of African baboons, still known in zoology by the Latin name *Cynocephalus*.³⁰³

Indian monkeys belong to two families, the rather short-tailed macaques (*Cercopithecidae*) and the long-tailed langurs (*Colobidae*). Of these, the langurs are more arboreal, the macaques more terrestrial in their habits. The most common species are the rhesus macaque (*Macaca mulatta*) in the north and the bonnet macaque (*Macaca radiata*) in the south, while the common langur, also called the hulman or hanuman (*Presbyter entellus*) is found all over India. There are several other species in both families, but these are only found in peninsular mountains and in Assam. In these areas two species of the order *Lemuroidea* (loris) are found, too, but these nocturnal and rarely seen animals were hardly known in ancient times.

The first Western account of Indian monkeys is found in Ctesias (F 45, 8), whose long-tailed small monkeys must have been langurs. Next follow the historians of Alexander and Megasthenes. In the forest near the Himalayas by the Hydaspes, where Alex-

²⁹⁹ Pliny, *N. H.* 8, 52, 123 in *Indis lycaon, cui iubata traditur cervix*. Lassen 1858, 323, McCrindle 1901, 115, André & Filliozat 1986, 357. Unfortunately I have been unable to check Cuvier.

³⁰⁰ I have been unable to trace Lassen's reference (1858, 341) to Pliny, *N. H.* 13, 21, 1 that Indians deter wolves because they have the evil eye.

³⁰¹ On Indian monkeys see Prater 1971, 22ff., on apes and monkeys in classical literature, Lichtenstein 1791, Lassen 1874, 688f. (1852, 683f.), Ball 1885, 279f., Keller 1887, 1ff. & 1909, 3ff., McDermott 1938, Pearson 1960, 223ff., and Puskás & Kádár 1980. Toynebee 1973, 55ff. emphasizes the African origin of monkeys seen in the West and does not deal with evidence of the Indian species. I do not think it necessary to comment here on Eggermont's peculiar theories (1984, 214ff.), which led him to discard all differences and to identify the accounts of the monkeys of the Pañjab and of those of the Prasian country as different versions of the same story. On early monkey figurines found in the Indus sites and in Mesopotamia see Ratnagar 1981, 149ff.

³⁰² An exception is the hoolock or white-browed gibbon, but this is found only in the extreme North-east of India (and in Southeast Asia) and thus was hardly known in the West.

³⁰³ In Karttunen 1977 I have collected references both to the animal and to the fabulous people. For a summary see Karttunen 1984.

ander cut timber for his fleet, a great number of long-tailed monkeys (langurs) of uncommon size were seen (Strabo 15, 1, 29). We are told how their imitative habits were used by hunters in order to catch them with the help of bird-lime. Describing the same event (as is confirmed by Diodorus 17, 90, 2f.) Cleitarchus gave a curious account of the method of hunting these apes, and the same is also found in Pliny. For Arrianus, in the early second century A.D., this account of Indian monkeys was no longer of sufficient interest to be quoted, though he referred to it.³⁰⁴

A fragment of Megasthenes³⁰⁵ mentions monkeys which climb precipices and roll stones upon their pursuers. Tailed hairy satyrs rolling stones are also found in Aelianus *N. An.* 16, 21 (where a reference to the Prasii perhaps shows the Megasthenian origin). They are found in the country of Colunda (Κόλουνδα) near the mountains bordering on India.

In the mountains in the east of India, in a country called *Catarcludorum regio*, human-like, hairy and extremely swift satyrs are mentioned by Pliny (7, 2, 24 *sunt et satyri subsolanis Indorum montibus*). The passage comes immediately after the F 51 of Ctesias, but hardly comes from him (the next passage is F 1 of Tauron). Lassen (1874, 689) connected this with Megasthenian satyrs, and Tomaschek (1899, 1785) explained the Catarcludi from *κατὰ Κολυ(ν)δῶν χώραν of the lost Greek original, which could also have been the source of Aelianus' Κόλουνδα. Tauron, too, mentions hairy satyrs in India, though they might also be a human forest tribe. Their home, *Choromandae*, has hardly anything to do with the civilized Coḷas of the south; one would rather take it as a variant of Colunda. But it is still not clear why Stein located this in the Northwest.³⁰⁶ There were probably many primitive peoples fitting this description.³⁰⁷

A more fully preserved Megasthenian account of Indian monkeys is found in Strabo and Aelianus, and further parallels are given by Pliny and Aelianus.³⁰⁸ It is located in the country of Prasii (Aelianus in both passages) or more vaguely in India beyond the Hypanis (Strabo). These monkeys are said to be larger than the largest dogs, of pure white colour with black faces. They, too, have long tails,³⁰⁹ of more than two cubits in length. They are rather tame, and not of a mischievous nature like other monkeys. From the second account of Aelianus we further learn that they are bearded, and they come to the suburbs of the town of Latage, where they are fed. It has often been observed that this

³⁰⁴ Cleitarchus F 19 in Aelianus *N. An.* 17, 25; Pliny, *N. H.* 8, 80, 215; Arrianus, *Ind.* 15, 9, cf. Brunt's note *ad l.* The difference between Strabo's account, perhaps going back to Onesicritus or Aristobulus, and that of Cleitarchus has been briefly discussed by Pearson 1960, 223f.

³⁰⁵ Megasthenes F 27b in Strabo 15, 1, 56

³⁰⁶ Stein 1942, 1418 on the Orsaei (see below), who perhaps were related to this.

³⁰⁷ An equation to Muṅḍa in Tomaschek 1899, 2442 is pure conjecture. McDermott 1938, 77f. thought that these satyrs were gibbons.

³⁰⁸ F 21a in Strabo 15, 1, 37, and F 21b in Aelianus *N. An.* 17, 39; Pliny, *N. H.* 8, 31, 76; and Aelianus *N. An.* 16, 10.

³⁰⁹ A long tail is often emphasized in our accounts of Indian monkeys, perhaps because to the Greeks the most familiar ones were the tail-less baboons.

feeding points to a religious context, and that the description well fits large Indian langurs.³¹⁰

Pliny in the above-mentioned passage briefly mentioned white apes hunted by the Indian Orsaei (a corruption of Prasii?). This was, probably rightly, connected by Stein (1942, 1417f. on the Orsaei) with the Megasthenian account of stone-rolling monkeys. Perhaps we should also include here Aelianus' account that both white and deep black apes are, among many other animals, presented to the Indian king by his subjects. A third kind, the reddish one, is said to be fond of women and therefore readily killed by Indians.³¹¹

To the realm of legend belongs Philostratus' fantastic account (*V. Ap.* 3, 5) that apes collect pepper for Indians. This is located in the (also otherwise entirely fabulous) country between the Hyphasis and the Ganges, although pepper in reality grows only in the south.

The horse (*Equus caballus*) was still a newcomer in India in Alexander's time. Meadow suspects the presence of horses in Harappa culture, but reports the existence of reliable remains from second and first millennium B.C. layers at Pirak.³¹² For the Indo-Aryans, the horse was important, and as far as the literary evidence is concerned, Indians have always employed horses. However, India proper has always been unable to breed good horses,³¹³ and therefore depended on import. But the northwestern country, for a long time known in the West as *the India*, was famous for its horses. This Indo-Iranian borderland was for a long time the main supply of horses for India; only in the second half of the first millennium A.D. did Arabian competition come to overshadow it, at least in the Deccan (Gupta 1984, 198f.). According to the *Arthaśāstra*, the best horses came from the countries of Kāboja, Sindhu, Āraṭṭa and Vanāyu.³¹⁴ The horse-dealers, too, were known as Northerners or Northwesterners.³¹⁵

Quite often we also find Indian horses in classical accounts. Herodotus briefly mentioned horses in India (3, 106) and Indian cavalry and chariots in the army of Xerxes (7, 86). During his Indian wars Alexander met both Indian cavalry and chariots in battle, and he also had Indian cavalry in his own army.³¹⁶

³¹⁰ Ball 1885, 280, McCrindle 1901, 45, note 1. The common langur is whitish and bearded and has a tail of approx. one metre in length. According to Prater 1971, 39, the Himalayan animals, particularly from the western ranges, are the largest and heaviest.

³¹¹ Aelianus, *N. An.* 15, 14. Geographical difficulties make it necessary to reject orang-utans, which only live far away in Southeast Asia. Moreover, that orang-utans should be sexually interested in women, is an old, very popular, and apparently entirely fictitious legend.

³¹² Meadow 1981, 147, note 7. See further Conrad 1968, 228ff.

³¹³ Gupta (1984, 203f.) ascribes this to the poor horsemanship of Indians and particularly to poor feeding, mainly consisting of rice. This has been noted by several mediaeval travellers, but also in the *Arthaśāstra* (2, 30, 18f.) and Jātakas.

³¹⁴ KA 2, 30, 29 *prayogyānām* [scil. *aśvānām*] *uttamāḥ kāmbojasaindhavāraṭṭavānāyujāḥ*. The whole chapter KA 2, 30 is devoted to horses and contains much interesting information. References to these place-names are given by Gupta 1984, 188ff.

³¹⁵ Gupta 1984, 193 with references from Jātaka, *Arthaśāstra* and *Baudhāyanadharmasūtra*.

³¹⁶ See also Hinüber 1985, 1128.

Ctesias (F 45, 22) only mentioned the dwarf horses of the Pygmies. Nearchus knew war horses in India, and Megasthenes spoke of horses in the army.³¹⁷ They were owned by the state and kept in royal stables. Greek and Indian sources agree that in an Indian army chariots were considered more important than cavalry. According to Megasthenes, an Indian chariot had room for two warriors and the charioteer.³¹⁸ Strabo (15, 1, 69, probably from Cleitarchus) mentioned four-horse chariots in a procession and briefly referred to the mules of the Sibae (15, 1, 8).

Aelianus in his animal history (*N. An.*) mentioned horses in India in three passages. 13, 9f. deals with the training of horses in India. Another passage (13, 25) mentions Indian war-horses and elephants and the high esteem in which they were held. A curious account (15, 24) mentions common races for horses and oxen in India. According to Philostratus (*V. Ap.* 2, 19), the Indian king sacrificed to the River Indus black bulls and horses, an account which some scholars interpreted as a veiled reference to the Indian *Aśvamedha* sacrifice.³¹⁹

The Megasthenian claim of a royal monopoly on (war) horses³²⁰ has often been suspected, but perhaps is not so difficult to explain. While the horse certainly was a royal animal from the Vedic period on (as in the *Aśvamedha* sacrifice), it has been argued by Gupta (1984, 187f.) that in the Maurya period horses really might have belonged to the state. As imported animals, horses were rare and expensive, and Gupta refers to *Jātaka* stories, where horse-dealers negotiate with royal officers only. The main use of horses in early India was always in war.³²¹ A veterinary surgeon specialized in horses (*aśvānām cikitsaka*) is mentioned as early as the *Arthaśāstra* (2, 30, 43), but the existing manuals are of a much later date.

Wild horses and asses – and mules – in India are mentioned by Aelianus (*N. An.* 16, 9). The reference to the Prasii and their king probably conveys its Megasthenian origin. Ball (1885, 285f.), on account of the horse-like (or mule-like) character of the Indian onager or gorkhar (*Equus hemionus khur*) and especially of the Central Asian kiang (*Equus hemionus kiang*), which, he says, was still often taken for a wild horse, identified both (of course including the mules) as real wild asses. As Aelianus (*l. c.*) further states that only foals and young animals were caught – those over two years of age were already untameable – and brought to the king of the Prasians, Ball adds that in the 19th century onager foals were still caught in Rajasthan and sold at a good profit to local princes. According to Herodotus (7, 86), Indian chariots in Xerxes' army were drawn by horses and wild asses.

The remains (bones) of a donkey (*Equus asinus*) have been reported from Harappa, but according to Meadow (1981, 146, note 7), they in fact belong to the wild *Equus*

³¹⁷ Nearchus F 11 in Arrianus, *Ind.* 16, 10–12, Megasthenes F 31 in Strabo 15, 1, 51.

³¹⁸ Megasthenes F 31 in Strabo 15, 1, 52.

³¹⁹ Goossens 1930 and Charpentier 1934, 47f., but see criticism in Stein 1936.

³²⁰ Megasthenes F 31 in Strabo 15, 1, 52, also in F 19 (Arrianus, *Ind.* 12, 2ff.) and Diodorus 2, 41, 2. Cf. Stein 1921, 57ff.

³²¹ KA 2, 30, 31 *caturaśraṃ karmāśvasya sāmñāhyam*.

hemionus, also common at some other sites. Domesticated asses used for riding are mentioned by Nearchus (F 11 in Arrianus, *Ind.* 17, 1). The so-called one-horned horse (and the one-horned ass of Ctesias) will be discussed below, in connection with the rhinoceros. Ctesias also mentioned asses held by the dog-heads (F 45, 40) and the dwarf mules of the Pygmaei (F 45, 22).

Camels in India were first mentioned by Herodotus (with a curious idea about their anatomy) in his account of the gold-digging ants (3, 103). Aeschylus (*Suppl.* 284ff.) mentioned camel-riding Indians living beyond the Ethiopians. Riding-camels in North-west India were known to Nearchus (F 11 in Arrianus, *Ind.* 17, 1f.), who stated that the most appreciated mount in India was an elephant as the royal animal; next comes a four-horse chariot, then a camel, and last of all a single horse. During his sea voyage he also saw camels on the Gedrosian coast (Arrianus, *Ind.* 29, 5). In later literature the Bactrian camel was rather often connected with India. According to Aelianus it lived for one hundred years. Apollonius, according to Philostratus, saw camels in the valley of Cophen (Kabul). Lucianus knew that Ptolemaeus Soter introduced Bactrian camels into Egypt. According to Pliny, the Indian lycion was packed in bags made of the skins of camels and rhinoceroses.³²²

Several remains of camels, including a complete skeleton, have been found at Indus sites.³²³ It has been suggested that the dromedary was imported from the West more or less during our period, and with it came a new word in India: OIA *kramela* (< κάμηλος), though it was only rarely used alongside the old and common word *uṣṭra*.³²⁴

Of Indian **Cervidae** and **Antilopinae** we do not have much information. Aristoteles was probably referring to information brought by Alexander's companions in his account of the horse-deer (ἰππέλαφος) of Arachosia.³²⁵ It has a mane and a beard; the male has horns resembling those of the gazelle, while the female is hornless. In size it is comparable to the deer. All these characteristics fit the nilgau, though this large antelope is now found only in India. Pliny knew of the spotted axis, probably meaning the animal still called the axis deer.³²⁶ Of Megasthenes' one-horned stag more will be said below, under rhinoceros. According to Strabo (15, 1, 70f.), the mountain Pramnae wear deer-skins (δοραῖς ἐλάφων χρῆσθαι), while those of the plains use skins of fawns and antelopes (καθημμένους νεβρίδας ἢ δορκάδων δοράς). Four-horned antelopes were referred to by Aelianus,³²⁷ and in another passage fattened stags, two kinds of antelopes, and gazelles

³²² Aelianus *N. An.* 4, 55; Philostratus *V. Ap.* 2, 6; Lucianus, *Prom. in Verbis* 4; Pliny, *N. H.* 12, 15, 31. A general account of both kinds, known as Bactrian and Arabian, is given in Pliny 8, 26, 67. Cf. Toynebee 1973, 137ff.

³²³ Meadow 1981, 146, note 7. For the early history of camels in India see also Conrad 1968, 232f.

³²⁴ See Liebich 1931, 432ff., Mayrhofer *EWA* ss. vv., and Eggermont 1975, 150, note. The *r* of *kramela* is perhaps an adaptation to the root *kram-* (Liebich).

³²⁵ *H. An.* 2, 1, 498b-499a. The same passage also contains the "wild oxen" of Arachosia, perhaps referring to wild buffaloes (see below).

³²⁶ Pliny, *N. H.* 8, 31, 176 (with Lassen 1858, 325)

³²⁷ Aelianus *N. An.* 15, 14 (δρυγας τετράκερωσ).

were presented to the Indian king.³²⁸ In Aelianus (*N. An.* 15, 15) a dwarf antelope is perhaps meant by ὑαινα. The identification of these scanty notes with the many possible species of India is often impossible.³²⁹ Moschus or the musk deer (*Moschus moschiferus*) was only mentioned by Cosmas Indicopleustes in the 6th century.³³⁰

Hump-backed cattle of the zebu variety (*Bos indicus*) were domesticated in India (and/or neighbouring countries) in the prehistoric period,³³¹ and have been common ever since. In the period corresponding to Hellenism in the West, cattle were still commonly eaten, even by Asoka.³³² The importance of cattle and especially of cows in ancient India has led some modern scholars to ask why they are so little discussed in Western sources. The same answer must be given here as in the case of lions – cattle were too familiar. But the truth is that Indian cattle are mentioned rather often in our sources.³³³ The special position of cows was probably a later development, and in any case not so conspicuous as to attract the attention of the Greeks. That we find oxen more often mentioned than cows also fully corresponds to the Greek attitude to cattle.

In the Paropamisadae a great number of oxen (230,000) were captured after a battle; they were of unusual beauty, and Alexander selected the finest and wished to send them to Macedonia to work the soil.³³⁴ Three thousand cattle were also presented by Taxiles to Alexander.³³⁵ A running-game for oxen in India is described by Aelianus, who also

³²⁸ Aelianus *N. An.* 13, 25 πλοῦτον πεπιασμένων ἐλάφων τε καὶ βουβαλίδων καὶ δορκάδων καὶ ὀρύγων.

³²⁹ The deer include the sambar (*Cervus unicolor*), the swamp deer or barasingha (*Cervus duvauceli*), the spotted deer (*Axis axis*) and several other species. The most common antelopes in India are the gazelle (*Gazella dorcas*), the black antelope or black buck (*Antilope cervicapra*) and the blue bull or nilgau (*Boselaphus tragocamelus*). See Prater 1971, 261ff. There have been early attempts at identification. According to Schlegel 1829, 25, Duvaucel had in the *Asiatic Researches* 15 suggested that the hippelaphus of Aristoteles was the “black antelope of Bengal or big axis”. In the West, Indian deer and antelopes were probably (and understandably) never seen. Toynebee 1973, 143ff. quotes no examples.

³³⁰ *Topographia christiana* 11, 6, giving the correct Indian name καστοῦρι (OIA *kastūrī* ‘musk’). Another late reference is found in an additional passage of the Syriac translation of Alexander’s Letter to Aristoteles (p. 153b in Feldbusch).

³³¹ See e.g. Meadow 1981, 161ff., further Conrad 1968, 208ff.

³³² In India this has been a matter of religious controversy. See Chattopadhyay 1968 and Sharma 1969.

³³³ However, Wecker’s (1916, 1303) reference to Ctesias 57, 13 (Müller = F 45, 27) and 57, 22ff. (F 45, 40ff.) and Aelianus, *N. An.* 4, 32 (probably going back to Ctesias) on cattle herds (*Rinderherden*) in India is erroneous; all these passages deal only with sheep and goats. Though in early and poetic language occasionally used for ‘cattle’, too, πρόβατα here clearly means ‘sheep’. Oxen, though only the dwarf (and probably fictitious) race of the Pygmaei, are mentioned in Ctesias F 45, 22 (Müller’s 57, 11). The word here is βόες; immediately before it πρόβατα is used for ‘sheep’. For an early discussion of Indian cattle in Western sources see Lassen 1858, 325ff.

³³⁴ Ptolemaeus F 18 in Arrianus, *Anab.* 4, 25, 4. Lassen 1874, 139 compares this with a contemporary account (S. Irwin in *JASB* 8–9) of the fine ploughing oxen in the valley of the Pañjkora.

³³⁵ Arrianus, *Anab.* 5, 3, 5, and Curtius 8, 12, 11. Cf. Trautmann 1982, 256. Chattopadhyay 1986 is not very useful here. In order to save Taxiles from the (Hindu) accusation of giving these animals in order for them to be eaten, she attempts to show, with a few random citations from secondary literature, that beef would not have been eaten in Greece and Western Asia, either. The words used by Arrianus, ἱερεῖα δὲ βοῦς, are quite conspicuous: the oxen were meant for sacrifice (McCrinkle’s “fattened for the shambles” is somewhat inexact). For the benefit of Indologist readers let it be

mentions a race of oxen of the size of the largest he-goats.³³⁶ The passages in the Dharma literature containing a prohibition of gambling, with one passage explicitly mentioning gambling on animals, at least show that such wagers were made.³³⁷

According to Strabo (15, 1, 8), the Sibae of the Western Pañjab branded the figure of a club on their cattle and mules, a fact which had been used by Greek authors as evidence for their supposed Heracleian origin. In another passage (15, 1, 52) Strabo quoted from Megasthenes (F 31) that bullock-carts were used in India by the army to transport arms and provenances. During a march they also drew the chariots so that the legs of the war-horses might not be chafed by the harness. In 15, 1, 69 he further claimed that ox-teams (βοῖκὰ ζεύγη) were seen in a procession in India together with elephants and other animals.

A curious passage in Aelianus (*N. An.* 16, 16) tells of the Chasm of Pluto (χάσμα Πλούτωνος) among the Arianoi, where cattle and other animals were offered. The account is curious enough to be worthy of Ctesias, but the name Arianoi points to a later origin. The account is located in Eastern Iran rather than in India. Lassen (1858, 352f.) could not say much for its explanation, and we can add nothing.

In the West an exceptionally large horn was brought from India to Egypt (Aelianus *N. An.* 3, 34), and live Indian oxen were seen marching in the procession of Ptolemaeus II Philadelphus (Athenaeus, *Deipn.* 5, 201C). These, of course, may also be so-called Indian oxen of Ethiopia (see below), but as they were shown together with elephants, Indian hounds, parrots and peacocks, I suppose that they, too, came from India. Later, the *Periplus* mentions the import of horns from Barygaza.³³⁸ Toynbee (1973, 149 & 285f.) knows a few examples of humped cattle in Roman art. A confused mythological fragment of Phylarchus³³⁹ lets Dionysus bring two bulls from India to Egypt and name them Apis and Osiris. Can this be taken as a compliment to Indian cattle?

Buffaloes originated in India, where wild buffalo (*Bubalus arnee*) are still found in eastern parts. It is not clear whether buffalo had been domesticated in the Harappan period, as the bones and teeth and pictorial representations may refer to the wild buffalo, which in the 3rd millennium B.C. was found as far to the west as Mesopotamia and Iran.³⁴⁰ In Indian literature the wild buffalo (OIA *mahiṣa*) is mentioned rather often. In the passage quoted above for the "horse-deer" Aristoteles (*H. An.* 2, 1, 399a) also mentioned the wild oxen of Arachosia. As they are black and have horns turning backward they may well be wild buffaloes (Wellmann 1899). Of tame buffaloes we hear nothing at

briefly stated that in ancient Greece oxen were among the principal offerings to the gods. But the gods were given, through the sacrificial fire, only bones and fat; the meat was gladly consumed by the worshippers.

³³⁶ Both in *N. An.* 15, 24. Running oxen also briefly mentioned in *N. An.* 15, 14.

³³⁷ *Manu* 9, 221–225. This has been already referred to in connection with our Aelianus passage by Lassen 1858, 326. Gambling in general was counted as sin e.g. in *Gautamadharmasūtra* 15, 18 and *Baudhāyanadharmasūtra* 2, 2, 16.

³³⁸ *Periplus* 36. Cf. McCrindle 1879, 12f.

³³⁹ Phylarchus F 78 in Plutarch, *De Iside* 29, 368BC.

³⁴⁰ Conrad 1968, 244f.

all in classical literature, and the animal was introduced into Southern Europe only in late antiquity or the early Middle Ages.³⁴¹

Other accounts of wild cattle in India are found in connection with Alexander's campaigns. Aristobulus (F 40 in Plutarch, *Pro nob.* 19) claimed that Indian dogs never attack wild oxen, though willingly lions. Wild oxen of a black colour are described in two passages of Aelianus.³⁴² As their tails are used by Indians as fly whisks, we can identify them as yaks (*Bos grunniens*).³⁴³ In other passages it is often difficult to say whether the yak, wild buffalo or Indian wild ox or gaur (*Bos gaurus*) is meant. Pliny (8, 70, 176) knew of wild oxen with large horns and tall as camels, and in another passage (28, 45, 159) of wild cattle in Indian forests. Aelianus described a country in the heart of India where cattle, sheep, goats and dogs all live wild. The one-horned *kartazonus* (see below) belongs to the same country.³⁴⁴ Aelianus *N. An.* 15, 15 mentions wild bulls fighting each other in an Indian arena. Jones' "tame bisons" (βόνασοι) in Strabo 15, 1, 69 (seen in a procession in India), explained in a note as aurochs (!), are merely an emendation; the MSS. have either a lacuna + ασοι, or ἄρκοι, or θηρία.

The so-called wild Indian oxen of Ethiopia have caused some confusion, when quoted among the fragments of Ctesias' *Indica*, but in fact they do not belong to Ctesias and India, but to Agatharchides (who was Cnidian like Ctesias) and Ethiopia. The "Ctesianic" fragments of Aelianus and Pollux are clearly corrupt.³⁴⁵

Sheep and goats had already been common in the Indus country for thousands of years previously (Conrad 1968, 219ff.). In literary sources both are often mentioned. In the dietary chapter of Caraka (*Sūtrasth.* 27, 61f.) the meat of both is greatly recommended. In Western sources Indian sheep and goats were first mentioned by Ctesias. His fantastic account of fat-tailed sheep and goats (!) in India I have discussed in my earlier book.³⁴⁶ He also mentioned the dwarf sheep and goats of the Pygmies (F 45, 22), and the animals of the dog-heads (F 45, 40). From Ctesias, but without a reference, fat-tailed sheep and goats were also described by Aelianus (*N. An.* 4, 32). In a passage probably going back to Megasthenes Pliny³⁴⁷ makes the Pygmaei ride on rams and she-goats in their expeditions against the cranes.

³⁴¹ According to Wellmann 1899, the first literary account is by Paulus Diaconus (8th century A.D.), but Warmington 1928 (1974), 360, note 16, refers to a 4th-century mosaic representing a tiger and buffalo.

³⁴² *N. An.* 15, 14, and 16, 11, briefly mentioned also in 16, 20.

³⁴³ See Ball 1885, 286f. Lassen 1858, 324f. on *N. An.* 16, 11, suggests, on slight grounds, the sambar; on p. 327 he correctly identifies *N. An.* 15, 14 as the yak.

³⁴⁴ *N. An.* 16, 20. Ball 1885, 286f., connects this, too, with yaks, but if we are to believe the account at all, then wild dogs and rhinoceroses point clearly to plains, not to the Himalayan and Tibetan homeland of the yak.

³⁴⁵ F 46ab in *N. An.* 16, 31, and *Onom.* 5, 41. For Agatharchides see his F 61 in Photius 250, Diodorus 3, 31, and Strabo 16, 4, 10. See also Pliny, *N. H.* 8, 30, 72 (perhaps the rhinoceros). See Lindegger 1982, 136 (and 67f.) and Karttunen 1984.

³⁴⁶ Ctesias F 45, 27 and 45i, see Karttunen 1989a, 167f.

³⁴⁷ Pliny, *N. H.* 7, 2, 26, cf. the similar passage of Megasthenes, F 27b in Strabo 15, 1, 57.

Over ten thousand sheep were included in the presents given to Alexander by Taxiles; Curtius adds that they were of extraordinary size (*eximiae magnitudinis*).³⁴⁸ Megasthenes (F 27b in Strabo 15, 1, 56) claimed that most animals which are tame in the West are found wild in India. The same is found in Aelianus (*N. An.* 16, 20), who, probably going back to Megasthenes, lists sheep, dogs, goats, and cattle as living wild in the heart of India. In India rams were induced to fight one other.³⁴⁹ Orthogoras wrote about fish-eating goats of the island of Coÿtha, and Nearchus twice mentioned fish-eating sheep of the Gedrosian Ichthyophagoi.³⁵⁰ The first passage of Nearchus is located in a place called Calima, with an island called Carnine.

That there should be no **pigs** in India – this was an often repeated false idea going back to Ctesias. It is mentioned by Aristoteles, too, and then twice by Aelianus.³⁵¹ Through Aelianus it was transmitted to many late texts. Of course there are pigs in India, both wild and domestic. Many bone-finds show that at least wild boars were hunted during the Indus civilization.³⁵² In Indian literary sources the wild boar is mentioned as (*dur*)*varāha* or *sūkara* beginning with the *Rigveda*, and nowadays the animal is common in most parts of India.³⁵³ The domestic pig (*grāmyasūkara*) is mentioned for the first time in the *Gautama-Dharmasūtra* 17, 29.

The account of Ctesias was already doubted by Aristoteles, and the Constantinian excerpt (45κγ) actually reveals that it is false by adding that Indians do not eat pork. The Indian wild boar with long tusks is mentioned by Pliny (8, 78, 212), and Philostratus (*V. Ap.* 2, 28) says that at the banquet of the king of Taxila wild boar was served. At least at a later date pork was eaten only by low-castes, though Caraka still mentions it as a medicine (*Sūtrasth.* 27, 78), but with wild boar the attitude has not been so strict. Kṣatriyas, as hunters, hunted and ate it,³⁵⁴ and, according to Manu, the ancestors are satisfied with the meat of boars and buffaloes for ten months.³⁵⁵

A great curiosity of Indian fauna was and is the one-horned **rhinoceros**, now rare and restricted to the Northeast of India, but formerly found as far to the west as the Lahore region.³⁵⁶ In the West the first vague knowledge of it seems to lie in the one-

³⁴⁸ Arrianus, *Anab.* 5, 3, 5; Curtius 8, 12, 11.

³⁴⁹ Aelianus, *N. An.* 15, 15, cf. *KA* 1, 17, 12, and *Kāmasūtra* 1, 3, where *meṣakukkuṭālāvakayuddhavidhīḥ*, arranging fights of rams, cocks and partridges, is given as the 42th among the 64 arts or *kalās*. In Greece cocks and quails were trained for fighting as early as the fifth century B.C. (Jennison 1937, 14 & 18). Fighting rams are often mentioned in Buddhist literature, e.g. in the *Camma-sāṭajātaka*.

³⁵⁰ Orthogoras F 1 in Aelianus *N. An.* 16, 35; Nearchus F 1 in Arrianus, *Ind.* 26, 7 and 29, 13.

³⁵¹ Ctesias F 45, 27 with 45κα-γ; Aristoteles *H. An.* 8, 28, 606a; Aelianus *N. An.* 3, 3 and 16, 37.

³⁵² Wheeler 1960, 68, Conrad 1968, 226ff.

³⁵³ Prater 1971, 299.

³⁵⁴ Wilson 1836, 47. He says that he had himself tasted it at a banquet given by the Maharāja of Bharatpur.

³⁵⁵ Manu 3, 270 *daśamāsāms tu tṛpyanti varāhamahiṣāmiṣaiḥ*.

³⁵⁶ It was depicted in Harappan seals and was still hunted by the Mughals in the 16th century. For a description of the great one-horned rhinoceros and its smaller relatives see Berg 1933 and Prater 1971, 228ff., for the rhinoceros in Indian literature, art and religion e.g. Laufer 1914, Briggs 1931,

horned ass of Ctesias.³⁵⁷ He was also the first to ascribe marvellous medical properties to its horn. More correct information came with Alexander's campaigns and Megasthenes.

In a fragment preserved by Strabo³⁵⁸ Megasthenes mentioned together the stone-rolling monkeys, tame animals living wild in India and one-horned horses with the head of a deer (ἵππους τε λέγει μονοκέρωτας ἐλαφοκράνους). The combination of tame animals living wild in India and the one-horned horse shows that Megasthenes is the source of Aelianus, *N. An.* 16, 20, where a more elaborate description of the animal called the kartazonus (καρτάζωνος) is given. Its young foals are taken and brought to the king of the Prasii, who thus has tame animals to exhibit in public shows. There is hardly any doubt that the rhinoceros is meant; most of the details well suit the rhinoceros, and the name has been explained as a compound containing OIA *khadga*- 'rhinoceros'.³⁵⁹

A comparison with Pliny has led Lassen, Benveniste (who gives a wrong reference) and Steier (1935, 1783) to think that the account of the cartazonus might be partly derived from Ctesias. But although the passage in question, *N. H.* 8, 31, 76 comes immediately after a Ctesias fragment (F 45dδ = *N. H.* 8, 30, 75), it is quite clear that Pliny, as often happens, has changed his source without bothering to give a reference. While the Ctesianic unicorn is in several fragments confirmed as a one-horned ass, Pliny here introduced oxen with solid hooves and one horn (*in India et boves solidis unguibus unicornes*), briefly mentioned the axis and Indian monkeys, and only then goes on to a description of the *monoceros*. In a somewhat problematic sentence he connects the axis with the Dionysian cult, and this seems to me sufficient to show that Ctesias has nothing to do with this passage. The *monoceros*, however, is clearly related to the cartazonus and thus must come from Megasthenes. It also confirms the connection between Strabo and Aelianus as a stag's head (*capite cervo*, missing in Aelianus) as well as elephant's feet and a pig's tail are mentioned. Both Pliny and Aelianus, however, err in claiming that the single horn is on the forehead.

That Alexander's men saw rhinoceroses is testified in two passages of Curtius.³⁶⁰ One-horned asses fighting in an Indian arena are mentioned in Aelianus (*N. An.* 15, 15).

and Bautze 1985, on classical literature e.g. Keller 1909, 383ff., Steier 1935, Richter 1969, and Toynbee 1973, 125ff.

³⁵⁷ F 45, 45 with 45q., fully discussed in Karttunen 1989a, 168ff. Philostratus, *V. Ap.* 3, 2, Pliny *N. H.* 11, 45, 128 & 11, 106, 255, and Aelianus, *N. An.* 3, 41, seem to go back to Ctesias.

³⁵⁸ Megasthenes F 27b in Strabo 15, 1, 56.

³⁵⁹ Lassen 1874, 651, though erroneously deriving Aelianus' account from Ctesias, right in 1874, 689. In the latter passage, however, Lassen shows that he had not read Aelianus' account carefully enough. Thus he claims that the account is located in the Indian Caucasus, while Aelianus actually spoke of innermost India (ἐν τοῖς χωρίοις... τοῖς ἐνδοτάτω). At the beginning of his Megasthenes fragment Strabo refers to the Caucasus, but it is not clear that all belongs there. I also fail to understand how this animal, which is the size of a horse, has unbending legs like an elephant's and a pig's tail, and which roams in solitude, meeting others only in the mating period, seems to Lassen to resemble so much more an antelope than a rhinoceros that he deems the whole account fabulous. For the name *kartazonus* (and the related Perso-Arabic *karkadan*) and its etymology from OIA *khadga* see further Charpentier 1911, 400ff. (Buddhist Sanskrit *khadgaviṣāna*, Pāli *khaggaviṣāna*), and Benveniste 1929.

³⁶⁰ Curtius 8, 9, 17 *eadem terra [India] rhinocerotas aliis ignotos † generat*. The reading *aliis ignotos* 'unknown to others' is an emendation by Hedicke and makes good sense in comparison to

According to Pliny (12, 15, 31), Indian lycion was packed in bags made of the skins of camels and rhinoceroses.

In the West the Indian rhinoceros was understandably rarely seen (think about the difficulties in carrying such an animal alive over such a distance!), and the rhinoceros was commonly thought of as an Ethiopian animal. The name itself, ῥινόκερως, was first mentioned by Agatharchides (F 72) and was commonly used of the African species. African rhinoceroses were in fact not so rare in the Roman arena. But at least according to Pliny, Pompey in his games 55 B.C. presented, among other animals, a one-horned rhinoceros of the Indian type (*rhinoceros unius in nare cornus*).³⁶¹ Dio Cassius (51, 22, 5) must thus have erred in claiming that the first rhinoceros, again one-horned, was seen (and slain) in a Roman arena in 29 B.C. Pliny's one-horned and three-horned Indian oxen, said to be found in Ethiopia,³⁶² may also refer to African rhinoceroses.

This would be the right place to discuss the greatest wonder of ancient animal lore, the **elephant**, but as it would expand this chapter beyond all reasonable limits, I have transferred it to a separate chapter V.3. And as this is not an account of natural history but of philology, **whales**, though mammals, are discussed among sea animals in the second part of chapter V.4.

A further curiosity of Indian fauna is the **pangolin**. According to one theory, this animal was the real origin of the gold-digging ants of Herodotus, but there are so many theories about them that we hardly need consider it here (see Karttunen 1989a, 171ff.), and in any case pangolins belong to India, not to Central Asia. The *phattages* or land-crocodile in Aelianus *N. An.* 16, 6 has been variously identified either as the pangolin or as a lizard.³⁶³ In India the pangolin was classified as a land-fish (Kohl 1954). The name remains unexplained. Lassen's (1858, 324) *phaḍinga*, which should be used for all kinds of lizards, is explained by Monier Williams as a 'grasshopper', and in any case it seems to be a late word found only in the works of lexicographers. As a nocturnal animal the pangolin was not too often seen and could easily have escaped the notice of Western authors.

Indian (and African) **porcupines** are mentioned at least by Pliny. The animal had long quills, and it is said, somewhat exaggeratedly, to be able to discharge them like

the MSS. reading *alit non (generat)* 'feeds, but does not give birth', cf. McCrindle 1896, 186 'is not indigenous' and note 4 ad l. The second passage, 9, 1, 1, is included in a description of the Pañjab, stating: *rhinoceroses quoque, rarum alibi animal, in eisdem montibus erant*.

³⁶¹ Pliny, *N. H.* 8, 29, 71, cf. Jennison 1937, 54f. Toynbee (1973, 125f.) explains this as an African animal, referring to Agatharchides' claim (F 72 in Photius 250, Diodorus 3, 35, 2f., and 16, 4, 15) that the snub-nosed (σιμός) Ethiopian rhinoceros is one-horned, and notes that the snub-nosed rhinoceros actually "has a rear horn so small as sometimes to pass unobserved". See, however, Burstein 1989, 119f., note 3, who points out that the small size of the rear horn is here rather exaggerated and that in Hellenistic art it is always clearly depicted.

³⁶² Pliny, *N. H.* 8, 30, 72 *Indicos boves unicornes tricornesque*.

³⁶³ φαττάγης has been explained as the pangolin by McCrindle 1877, as a lizard by Lassen 1858, 323f. (*Monitor elegans*) and Ball 1885, 287 (*Varanus sp.*).

missiles by distending its skin.³⁶⁴ The feat, also ascribed by Ctesias to his terrible martichora, is fabulous, but in the case of the porcupine somehow understandable from its easily loosened, piercing quills. From this the animal also had its OIA name *śvāvidh* 'wounder of dogs'.

No hares (*śaśa*), not to speak of smaller Indian rodents and insectivores, are met with in our Western sources.

3. The New Weapon of Alexander and his Successors

Among Indian fauna there is one species which above all others is entitled to a separate treatment. This is, of course, the elephant. The number of classical accounts of elephants in India (not to speak of those dealing with elephants in general, with African elephants, or with Indians brought to the West) widely surpasses those of any other animal discussed above. The elephant really is an exceptionally fascinating animal – for the ancients as well as for us. There are so many studies, for instance Schlegel 1820, Armandi 1843, Lassen 1858 (330ff.), Wellmann 1905, Keller 1909 (372ff.), Deraniyagala 1955, Carrington 1958, Krebs 1964 & 1968, Lach 1967, Goukowsky 1972, Toynbee 1973 (32ff.), Scullard 1974, Schwarz 1978 (1134ff.) and 1989a, and Trautmann 1982. It is a wonder of nature which needed no human fantasy to add to it. Nevertheless, it *was* added to by human fantasy.

Ivory was known in Greece as early as the Minoan and Mycenaean periods (in the latter, at least, by the name *ἐλέφανς*).³⁶⁵ Early ivory was most probably imported from Africa (*via* Egypt) or Syria, where elephants were found until the early centuries of the first millennium B.C.³⁶⁶ In the 5th century the Greeks seem to have had no idea about the animal. An *argumentum e silentio* is a highly dangerous method, but the fact that Herodotus³⁶⁷ mentions elephants (in Africa) by name and yet gives no description of the animal, seems to bear out the contention that he had no idea of what an elephant is like.

³⁶⁴ Pliny, *N. H.* 8, 53, 125. The account of this supposed feat by porcupines may originally come from India, where a similar belief seems to have been recorded at least in modern folklore. See Prater 1971, 217.

³⁶⁵ Karttunen 1989a, 104ff. It is also shown there that the traditional derivation of Greek *ἐλέφανς* from OIA *ibha-* is untenable.

³⁶⁶ On Syrian elephants, who might have been related to Indian elephants (and not to African) as well as to Egyptian (which became extinct much earlier) see e.g. Deraniyagala 1955, 116f., Brentjes 1961, 14ff., Krebs 1964, 205f., Scullard 1974, 28ff., and Trautmann 1982, 262ff.

³⁶⁷ Herodotus 3, 44; 3, 97; and 4, 191. Our argument was already used by Pausanias (1, 12, 3f.) in the case of Homer mentioning ivory, but apparently not having any idea of the animal. Cf. Schlegel 1820, 145f. and Scullard 1974, 32.

The Achaemenids imported ivory both from Africa and from India and Arachosia,³⁶⁸ and it was Ctesias, very familiar with the Persian situation, who introduced (Indian) elephants to the Greeks, and gave an eye-witness account of the animal.³⁶⁹ Notwithstanding the criticism of Aristoteles, he did not do it so badly. For a Greek writing nearly four centuries B.C. an elephant with its trunk, pulling out trees at the order of the mahout, as Ctesias had seen it in Mesopotamia, was a wonder indeed.³⁷⁰ It was also true that in India elephants were used in war.³⁷¹ If Ctesias was then told curious lies about the semen of this marvellous animal (F 48), he had no means of verifying them. Oriental stories were involved here as often in his accounts. In another passage (F 45, 15) Ctesias mentions the use of elephants in hunting, and in his *Persica* he claimed that Semiramis confronted war elephants during her Indian campaign.

It is perhaps significant that while Ctesias knew of Indian elephants and their abilities in the Persian Empire and of their use in war in India, in the detailed account of Xerxes' army by Herodotus there are Indian soldiers and Indian cavalry, but no elephants at all. A war elephant was such a wonder for people entirely unfamiliar with elephants (as were the Greeks in the early 5th century B.C.) that Herodotus' silence must be regarded as conclusive. Xerxes did not have war elephants, and Herodotus, who anyway knew no details about elephants, had probably never heard of their use in war.³⁷² But Ctesias knew of them and himself saw elephants in Babylonia, and later Darius Codomannus employed Indian war elephants in his army at Gaugamela. Even if we assume that these elephants of Darius were merely a gesture of a friendly neighbouring prince in the East, we can hardly accept, considering Ctesias (who also often mentioned other Indian tributes), that Achaemenid rule in Northwest India ended with Xerxes.

An important, because chronologically close, parallel to Ctesias is Aristoteles. He borrowed, but also criticised, Ctesias' account of the elephants (cf. IV.1 above). But when we collect all the passages about elephants in his works (most of them without a reference to India) we obtain so much that Ctesias can hardly be considered his only source. And as it is not so sure that all other sources were always telling the plain truth, we must absolve Ctesias of blame for further legends, such as the unbending legs (below).

One source of new information is easy to find. When Alexander acquired his first few elephants after the battle of Gaugamela, where they had fought under Darius

³⁶⁸ DSf 43f. *piruš hya idā karta hacā kūšā utā hacā hidauv utā hacā harauvatiyā abariya*. As Arachosia seems to be a completely unsuitable region for elephants, the country was probably dealing in Indian ivory. For still earlier ivory trade between Mesopotamia and India see Ratnagar 1981, 111ff.

³⁶⁹ F 45, 7 and 45b from Aelianus, *N. An.* 17, 29. Cf. Scullard 1974, 33ff.

³⁷⁰ See further the similar account in Aelianus, *N. An.* 5, 55.

³⁷¹ The "wall-breaking elephants" of Ctesias have often been taken by early scholars (e.g. Lassen 1852, 645) as an example of his wild imagination, but in fact elephants were employed in Indian warfare to break down, if not walls, at least gates. To references in Karttunen 1981, 106, should be added Kanakasabhai 1904 (1966), 100, 108 and 130 referring to ancient Tamil poetry (so-called Sangam literature) and KA 13, 4, 9 with Kangle's note.

³⁷² This was pointed out as early as by Schlegel 1820, 17.

Codomannus in the Indian contingent, he perhaps sent one animal to Athens, where his old teacher seems to have had an occasion to examine it. His detailed knowledge certainly gives the impression of an eye-witness account and in one passage³⁷³ he gives the food rations of an elephant in Macedonian medimni, which clearly points to information coming from Alexander.

With Aristoteles we already find some essential elements of Western elephant-lore. There are more than twenty scattered references to elephants in the *History of Animals*, six in the *Generation of Animals*, four in the *Parts of Animals*, and two in the *Progression of Animals*.³⁷⁴ He made some anatomical observations (e.g. *H. An.* 2, 1, 500b and 2, 5f., 501bf.), and was able to correct some persistent errors such as the unbending legs (*Progr. An.* 9, 709a). Unfortunately, this particular error lived on, at least until the end of the Middle Ages.³⁷⁵ Aristoteles himself was unable to correct the exaggerated gestation period of two years.³⁷⁶

The question of procreation remained somewhat mysterious. In the grossly exaggerated account of Onesicritus (F 14 in Strabo 15, 1, 43) the period of gestation is no less than ten years! Megasthenes, with his great expertise on India, correctly stated 16–18 months of gestation, but then claimed a suckling period of six years, while six months would have been more correct.³⁷⁷ Aelianus (*N. An.* 4, 31) referred to two diverging opinions, one claiming a gestation period of two years, another of 18 months. In later tradition (Aelianus, *N. An.* 8, 17) we also meet the claim that elephants copulate only once in their life-time, and then merely in order to reproduce. Aelianus and his unknown source apparently forgot to consider what soon happens to the population when every two animals only produce a single offspring.

³⁷³ *H. An.* 8, 9, 596a. This has been discussed by Bernard 1985, 93f., and Bosworth 1995, 33. The latter rightly rejects Romm's tenuous hypothesis (1989) that Aristoteles even here referred to African elephants. Romm's main argument was the claim of Onesicritus (F 14 in Strabo 15, 1, 43, cf. below) that Indian elephants were bigger than the African variety. According to Romm, this presupposes a knowledge of African elephants before the Indian animals were seen in the east. But we never hear of African elephants so early, and Onesicritus was perhaps generalizing from his idea of the general superiority of India or he might have seen African elephants later, when he was working on his book.

³⁷⁴ We mention here only some of the more interesting among them, but all are discussed by Scullard 1974, 37ff.

³⁷⁵ In classical sources it was stated as a fact e.g. by Strabo 16, 4, 10 and Diodorus 3, 27, both speaking of Ethiopian elephants and going back to Agatharchides (F 56, also in Photius 250). An error like this seems to be somehow understandable with people who have only seen an elephant, but not examined it (as Aristoteles had). Although by no means jointless, the strong legs of an elephant are stiff and pillar-like, and while it can actually lie down, it is unable to jump. See Carrington 1958, 41f., and Scullard 1974, 40.

³⁷⁶ So *Gen. An.* 4, 10, 777b; *H. An.* 5, 14, 546b, but according to *H. An.* 6, 27, 578a eighteen months or even three years. In 5, 14, 546b three years was the time the male is said to wait before a new copulation. From more reliable information he stated that a female elephant first copulates at the age of ten to fifteen, but an age of five or six years for males is somewhat too early. See Carrington 1958, 43f. (females 13–16 years, but the youngest known only 8 years old, males on the average 15, but the youngest known 9 years), also Scullard 1974, 44f.

³⁷⁷ F 20ab in Arrianus, *Ind.* 14, 7 & Strabo 15, 1, 43. The same is also repeated in Diodorus 2, 42. Stories about a gestation period of 2–9 years lasted until the modern period, but according to Deraniyagala (1955, 71f.) and Carrington (1958, 58), the true period is no more than 20–21 months.

The longevity of elephants has always been exaggerated. Onesicritus claimed that they reach the age of 300, occasionally 500,³⁷⁸ and have full vigour at the age of 200. In connection with Macedonian information Aristoteles referred to some claiming 300 years, while others stated 200 years as their greatest age.³⁷⁹ The correct, or only slightly exaggerated account of their age, about that of the oldest men, seems to have been given by Diodorus (2, 42). But a comparison with Megasthenes' remains shows that Diodorus was merely quoting carelessly in his usual way. In F 20b (Strabo 15, 1, 43) it is also stated that most elephants live as long as very long-lived humans, but that some continue to live as long as 200 years. Arrianus (*Ind.* 14, 8 = F 20a) gave 200 years as the normal life-span, "though many die before that of disease". In any case Megasthenes, too, had been exaggerating. Two hundred years was also repeated by Aelianus.³⁸⁰ In Indian tradition the standard span of life for elephants is stated as 120 years.³⁸¹ This figure of 120 seems somehow to have arrived in Europe, too, and has often been quoted and apparently thought to be confirmed by experience.³⁸² Hinüber quotes from Grzimek an age of hardly 70 years, and in the wild only an average of 35, which seems somewhat low.³⁸³

To return to Aristoteles, elephants are said to be easily tamed (*H. An.* 1, 1, 488ab) and in one passage a reference to Indian mahouts is made (6, 18, 571bf.). In the ninth book, which some scholars consider spurious, there is a long passage where the employment of elephants for war and hunting in India is mentioned (*H. An.* 9, 1, 610a).

As stated by Pausanias (1, 12, 3), Alexander was the first European to acquire elephants. He seems to have been fascinated with this new weapon, although its weak side was already clearly seen in the battle against Porus, when scared elephants caused so much havoc on their own side. During his campaigns Alexander collected quite a number of them, and the force was then divided among his successors, as we shall see.

We can to some extent reconstruct the accumulation of Alexander's elephants from the *Anabasis* of Arrianus.³⁸⁴ The *Vulgate* authors occasionally give different numbers.

³⁷⁸ F 14 in Strabo 15, 1, 43, cf. Brown 1949, 93f. Philostratus (*V. Ap.* 2, 12) with his account of Porus' elephant still being alive at the age of 350 in the first century A.D. Taxila apparently believed this. According to Carrington (1858, 47), an "elephant of Napoleon" was shown in Budapest in the 1930s. In *V. Ap.* 2, 13 Philostratus quotes Juba (F 50) on an African elephant living over 400 years.

³⁷⁹ *H. An.* 8, 9, 596a.

³⁸⁰ *N. An.* 4, 31 (cf. also 9, 58).

³⁸¹ *Mātaṅgalīlā* 5, 23 in Edgerton 1931, 68.

³⁸² E.g. Schlegel 1820, 183, but even some modern authors such as Krebs 1964, 207, Pédech 1984, 147, and, though himself a naturalist, Deraniyagala 1955, 74. Krebs has argued against lower estimates, supposing that they were based only on average life-expectation in European zoos and circuses, where conditions are completely different from those in India. But in addition to the fact that the life expectation in a modern zoo tends to be longer, not shorter, than in nature, the lower figures given below are mainly based on the wearing out of molars, which makes feeding impossible.

³⁸³ Hinüber 1985, 1122. Carrington 1958, 46f. gives somewhat higher figures, but still the age of an elephant in captivity does not extend beyond that of a human, and in the wild it is probably still less.

³⁸⁴ Of course, this was done earlier, too. See e.g. Schlegel 1820, 167ff., Armandi 1843, 44ff., Krebs 1964, 206f., Goukowsky 1972, 475f., and Scullard 1974, 64ff.

The very first elephants had been those Darius had had at Gaugamela, 15 in number (3, 8, 6 and 3, 15, 7). The next were obtained, though not mentioned by Arrianus, in Susa, 12 in number (Curtius 5, 2, 10). The second addition was found when Alexander was still to the west of the Indus. Seizing the Assacenic town of Ora he captured its elephants, too (4, 27, 9), and some more were obtained when his adversaries fled to Abisares, on the other side of the Indus, and left their elephants behind (4, 30, 5). On this occasion we learn that Alexander already had Indian elephant-hunters in his retinue.

Taxiles had already (4, 22, 6) promised his elephants, and gave all thirty of them, when Alexander met him east of the Indus (5, 3, 5).³⁸⁵ To Porus his own elephants³⁸⁶ brought disaster, and many were killed in the battle. The rest were again acquired by Alexander (5, 18, 2),³⁸⁷ who also ordered Porus, reinstated in his position, to collect more (5, 21, 2). After Porus' defeat, Abisares presented Alexander with 40 elephants (5, 20, 5), and during the siege of Sangala Porus came with the remainder of his elephants as promised (5, 24, 4).

During the voyage down the river, the elephants marched on the river bank, in the contingent led by Hephaestio. At this time Alexander had collected some 200 beasts (6, 2, 2). The collection was enlarged in the south, too, at least by the elephants of Oxycanus (6, 16, 2). Later they marched under Craterus (6, 15, 4), and when he led the veterans on the return journey *via* Arachosia, the elephants went with him (6, 17, 3). They were thus saved from the hardships of the Gedrosian desert, and only met Alexander again in Carmania (6, 27, 3). They were present with the army at the death of Calanus and trumpeted their honour to the sage (7, 3, 6 = Nearchus F 4). Their total number must have been somewhere between 200 and 300.

Though African elephants were known and soon employed, India was always thought to be the main country of elephants (e.g. Diodorus 2, 35). Tales about the elephant armies of Indian kings aroused much wonder. In his account of Indian peoples Pliny (6, 21, 63ff.) included information about their armies, probably derived from a Hellenistic source (Megasthenes?). This account seems to show a greater number of elephants among the more eastern kings (and a greater number of horses in the west).³⁸⁸ In

³⁸⁵ Also in Curtius 8, 12, 11 (where their number is given as 56).

³⁸⁶ On the battle and the elephants' role in it see Arrianus, *Anab.* 5, 17, and Curtius 8, 14. Diodorus 17, 87, 2, gives their number as 130, according to Curtius 8, 13, 6 his army was headed by 85 large elephants. He tells us further that 30 elephants were brought to Alexander from Arachosia (8, 13, 3), and that he entrusted them to the care of Taxiles (8, 13, 5).

³⁸⁷ Diodorus 17, 89, 2, gives the number of captured elephants as 80.

³⁸⁸ So stated by Smith 1957, 193, cf. Trautmann 1982, 267. The elephant forces given are as follows: in 6, 22, 66 Gangaridae Calingae had 700 elephants; 6, 22, 67 Thalutae or all peoples beyond the island of the Ganges 4,000 (McCrinkle 1877, 138: 400) and Andarae 1,000; 6, 23, 73 Megallae between the Indus and the Iomanes 500 and Asmagi near the Indus 300; 6, 23, 75 Oratae in Gujarat (?) 10, Suarattaratae in Gujarat had no elephants, Sarabastreae in Gujarat 1,600, Charmae (*pauper rex*) 69; 6, 23, 76 Pandae 500. The last number is perhaps not very reliable, as it seems not to be a contemporary account (by Pliny or Megasthenes, the difference is not important here), but to belong to legendary history. Arrianus, *Ind.* 8, 7 tells us that Heracles gave his daughter a force of five hundred elephants, and this number we have again in Pliny.

Indian tradition, too, the easterners are particularly skilled in elephant warfare.³⁸⁹ Porus with his rather low number of elephants had given the Macedonians a hard fight, and the rumour, liberally offered by Porus and his men, of the far greater number of large, strong elephants in eastern armies³⁹⁰ was probably one reason for the draining away of the courage of the Macedonians exhausted from battle and thus it led to the events at the Hypasis.

From Megasthenes we have an account of elephants in the Maurya empire.³⁹¹ In F 20 he described an elephant hunt (below) and some peculiarities of the animal, while the account of the Indian army (at the end of F 31) briefly describes Indian war elephants. They carry four men, the driver and three bowmen. From F 32 we learn that the Indian king was accustomed to hunting from an elephant's back (as in Ctesias). It is not clear that Diodorus 2, 37, 2, claiming that the Gangaridae have the largest elephants, is from Megasthenes, as Aelianus *N. An.* 13, 8 says that the Prasian elephants are the largest.³⁹² Both names, the Gangaridae and the Prasians, were already familiar to the historians of Alexander, but there is reason to think that the rather numerous references to the latter in Aelianus hail from Megasthenes.

Literature about Alexander's Indian campaigns contains the curious statement about women accepting the gift of an elephant as a price for their favours.³⁹³ While this is perhaps not reliable (though the naive arguments of Chattopadhyay 1973 do not help us at all), there is no need to compare it with Megasthenes' statement that all elephants belonged to the state, as he was describing the Maurya empire, not the Northwest. Leaving the price of female modesty aside, we learn from Nearchus that, although in the Northwest, too, the elephant was considered a royal mount (*βασιλικὸν ὄχημα*), its use was not restricted to the king (as in the Maurya empire, according to Megasthenes). Among the oligarchic *Gaṇas*, it could hardly have been so. The noble or rich people rode on elephants (*ὀχήματα... τοῖς εὐδαίμοσιν ἐλέφαντες*).

Even for the Mauryas, Megasthenes' claim of a state monopoly seems to receive no confirmation in Indian sources, and it might be that he had somehow misunderstood the situation.³⁹⁴ The Indian sources, however, are of a general nature, and there is next to nothing especially connected with the early Mauryan empire. This leaves some room for speculation, which could perhaps save Megasthenes' reputation. We may well consider a

³⁸⁹ E.g. *Mbh.* 12, 102, 4cd *prācyā mātaṅgayuddheṣu kuśalāḥ śathayodhinaḥ*. See also Vasil'kov 1982, 56.

³⁹⁰ According to Diodorus 17, 93, 2, King Xandrames was said to possess no fewer than 4,000 trained elephants. See further Diodorus 18, 6, 1 (*πληθος*); Curtius 9, 2, 4 (3,000); Arrianus, *Anab.* 5, 25 (*πληθος*), 1; Plutarch, *Al.* 62, 3 (6,000). See also II.3 above.

³⁹¹ Strabo 15, 1, 42f. (F 20b), 52 (F 31) and 55 (F 32); Arrianus, *Ind.* 13f. (F 20a); clearly related to F 20 is Diodorus 2, 42. See Stein 1921, 47ff.

³⁹² Diodorus 2, 37, 2; Aelianus *N. An.* 13, 8; Gangaridae and their elephants also in Vergil, *Georg.* 3, 27.

³⁹³ Nearchus F 11 in Arrianus, *Ind.* 17, and F 22 in Strabo 15, 1, 43; and Onesicritus F 14 in Strabo 15, 1, 43. Cf. Thapar 1963, 87f.

³⁹⁴ F 19b in Strabo 15, 1, 41 (and repeated at the end of 43), so explained by Stein 1921, 58ff., but see Trautmann 1982, 254ff.

situation where Candragupta was busy consolidating and enlarging his newly conquered kingdom. Military interests must have been very prominent. We know that Megasthenes actually visited the king in his military camp. Perhaps elephants had been confiscated for the army, and Megasthenes understood the situation as a permanent arrangement. We may also note that in the West, in Ptolemaic Egypt, elephants, like many other things, seem to have been a royal monopoly and that is what they were in the Roman Empire.³⁹⁵

As to the women, their modesty should perhaps not be so great a problem. The point is really one of chastity, not of lasciviousness (as Chattopadhyay 1973 supposes). An army generally attracts women, who are ready to work for much lower prices than elephants. Let us suppose that an interpreter really told the Macedonians this story. Perhaps there was one particular case which he was generalizing, perhaps he was merely exaggerating ("an elephant is so much valued as a gift that a woman would even..."). In the military camp, which was otherwise accustomed to being surprised by the curious customs of the strange country, something like this might easily become a subject of common gossip. We should perhaps not make too much of it.³⁹⁶

The method of catching wild elephants is described in detail in classical sources, and generally it corresponds quite well with what is known of India in later times.³⁹⁷ Two methods were mentioned: either the animals were chased with the help of tamed ones,³⁹⁸ or they were lured by female elephants into a walled enclosure.³⁹⁹ Both methods are known in the Gajāśāstra as well as in accounts of modern elephant hunts. Occasionally it is claimed that only young animals were captured.⁴⁰⁰ The account of taming, too, corresponds well to what is known from independent sources.⁴⁰¹ Elephant hunts in Africa (Ethiopia) are described by Agatharchides, Pliny and Aelianus, but these were intended for killing animals, not for catching living ones.⁴⁰²

³⁹⁵ Wellmann 1905, 2253. The evidence is not conclusive, e.g. Agatharchides F 57 (in Photius 250), cited by Wellmann, claims that Ptolemy wanted all elephants for himself, but does not clearly state that their possession was actually forbidden for others. For the Seleucid Empire there is no direct evidence at all, but again there is no evidence for private elephants, either, and their existence is rather unlikely.

³⁹⁶ A kind of rejoinder to this story can be seen in Aelianus, *N. An.* 11, 15, a story of how an elephant in India punished the unfaithful wife of his mahout and her lover killed them both with his tusks.

³⁹⁷ See Stein 1921, 54f., Edgerton 1931 on the *Mātāṅgalīā*, and e.g. Corse 1799, Deraniyagala 1955, 78ff., and Carrington 1958, 163ff. There is at least one (apparently late) Sanskrit text dealing particularly with the catching and training of elephants, the *Gajāgrahaṇaparakāra* by Nārāyaṇa Dīkṣita.

³⁹⁸ Aristoteles, *H. An.* 8(9), 1, 610a; Pliny, *N. H.* 8, 8, 24.

³⁹⁹ Megasthenes F 20ab in Arrianus, *Ind.* 13–14 and Strabo 15, 1, 41–43; Aelianus *N. An.* 12, 44.

⁴⁰⁰ Aelianus, *N. An.* 4, 24, but see 12, 44 about an Indian method of taming full-grown elephants with the aid of music. The latter passage, including the method of using enclosures, may be borrowed from Megasthenes F 20 as here, too, full-grown animals are taken (Arrianus, *Ind.* 14, 1, Strabo 15, 1, 42) and the use of music is briefly mentioned (Arrianus, *Ind.* 14, 3, Strabo 15, 1, 42)

⁴⁰¹ Megasthenes F 20ab in Arrianus, *Ind.* 13–14 and Strabo 15, 1, 41–43; Aelianus, *N. An.* 12, 44; Pliny, *N. H.* 8, 8, 25. Cf. further Aristoteles, *H. An.* 6, 18, 571b–572a.

⁴⁰² Agatharchides FF 54–57 (in Photius 250, Diodorus 3, 26f., and Strabo 16, 4, 10), Pliny, *N. H.* 8, 8, 26, Aelianus, *N. An.* 6, 56, see further 7, 6; 7, 36; 8, 10 and 10, 10; cf. Krebs 1968, 435f., and Scullard 1974, 128ff. The above-mentioned legend of unbending legs gave rise to the famous

We never hear of different breeds in Africa, though the difference between the wood elephant and the bush or savannah elephant is quite considerable. But in Asia, the large elephants of Taprobane are especially mentioned in several classical sources as a different breed, as they are.⁴⁰³ The first to mention them was Onesicritus, who claimed that they were larger and better adapted to warfare than Indian elephants, and Eratosthenes briefly confirms the presence of elephants on the island.⁴⁰⁴ The Megasthenian Taprobane fragment (F 26) is silent about elephants, but Pliny apparently much abridged his quotation, and it may be that Aelianus, *N. An.* 16, 18, goes back to Megasthenes. Here we again hear that the elephants of the island are larger, more powerful and cleverer than those of the mainland. What points to Megasthenes is that they were sold to the Calingae of eastern India, and the following detailed account of sea monsters around Taprobane also corresponds well to Indian tradition and could thus have originated with Megasthenes. The island thus became known as the home of large elephants (μητέρα Ταπροβάνην Ἀσιηγενέων ἐλεφάντων of Dionysius Periegetes 593) and as such it is occasionally mentioned in literature. To quote just two more examples, Alexander Lychnus (first century A.D.) in a fragment preserved by Stephanus mentions “fine-nosed elephants” common in Taprobane, and Ptolemy twice briefly mentions elephants in Taprobane.⁴⁰⁵

With Indian elephants the Indian art of Elephantiatra (*gajaśāstra*, *hastyāurveda*) was also imported into the West. Much of it is written down in the Indian manuals of *Gajaśāstra*, although they are from a much later period.⁴⁰⁶ Indian methods were known in the West, too, as for a long time the mahouts were imported from India (see below).⁴⁰⁷

We must now return to the military history of elephants. In India elephant warfare had been popular among kings and princes from the pre-Mauryan period until Mughal

method of elephant-hunting by cutting down the tree-trunks on which sleeping elephants were supposedly leaning. This has been described by Agatharchides (F 56) as having been practised in Ethiopia. It is impossible to say whether Aelianus' description (*N. An.* 7, 6) of elephants fleeing chasing horsemen should be located in India or Africa.

403 The Sri Lankan elephant is the type form (the form first described by Linnaeus) of the Asian elephant and therefore called *Elephas maximus maximus*. For a zoological description see Deraniyagala 1955, 43ff. But while discussing tusks and molars in great detail, the Sri Lankan naturalist is curiously silent about size and merely states (1955, 40) that the Ceylon and Indian varieties are the largest, the Southeast Asian smaller.

404 Onesicritus F 13 in Pliny, *N. H.* 6, 23, 80, Eratosthenes in Strabo 15, 1, 14. Cf. André & Filliozat 1980, 111 (note 3) and Schwarz 1990.

405 Stephanus s.v. Taprobane, Ptolemy 7, 4, 1 and 7, 4, 8.

406 The *Gajaśāstra* (published in the Tanjore Series), the *Hastyāurveda* (publ. in the Ānandāśrama Series) and the *Mātāṅgalilā* by Nīlakaṅṭha (translated in Edgerton 1931) are the best-known texts. See Edgerton's introduction and Deraniyagala 1955, 130f. Further e.g. Nārāyaṇa Dīkṣita's *Gajagrahaṇaprakāra*, a metrical text dealing with the catching and training of elephants (Sarman in the *Sri Venkateswara University Oriental Journal*), and Nārādāmuni's *Gajaśikṣā* (both edited by E. R. Sreekrishna Sarman in the *Sri Venkateswara University Oriental Journal*. 7:1-2, 1964 & 18:1-2, 1975 [Texts and Studies]).

407 See Aristoteles, *H. An.* 8, 22, 604a and 8, 26, 605af; Megasthenes F 20a in Arrianus, *Ind.* 14, 9 (and briefly 20b in Strabo 15, 1, 43); Pliny, *N. H.* 8, 10, 28; and Aelianus, *N. An.* 13, 7f. (cf. 2, 18). See Filliozat 1933a for a comparison between the classical accounts and the *Mātāṅgalilā*. Parts of the elephant were also used as medicine for human disorders (see Wellmann 1905, 2257).

times, and it was definitely given up only with the introduction of firearms.⁴⁰⁸ We have seen how war-elephants had been introduced on a small scale by the Achaemenids. In the Hellenistic world elephants were a new and much appreciated weapon.⁴⁰⁹ The foundation in the West was the elephant force brought by Alexander from India. After his death, they were inherited by Perdikkas as the regent and employed by him against Ptolemaeus in Egypt in 321 B.C., though with meagre success.⁴¹⁰ Some of these animals fell at Triparadeisus (321 B.C.) to the lot of Antipater, who brought them to Europe, and in 318 B.C. Polyperchon employed them (65 animals) at the siege of Megalopolis, again without success.⁴¹¹ The rest had been given to Antigonos, who was the first to use elephants in open battle, for the first time in Paraetacene in 317 B.C. in his war against Eumenes.⁴¹² But by then his adversary had already obtained an elephant force of his own.

Eudamus, whom Alexander had left to govern India together with Taxiles, and who used his position to murder Porus, had left India, taking with him 150 elephants, which he offered to Eumenes. These animals, however, were not enough, as Eumenes was defeated. His elephants were taken by Antigonos among other spoils.⁴¹³

The well-known treaty with Candragupta (see VI.1 below) gave Seleucus the valuable force of 500 elephants,⁴¹⁴ much used in continual wars against rival kings. African elephants were soon seen in the armies of the Ptolemies, who were independently hunting in Ethiopia,⁴¹⁵ and Carthage, which could use the then not yet extinct elephant population in the Atlas country.⁴¹⁶ In Macedonia there was no fresh supply, though Demetrius Poliorcetes kept the animals of his father Antigonos. Some of them, however, were taken by Pyrrhus, who led them against the Romans.⁴¹⁷

In the Seleucid East later additions were probably acquired from India by way of commerce, although our sources are silent. We only know that early in the second century

⁴⁰⁸ Singh 1963 & 1965, 72ff.; Goukowsky 1972; Carrington 1958, 177ff.

⁴⁰⁹ The military history of elephants in the West is discussed e.g. by Schlegel 1820, 167ff., Armandi 1843, Krebs 1964 and 1968a, Goukowsky 1972, Seibert 1973, and Scullard 1974.

⁴¹⁰ Diodorus 18, 33–36; cf. Krebs 1964, 207, Goukowsky 1972, 482, Seibert 1973, 353f., and Scullard 1974, 79.

⁴¹¹ Diodorus 18, 71; cf. Goukowsky 1972, 483, Seibert 1973, 354, and Scullard 1974, 82ff.

⁴¹² Pausanias 1, 12, 4; cf. Krebs 1964, 207f., Goukowsky 1972, 483f., Seibert 1973, 354f., and Scullard 1974, 85ff.

⁴¹³ The history of Eudamus is discussed in more detail in chapter VI.1 below.

⁴¹⁴ Tarn 1940a, Krebs 1964, 208, Goukowsky 1972, 487ff., Seibert 1973, 354f., Scullard 1974, 97f., and Trautmann 1982, 269ff.

⁴¹⁵ It was started during the reign of Ptolemaeus II Philadelphus. Its history, as told by Agatharchides F 1 (Photius 250) and FF 54–57 (Photius 250, Diodorus 3, 26f., Strabo 16, 4, 7), has often been discussed, see e.g. Schlegel 1820, 187ff., Wellmann 1905, 2253, Tarn 1926, 99f., Jennison 1937, 37ff., Carrington 1958, 182f., Krebs 1964, 212f., and in more detail 1968, 428ff., Scullard 1974, 126ff., and Burstein 1989, 4ff.

⁴¹⁶ On Carthaginian elephants, their origin and history (cf. Strabo 17, 3, 14), see Wellmann 1905, 2254, Carrington 1958, 183ff., Krebs 1964, 214ff., and in more detail 1968, 440ff., Seibert 1973, 357ff., Scullard 1974, 146ff.

⁴¹⁷ See e.g. Krebs 1964, 208f. & 211f., Seibert 1973, 355f., and Scullard 1974, 101ff.

Antiochus obtained some new elephants (150) from Bactria and India.⁴¹⁸ But it is by pure chance that the particular passage of Polybius mentioning this incident is preserved in the meagre records of Hellenistic history, and there might have been other incidents lost to us. The Ptolemies, however, were cut off from India and its elephants and so created their own African supply of these animals.

It has been a source of wonder that classical authors claim that Indian elephants are larger and more courageous than African ones,⁴¹⁹ while modern experience points in the opposite direction, but this old question seems to have been actually settled.⁴²⁰ Instead of the large bush or savannah elephants of Central Africa, the Ptolemies and Carthaginians used smaller wood elephants, which were probably still common in Ethiopia and in the Atlas forests. It has also been shown by Carrington that the oft-cited legend about the untameability of *Loxodonta africana* is no argument against our evidence. At the beginning of this century Belgians tamed wood elephants successfully in the Congo and used them in forest work, and Western zoos and circuses offer further examples of tamed African elephants.⁴²¹

African (bush and wood alike) and Indian elephants differ so much in appearance that it is often easy to make the distinction even in works of art, and both types have been depicted.⁴²² In general appearance the Indian elephant has a convex or level back and keeps its head much lower down than the African, which has a concave or saddle-shaped back and larger ears and trunk. According to Carrington, the African bush elephant male is approx. 11 feet tall at the shoulders, the Indian rarely more than 10 feet and the African wood elephant only 7–8 feet.⁴²³

Krebs (1964, 219) suggested the possibility that, instead of the wood elephant (*Loxodonta africana cyclotis*), which is a small subspecies of the African elephant, the Atlas elephants might have belonged to the more remote and completely extinct species *Elephas antiquus*, which was actually living in North Africa in prehistoric times. This, however, seems to be the same as Carrington's *Palaeoloxodon antiquus* (1958, 28f.), and this was actually much greater in size than the greatest living elephants, approximately 14 feet at the shoulders. There is also no archaeological evidence for its existence in the historical period besides a questionable interpretation of Saharan rock-drawings, while in the light of palaeontological evidence it became extinct much earlier. Deraniyagala (1955, 28f.) suggested instead a separate, now extinct subspecies of the African elephant, which he called *Loxodonta africana pharaohensis*, but even this can be ruled out, as it seems

⁴¹⁸ Polybius 11, 39. Cf. Goukowsky 1972, 490f., and Trautmann 1982, 268.

⁴¹⁹ First by Onesicritus (F 14 in Strabo 15, 1, 43), then e.g. Polybius 5, 84, 5f.; Curtius 8, 9, 17; Diodorus 2, 16, 4; 2, 35, 4 & 2, 42. Brown 1949, 94f., and Scullard 1974, 54 consider the idea that Onesicritus was merely drawing a conclusion from the supposed general superiority of India to Africa.

⁴²⁰ Not by Tam 1926, but see Jennison 1937, 196ff., Carrington 1958, 162f. and Scullard 1974, 23f. & 60ff.

⁴²¹ Carrington 1958, 162, 187ff., and Scullard 1974, 62.

⁴²² See Goukowsky 1972, 498ff. about elephants in Hellenistic art. Illustrations also in Scullard 1974.

⁴²³ Carrington 1958, 26f., Scullard 1974, 19ff.

that a small remnant of North African elephants has actually been preserved in Mauretania, and these are common wood elephants.⁴²⁴

Although there were other sources of elephants (Ethiopia and even Western Africa), and the mahouts of *these* elephants certainly could be westerners, too, the Indian origin of this weapon was never forgotten. Therefore the common Hellenistic word for a mahout was just Ἰνδός/*Indus* 'Indian',⁴²⁵ though other words, too, such as ἑλεφαντιστής and ἑλεφαντάγωγος, were occasionally used. The monopoly of Indian mahouts as a class of privileged "Gastarbeiter" was broken during the Ptolemaic venture, when it was found out that elephants could also be trained to obey Greek commands. At first it had been thought that they understand only the Indian language.⁴²⁶ We can be quite sure that the men who led the Carthaginian African elephants were not really Indians, but that is what they were called by Polybius and Appianus.

The military history of the elephant in the West was brief. All was well when two armies with elephants fought each other (as they did in India until the coming of the Muslims and even later). But good cavalry with proper tactics could easily defeat these tanks of the ancient world. After Pyrrhus and Hannibal, Romans, too, acquired some, but it seems that they never really trusted this precarious new weapon.⁴²⁷

The heyday of Indian elephants in the West was in the days of the early Hellenistic kingdoms, and after the passing of Alexander's elephants the Seleucids seem to have possessed the only supply of Indian animals.⁴²⁸ They still had elephants at the battle of Magnesia against the Romans in 190 B.C., but after their victory the Romans forbade Antiochus III to keep elephants. These were the animals brought by Antiochus from Bactria and India at the end of the third century, and this was the last time we hear of elephants brought from India. Nevertheless, it seems that his son, Antiochus IV Epiphanes, again owned some.⁴²⁹ After the decline of the Seleucid power Indian elephants became a rare sight in the West,⁴³⁰ and the many animals seen in Rome were mostly brought from

⁴²⁴ Scullard 1974, 25.

⁴²⁵ For Hannibal's mahouts ("Indians") see Polybius 1, 40, 15; 3, 46, 7 & 11; 11, 1, 12; and Appianus 7, 7, 41; for those of Pyrrhus, Dionysius of Halicarnassus 20, 12, 3. See Filliozat 1933a, Stein 1920, 55f., Goukowsky 1972, 483, and Karttunen 1995a, 157.

⁴²⁶ Aelianus, *N. An.* 11, 25. In two further passages (4, 24 & 13, 22) Aelianus claims that elephants by nature understand the "Indian language". It was never really understood by the Greeks and Romans (with the early exception of Herodotus) that several different languages were spoken in India. What is meant by the Indian language (Ctesias even used the word Ἰνδιστί 'in Indish') seems mostly to be a MIA dialect. According to Carrington 1958, 175, an elephant can learn at least 30 different verbal commands.

⁴²⁷ On ways of fighting against elephant forces see Armandi 1843, 273ff., 350ff. & 489ff., on Roman elephants Toynbee 1973, 37ff., and Scullard 1974, 178ff.

⁴²⁸ Disbelieving in such fresh accessions Krebs (1964, 209f.) endeavours here to posit an argument for the long life of elephants, suggesting that the 102 Indian animals used against Egypt at Raphia in 217 were centenarian remnants of the 500 of Seleucus.

⁴²⁹ Krebs 1964, 210, and Scullard 1974, 185f.

⁴³⁰ So stated by Lucretius (2, 540 Indian elephants, *quarum nos perpauca exempla videmus*) as early as before the middle of the first century B.C.

Africa. It has been emphasized by Warmington that there is no reference at all to the import of live animals from India.⁴³¹

The rise of Rome also meant the end of elephant warfare in the West, despite a few short-lived experiments. In the 2nd century A.D. Arrianus (*Tactica* 19) could affirm that only Indians and Ethiopians employed elephants in war. On the other hand, (African) elephants were quite a sight in triumphal processions, and this, together with the arena, was their only use in the West from the first century B.C. onwards.⁴³² It has been suggested (Carrington 1958, 192) that the massive import of elephants to Rome was the direct reason for the extinction of the Atlas elephant.

In the Middle Ages elephants were so much forgotten that illustrations of them in mediaeval manuscripts occasionally resemble more a pig with a trumpet as a trunk than the real thing. Only two living elephants are mentioned as coming to Europe, one for Charlemagne and one for Saint Louis, and only in the 16th century were the Portuguese again able to import several animals.⁴³³

Nevertheless, it is in the literature of the Roman period that we find the extant accounts of classical elephant-lore. A certain Amyntianus had written a monograph on elephants, but only one fragment is preserved,⁴³⁴ and we have no idea of the nature of the work. In extant literature the animal was rather popular, as can be seen in the accounts of Pliny and Aelianus. In the *Naturalis historia* there is a special chapter on elephants (8, 1, 1 – 8, 12, 34), while Aelianus' account is scattered in various parts of his *Natura animalium*. Both offer a mixture of different material, mostly culled from Hellenistic literature. An important source seems to have been the lost book of King Juba, from whom Pliny and Philostratus seem to have derived much of their knowledge, but this was mainly concerned with African elephants.⁴³⁵ Late accounts of elephants, but often referring to classical sources (mainly Aelianus), are found in Byzantine literature, such as in the *Excerpta Constantini* (2, 68–132) and in the didactic poem by Manuel Philes, a poet of the early 14th century.

Space does not allow a detailed account of all classical information. Therefore, a summary of Pliny's contents is given⁴³⁶ and then a few of the more salient points in classical elephant-lore will be discussed more fully.

⁴³¹ Warmington 1928 (1974), 146f. & 151f. Indian ivory, however, was imported and also mentioned in texts (*ibid.*, 162ff.).

⁴³² See Armandi 1843, 373ff., Wellmann 1905, 2255f., Jennison 1937, 44 & 48f. & 58 & 64 & 66f., Carrington 1958, 191ff., Toynbee 1973, 46ff., and Scullard 1974, 198ff. & 250ff. Deraniyagala 1955, 67f. gives an interesting account of elephant fights in historical Sri Lanka.

⁴³³ Carrington 1958, 200ff. and Lach 1967; illustration from a Mediaeval MS. in Carrington 1958, 224.

⁴³⁴ *FGrH* 150, F 2 from *Schol. Pind.* rightly stating that in Africa female elephants, too, have tusks, while in India they do not.

⁴³⁵ The direct fragments of Juba (who was mainly discussing African matters) are found in *FGrH* 275, but probably the accounts of Pliny (*N. H.* 8, 1, 1 – 8, 13, 35) and Philostratus (*V. Ap.* 2, 11–16) contain much material derived from him without reference. See also Charpentier 1934, 43ff.

⁴³⁶ See also Scullard 1974, 208ff.

(Pliny *N. H.* 8, 1, 1) The elephant and its great intelligence. (2) A religion of elephants in Africa, and (3) other marks of religion. Small bastard elephants are used for ploughing in India. (2, 4) Elephants in Rome, with a reference to Dionysus' Indian conquests. (5) Elephants in the arena. (3, 6) Examples of intelligence. (4, 7) Tusks as ivory. (8) Elephants know that their tusks are valuable. (5, 9) Their fear of hunters. (10) That even tigers fear hunters. (11) The intelligence of elephants, their personal names. (12) How Antiochus rewarded the elephant which first dared to cross a river. (13) Their sense of shame and modesty, their sexual habits and love. (14) Elephants falling in love with humans. (15) Their good memory. (6, 16) How the first elephants arrived in Italy, (17) and how the Romans did not know what to do with captured elephants. (7, 18) Fighting with elephants in war and (19) in the Circus. (20) Elephant fights arranged by Pompey. The elephants (21) were then so gentle that the public was angry at their killing. (22) Further fights arranged by Caesar and others. (23) The gentleness of elephants. (8, 24) The method of capturing them in India and in Africa, (25) and of taming them in an enclosure. (26) Ethiopian Troglodytae eat their flesh and hunt them single-handed. (9, 27) The training of elephants. They dread the squeal of a pig. Africans are smaller and afraid of Indians. (10, 28) The breeding of elephants; that they love a bath; their diseases and (29) eating habits; how they use their trunk. How leeches can torture them when imbibed with water. (30) Their thick skin. (31) Ivory. (11, 32) African and Indian elephants, the hatred between elephants and snakes in India, (12, 33) and how they fight each other. (34) Aquatic snakes grabbing elephants' trunks and drinking their blood.

Much of this reappears in other classical sources. While some of the information was correct, there were many myths concerning elephants, and some of them lasted until the modern age. Many stories were told about the intelligence, emotions and devotion which were more or less rightly supposed to be characteristic of elephants. Especially the devotion of elephants towards their masters was a frequently mentioned theme, first made famous by the elephant of Porus.⁴³⁷ Readers were probably fascinated by stories of elephants falling in love with humans. In most cases these were male elephants and girls, but at least one instance is quoted where the object of the elephant's love was a man.⁴³⁸ From Juba came the account of a kind of religion of the sun and moon supposedly practised by elephants in Africa.⁴³⁹ According to Aelianus, tame elephants are very fond of flowers.⁴⁴⁰

Much was also said about various uses of elephants. Since the days of Ctesias it had been known that elephants can pull trees and this seems to have been an important use for them (as it was in Asia until recent times).⁴⁴¹ Much has been written on their use in warfare⁴⁴² and in animal fights in the Roman Circus (see below). Pliny knew of small

⁴³⁷ E.g. Curtius 8, 14, 40; Plutarch, *Al.* 60, 12f., and *De soll. an.* 14, 970CD; Aelianus, *N. An.* 7, 37. For other examples of smartness, thankfulness etc. see Wellmann 1905, 2252.

⁴³⁸ Pliny, *N. H.* 8, 5, 14 (three cases, one quoted from Juba F 54) and Plutarch, *De soll. an.* 18, 972D; Aelianus, *N. An.* 7, 43. Pliny specifies that the first two of his cases had taken place in Ptolemaic Egypt, while Aelianus locates his story in Antioch in Syria. We may assume that the Syrian case, too, is derived from Hellenistic literature, because that was the only period when elephants were commonly seen in these places.

⁴³⁹ Juba F 53ab in Plutarch, *De soll. an.* 17, 972BC and Aelianus, *N. An.* 7, 44; further Pliny, *N. H.* 8, 1, 2f., and Aelianus, *N. An.* 4, 10. See Carrington 1958, 221ff.

⁴⁴⁰ Aelianus, *N. An.* 13, 8. At the end of the passage there is a reference to the Prasians, so perhaps this comes from Megasthenes. According to Aelianus 1, 38, elephants love perfumes and among the human loves of elephants mentioned above a flower-seller and a perfume-seller were mentioned.

⁴⁴¹ Ctesias quoted above; Aristoteles, *H. An.* 2, 1, 497b; Aelianus, *N. An.* 5, 55. Cf. Pliny 8, 10, 29.

⁴⁴² To passages quoted elsewhere in this chapter add Aelianus, *N. An.* 13, 8 (war elephants drink wine); 13, 22 (elephants as guards of the Indian king); and 13, 25.

elephants called "bastards" used in India for ploughing, and of normal ones used as mounts.⁴⁴³ In a passage perhaps derived from Cleitarchus, Strabo mentions elephants, adorned with gold and silver, seen in processions during festivals in India.⁴⁴⁴ Aelianus tells the story of a white elephant in India and of its devotion to its master.⁴⁴⁵

Even in the classical age naturalists were wise enough to discount Juba's theory that the tusks were not teeth at all, but horns.⁴⁴⁶ It was accepted, though wrongly, that elephants would normally use just one tusk for digging and chopping in order to keep the other one sharp for fighting.⁴⁴⁷ It was also supposed that elephants themselves knew that hunters were after them because of the valuable ivory of their tusks. It was probably no more than an exaggerated statement, proper to a famous orator, about the supposed fantastic richness of India to claim that tusks and skulls were there incorporated in house-walls.⁴⁴⁸

There is not much that is correct in accounts of the relations between elephants and other animals, though it might be true that leeches may torment elephants.⁴⁴⁹ However, naturalists have assured us that there is no truth in such claims that elephants hate pigs and cannot stand their grunting⁴⁵⁰ or that tigers can easily kill a full-grown elephant.⁴⁵¹ The well-known idea that elephants hate or fear mice is found in Pliny.⁴⁵² It has further been stated that elephants and rhinoceroses fight fiercely for pasture, though all the references are related to Africa.⁴⁵³ A popular motif in classical literature was the implacable enmity between elephants and serpents or dragons (V.6 below). It is variously

⁴⁴³ Pliny, *N. H.* 8, 1, 3 *Indis arant minores, quos appellant nothos*; 6, 22, 66 *his arant, his vehuntur... his militant dimicantque pro finibus.*

⁴⁴⁴ Strabo 15, 1, 69. Elephants were also included in the famous Bacchic *pompa* of Ptolemy (Athenaeus 5, 200f). See Jennison 1937, 30.

⁴⁴⁵ *N. An.* 3, 46. According to Horace, *Ep.* 2, 1, 196, a white elephant had been seen even in Rome in the time of Augustus (*sive elephans albus volgi converteret ora*). This might be Indian, of course, but even then it is not necessary to search for its origin as far as Thailand (so Jennison 1937, 96), and albinos are in fact not unknown in Africa, either. See Carrington 1958, 232f. on a cult of white elephants in Ethiopia (and 226ff. on white elephants in Thailand).

⁴⁴⁶ Juba F 47ab quoted and criticized in Pliny, *N. H.* 8, 4, 7 and Philostratus, *V. Ap.* 2, 13. Briefly Aelianus, *N. An.* 4, 31. That tusks were teeth, indeed, had been confirmed by Aristoteles, who had also studied the molars (*H. An.* 2, 5f., 501b–502a). Juba's idea of tusks being horns is followed by Lucianus (*De Syria Dea* 16) and Oppianus (*Cyneg.* 2, 489ff.).

⁴⁴⁷ Pliny, *N. H.* 8, 4, 8; Plutarch, *De soll. an.* 966C; Aelianus, *N. An.* 6, 56. However, it seems possible that tame war elephants were trained to do so.

⁴⁴⁸ Dio Chrysostomus 79, 4.

⁴⁴⁹ Pliny, *N. H.* 8, 10, 29. From Carrington (1958, 41) we learn that the thick skin of elephants is in fact very sensitive, and at least mosquitoes and flies can greatly plague them. As pachyderms elephants were already known to Aristoteles (*Gen. An.* 5, 3, 782b).

⁴⁵⁰ Pliny, *N. H.* 8, 9, 27, and Aelianus, *N. An.* 16, 36, but see Carrington 1958, 77.

⁴⁵¹ This is claimed by Nearchus F 7 in Arrianus, *Ind.* 15, 1; cf. Pliny, *N. H.* 8, 4, 10. According to Carrington 1958, 78 (and Scullard 1974, 54), tigers only attack calves, not full-grown elephants.

⁴⁵² Pliny, *N. H.* 8, 10, 29 *animalium maxime odere murem, et si pabulum in praesepio positum attingi ab eo videre fastidiunt.*

⁴⁵³ Agatharchides F 72 (in Photius 250 and Diodorus 3, 35) and Artemidorus in Strabo 16, 4, 15; Pliny, *N. H.* 8, 29, 71; Aelianus, *N. An.* 17, 44; Oppianus, *Cyneg.* 2, 551ff.

located in India and Africa and used as an explanation for the origin of cinnabar.⁴⁵⁴ From the little-known Statius Sebosus, Pliny (9, 17, 46) quotes an account of a giant worm living in the Ganges and hunting elephants, gripping the trunk when the animals are drinking. While a variation of the dragon motif, this is probably also related to the famous Odontotyranus of Pseudo-Palladius and the Alexander Romance and perhaps also to the much earlier giant worm of the Indus described by Ctesias.⁴⁵⁵

It remains to add a few words about a passage in Aelianus. After having told how elephants are supposed to cross a ditch (the largest one goes down, others tread on its back and after crossing rescue him),⁴⁵⁶ he goes on to say that in India there is a region called Phalacra, and that only the elephants are wise enough to avoid this country. There is probably no need to search for an Indian explanation to this name, as it is stated that any creature which eats the grass growing there loses its hair and horns (Greek φαλακρός 'baldheaded'). That this story does not necessarily originate in India is seen in Strabo (16, 2, 45), where the same is told of an Ethiopian lake.

4. Talking Birds and Aquatic Monsters

Next we have to discuss Indian birds, though, with a few exceptions, we here have much less material than about the mammals. Among the historians of Alexander the account of Cleitarchus has been partly preserved by Strabo and Aelianus.⁴⁵⁷ From Cleitarchus is perhaps also the preceding part of Strabo's passage describing royal processions in India, which included, among many other animals, "a multitude of birds of variegated plumage and fine songs". According to Cleitarchus, they were carried in cages suspended in four-wheeled carriages, and among these birds were those called the orion and catreus, which will be discussed below.

There is much more in Aelianus' work concerning Indian birds. In *N. An.* 13, 18 he described royal gardens in India with tame birds and many kinds of plants and trees, surpassing in splendour the famous gardens (paradises) of Susa and Ecbatana. A de-

⁴⁵⁴ Elephants and dragons (δράκων, *draco*, but by this word giant snakes were meant) in India: Pliny, *N. H.* 8, 11, 32ff.; Aelianus, *N. An.* 6, 21; Philo of Alexandria, *De aeternitate mundi* 128f. Elephants and giant snakes in Ethiopia: Diodorus 3, 37, 9; Aelianus, *N. An.* 2, 21. This supposed enmity is often alluded to in late Latin literature (examples in André & Filliozat 1986). Cinnabar (V.1 above) as the blood of these animals killing each other in Pliny 33, 38, 116. See also V.6 below.

⁴⁵⁵ Pseudo-Palladius 1, 14, *Alexander's Letter to Aristoteles* p. 20f. Ctesias F 45, 3; 45, 46 & 45r (the last in Aelianus, *N. An.* 5, 3). See Goosens 1929, 1934 & 1946, Gunderson 1980, 102ff.

⁴⁵⁶ Aelianus, *N. An.* 8, 15. More acceptable accounts of river-crossings are found e.g. in Pliny, *N. H.* 8, 5, 12, and Philostratus, *V. Ap.* 2, 15. Cf. Carrington 1958, 69f.

⁴⁵⁷ *FGrH* 137, F 20 in Strabo 15, 1, 69 (twice); and F 22 & 21 in Aelianus, *N. An.* 17, 22f.

scription of the parrot (below) is then given. In 13, 25 he listed a number of animals presented to the Indian king, including cranes, geese, hens, ducks, turtle-doves, francolins, partridges, a kind of francolin called the spindalus, and small birds such as the boccalis, beccafico and ortolan. A similar list of animal presents is also given in *N. An.* 15, 14, but the only birds included here are the dove and cercoronus (below). In *N. An.* 16, 2–5 several individual Indian birds are described by Aelianus and will be discussed below. Pliny (10, 2, 3) knew that India and Ethiopia have many brightly-coloured birds, but his bird book (*N. H.* 10) contains rather few accounts of Indian birds. In Hesychius' lexicon a few Indian bird names are mentioned (γανσσαλίτης and ἀνάκης), but without any description their identification remains entirely conjectural (as in Goossens 1943, 53f.).

In both lists of animal presents in Aelianus doves or **pigeons** were included. The latter list (15, 14) specifies them as untameable pale-yellow pigeons and in *N. An.* 16, 2 a brief description of green pigeons resembling parrots is given. Yellow pigeons in India were also mentioned by Daimachus (F 4 from Athenaeus; also in Aelianus, *V. H.* 1, 15). There is not much to add by way of comment. The family *Columbidae* includes more than twenty species of various pigeons and doves found in South Asia, among them too many possibilities for certain identification.⁴⁵⁸ Quite a number of pigeon figurines have been found at sites of the Indus civilization, but nothing seems to point to taming, and it has been suggested that they rather represent wild pigeons, with a possible religious connotation.⁴⁵⁹ In OIA and MIA literature both tame and wild pigeons (OIA *kapota*, *pārāvata*, *hārīta*) are described, the former e.g. in the *Milindapañha*, *Mahābhārata*, *Pañcatantra* and *Śiśupālavadhā* (4, 52 *grhakapota*). Aśoka forbade the killing of white pigeons and domestic doves.⁴⁶⁰ Both kinds are mentioned as food by Caraka (*Sūtrasth.* 27, 72f.).

The **parrot**⁴⁶¹ and its ability to imitate human speech was reported in Greece as early as by Ctesias (F 45, 8), but only Alexander's campaign made this bird really familiar in the West. Ctesias had clearly seen the bird himself: he relates that it spoke "in the Indian language", but could also learn Greek.⁴⁶² Ctesias called it βίττακος, but later it was commonly known as ψιττάκη (and ψιττακός), occasionally also σιττακός (-κη and even σίττας). Even with so many variants the word has escaped all acceptable etymologies (OIA *śuka* is too distant in form), though obviously a loan-word. Pliny (10, 58, 117)

⁴⁵⁸ This was already noted by Ball 1885, 305. See also Scholfield's note on *N. An.* 16, 2. It must be noted that Aelianus here used the word *πελειάς*, in 15, 14 the more common *περιστερά* (and so also Daimachus).

⁴⁵⁹ Conrad 1968, 250.

⁴⁶⁰ Pillar Edict V *setakapote gāmakapote*. Chakravarti 1906, 371, quoted examples from the *Dharmaśāstras*, where the killing of pigeons is prohibited, and from *Jātakas*, where they were used as food.

⁴⁶¹ For a general account of parrots in the classical West see Keller 1913, 94ff.; Warmington 1928 (1974), 152ff.; Thompson 1936, 335ff.; Wotke 1949; Toynbee 1973, 247ff.; and, most recently, Tammisto 1997, 80f. & 95f.; on parrots in India see e.g. Dave 1985, 141ff.

⁴⁶² I fail to see why this should be considered to be stated "in sehr naiver Weise" (Wotke 1949, 929). We have seen that more than a century later it was commonly believed that elephants naturally knew "the Indian language" and it was a cause of surprise when the African elephants learned Greek commands.

claims that the Indian form of the name is, in the accusative, *siptacen* (v.l. *septagen*), which does not help us much.⁴⁶³

Wild parrots are gregarious and noisy birds and therefore easily attract attention, but their remarkable imitative ability was so much greater a source of wonder to the Greeks that we mostly read of tame birds. The first after Ctesias to mention them was Aristoteles (*H. An.* 8, 12, 597), though only in the somewhat suspect eighth book. He knew that it came from India, was capable of imitating the human voice (*ἀνθρωπόγλωττος*), and became insolent when given wine. This can as well come from Ctesias as from companions of Alexander's. Nearchus mentioned the parrot as a kind of marvel,⁴⁶⁴ and Curtius, too, counted it as an Indian wonder, though he knew that they were also exported to the West.⁴⁶⁵

Parrots were displayed in Ptolemaeus' great procession in Alexandria (Athenaeus, *Deipn.* 5, 200). In the late first century B.C. parrots were still a rare sight in Rome, but soon they became common among wealthy people.⁴⁶⁶ Arrianus (*Ind.* 16, 9), commenting on Nearchus, confirms that a talking parrot was no longer a novelty in his time. He had himself seen several.

Although there are parrots in Africa, too,⁴⁶⁷ in classical antiquity the parrot was always associated with India. Pliny and Pausanias assured their readers that parrots were imported from India.⁴⁶⁸ For Clement of Alexandria the parrot was merely "the Indian bird".⁴⁶⁹ In Imperial Rome they were often kept as luxury pets, some in cages of ivory or of tortoise-shell. In India the bird is mentioned in literature from the early Vedic period.⁴⁷⁰

⁴⁶³ A relationship *pt* > *tt* would be a normal development from OIA to MIA, but it can as well be that an original *psittace* was corrupted in Pliny's text.

⁴⁶⁴ Nearchus F 9 in Arrianus, *Ind.* 15, 8. There is nothing in the text to the effect that Nearchus "brought some live parrots to the West" as claimed by Jennison 1937, 18. Keller 1913, 45, states the same of Onesicritus without giving a reference. Parrots are not mentioned in the fragments of Onesicritus.

⁴⁶⁵ Curtius 8, 9, 16 *aves ad imitandum humanae vocis sonum dociles sunt*.

⁴⁶⁶ Jennison 1937, 120f., and Toynbee 1973, 247ff. (with references). On birds in the Ptolemaic procession see now Tammisto 1997, 58.

⁴⁶⁷ Pliny, *N. H.* 6, 35, 184 knew that the military expedition sent by Nero to the south of Egypt (6, 35, 181ff.) saw parrots beyond Syene (*inde primum visus aves psittacos*), but this apparently never became common knowledge. It is difficult to say whether "farthest Syria" as the parrot country in Diodorus 2, 52, 2 refers to India or Africa, though the mention of guinea-fowls point to the second alternative.

⁴⁶⁸ Pliny, *N. H.* 10, 58, 117 *India hanc avem mittit* (Solinus 53 *sola India mittit psittacum avem*); Pausanias 2, 28, 1 *παρά δ' Ἰνδῶν μόνον ἄλλα τε κομίζεται καὶ ὄρνιθες οἱ ψιττακοί*.

⁴⁶⁹ *Paedagogus* 3, 4, 30, 1. The identification as the parrot is confirmed by a scholium ad l.

⁴⁷⁰ *AV* 1, 22, 4 (= *RV* 1, 50, 12). Keller 1913, 45, mistakenly supposed that Ctesias was the first author to mention the bird in literature (he claimed that it is not mentioned in the Veda). However, Ctesias might well be the first reference to a parrot kept as a pet. Later Indian references will be quoted below.

In Roman times parrots were even eaten. According to Apicius, the bird is cooked in the same way as the flamingo.⁴⁷¹ In India, too, it was occasionally eaten (Caraka, *Sūtrasth.* 27, 74), but among the orthodox the flesh was forbidden together with that of several other birds and a penance was imposed for its killing.⁴⁷² In the Pillar Edict V Aśoka claims to have forbidden the killing of parrots and mynas in his realm. This prohibition was perhaps reflected in the account of Aelianus, who claimed that Brahmans regard the bird as sacred and that consequently it is never eaten in India.⁴⁷³

The most important characteristic of the parrot, in India as well as in the West, was of course its imitative ability. This talking ability has been somewhat exaggerated in Western sources, but not to the same extent as in India, where a parrot is often described as a kind of tape-recorder.⁴⁷⁴ Apuleius (*Flor.* 2, 12) correctly knew that it learns human words only when young, and Aelianus (*N. An.* 16, 2) was aware that a wild parrot imitates other birds, though in a cage it learns like a human child.

In the same passage Aelianus also claimed that there are three different kinds of parrots in India, and all of them capable of imitating human speech. We have several descriptions of parrots, mainly by Ctesias, Pliny, and Apuleius. The bird of Ctesias is of the same size as the hawk; it has a red face and black beard or tail, and its body is dark blue up to the throat.⁴⁷⁵ Pliny (10, 58, 117) stated that a parrot is green all over, with a red ring around its neck, while Apuleius (*Flor.* 2, 12) calls the ring golden. There are several further references to the bright green colour of parrots, which is also seen in some preserved paintings. Aelianus did not describe the appearance of the bird, which was familiar enough in his time.

There are eleven species of parrots found in South Asia, nine parakeets (genus *Psittacula*) and two lorikeets or hanging parrots (genus *Loriculus*). While we can probably leave out the small, sparrow-sized lorikeets, there are still enough options, and the above-quoted descriptions are not always detailed enough for the confident identifications found in secondary literature. In any case it seems that we can follow Thompson (1936, 336) and accept that Ctesias must have referred to the *Psittacula cyanocephala*.⁴⁷⁶ Leav-

⁴⁷¹ *De re coqu.* 6, 6, 1 *idem facies [quam in phoenicoptero] in psittaco*. Further late references in Thompson 1926, 337.

⁴⁷² *Manu* 5, 12 & 11, 135, also in other Dharma texts. Cf. Chakravarti 1906, 366.

⁴⁷³ *N. An.* 13, 18 probably from a Hellenistic source, perhaps from Megasthenes.

⁴⁷⁴ Pliny, *N. H.* 10, 58, 117 (repeating Aristoteles' statement that wine makes the bird insolent); Aelianus, *N. An.* 6, 19; etc., see Wotke 1949, 929ff. In modern times it has actually been claimed that some African parrots are clearly superior to Indian parrots in this respect. There is no end of references to talking birds (parrots and mynas) in Indian literature. In the *Arthaśāstra* 1, 15, 3f. the king is warned against discussing matters of state in the presence of parrots and mynas, as these birds can repeat secrets to unauthorized persons. The *Harṣacarita* (p. 105 Kane) names examples of people supposedly having suffered death or calamity because these birds had divulged their plans. In texts like the *Vāsavadattā* and the *Śukasaptati* parrots tell long stories. For further references see note 5 on p. 74 in Gray's *Vāsavadattā*, Bloomfield 1914 and Sternbach 1977.

⁴⁷⁵ The passage is rather difficult. When it is stated that "it is dark blue up to the throat like cinnabar", something seems to be missing. Bowman adds: "(and then red) like cinnabar"; Henry takes *κυάνεος* as meaning dark, but "dark like cinnabar" is difficult to imagine.

⁴⁷⁶ Ali 1977, n. 137. Ali calls *Psittacula cyanocephala* the blossom-headed parakeet, in another bird book this is the closely related *Ps. roseata*, while *Ps. cyanocephala* is called the plum-headed

ing out such species, which have restricted distribution (e.g. in the south only), there are still several possibilities for the red-ringed green parrot of Pliny (and other references can well mean the same). Thus the most probable species are the Alexandrine or large Indian parakeet (*Psittacula eupatria*) and the rose-ringed parakeet (*Psittacula krameri*), both found all over India and commonly used as caged birds.⁴⁷⁷

To conclude this discussion of parrots, Ptolemy (7, 2, 23) had heard of a country in Southeast Asia where crows and parrots are white. Warmington (1928, 153) explained these as Arakanese cockatoos, but unfortunately it seems that there are no cockatoos in Arakan.

Another talking bird, the myna or maina (OIA *śārikā/sārikā*),⁴⁷⁸ is described by Aelianus, *N. An.* 16, 3, under the name *κερκίων* in a way that leaves little room for doubt.⁴⁷⁹ It is of the size of a starling, coloured, docile, and it learns to speak. It is rightly said to be cleverer than the parrot.⁴⁸⁰ This bird is never found among the known fragments of literature on Alexander's campaign, and it has been supposed that this piece of information must have come from Megasthenes. But Aelianus himself ascribed his account to the Greeks who settled in the cities founded by Alexander (Bucephala in the Pañjab and Cyropolis in Sogdiana are mentioned by name), which seems to refer to the Indo-Greeks.⁴⁸¹ Unlike parrots, mynas were probably never imported into the West. In India the art of teaching parrots and mynas to talk is enumerated among the skills and pastimes proper for a gentleman or lady.⁴⁸²

In order to explain the name *κερκίων* Aelianus suggested that the bird has the habit of wagging its tail (*κέρκος*) like a wagtail, but as the name comes from the Indo-Greeks (and

parakeet. As *Ps. cyanocephala* is commonly found all over India, it seems more likely than *Bartsittich* or *Ps. fasciata* suggested by Wotke 1949, 927, which I suppose to be the same as the moustached parakeet or *Ps. alexandri*. Ball's (1885, 304) *Palaeornis eupatrius*, i.e. *Ps. eupatria* (below) seems impossible for Ctesias, if we do not take "red face" as just referring to the red bill.

477 Ali 1977, n. 113 & 114. Keller 1913, 46f. identified literary accounts as probably referring to the *Palaeornis torquatus*, apparently an old name for *Ps. eupatria*. Warmington 1958, 152f. mentions several other species, too, referring to representations in works of art. Tammisto 1997, 80f., commenting on Hellenistic mosaics, mentions both the Alexandrine and the rose-ringed parakeet as possible identifications.

478 *Gracula religiosa*, Ali 1977, n. 175. It is also called the hill myna (and grackle) as distinguished from common mynas (genus *Acridotheres*). The latter never learn to speak.

479 It has been identified as the myna by e.g. Temple 1882, Ball 1885, 305, McCrindle 1896, 186, note 3, and Thompson 1936, 138f. Lassen 1858, 321f. suggested instead a small Indian cuckoo called the *gurul*, which I have been unable to identify, and Wotke 1949, 928, a kind of parrot.

480 Though Aelianus *N. An.* 13, 18 claims that the parrot is the best. In Indian literature parrots and mynas are often mentioned together and a poetic convention despising biological facts demanded that the male parrot was the husband of the myna female (so e.g. in the *Śukasaptati*). This was probably often put into practice to the extent that the two birds were kept together in the same cage. That such a union was not always taken literally is seen in a Jātaka verse (J. 546) quoted by Chakravarti 1906, 366:

suvo va suviṃ kāmeyya sālika pana sālikaṃ |
suvassa sālikāya ca saṃvāso hoti kīdiṣo ||

481 An otherwise unknown reference to Eucratides in *N. An.* 15, 8 proves that Aelianus had a source dealing with them. Did he perhaps use this source in other passages as well?

482 *Kāmasūtra* 1, 3, where *śukasārikāpralāpanam* is given as the 43th among the 64 arts (*kalā*).

as wagging is not a characteristic of the myna), it could well be a loan-word. However, unlike Temple (1882), I do believe that “it is doing violence to philological principles to connect the Sanskrit *śārikā*” with Greek κερκίων.

Scholfield in his note on Aelianus *N. An.* 15, 14 suggests that the Indian bird κερκορῶνος mentioned briefly there might be the same as the κερκίων, i.e. myna, but also refers to Thompson (1936, 139), who stated that the closeness to κερκορῶνη (‘tail-crow’) “would suggest one of the handsome long-tailed jays”. There are many such jays in India, true, but with such a *hapax legomenon* without any description it is impossible to decide. Scholfield further identifies the “thrush called hunter” (ἀγρεύς) in Aelianus (*N. An.* 8, 24) as the Indian myna. It has a very sweet voice, and with this voice it captivates smaller birds and feeds on them; when caught and put in a cage, it refuses to sing. I certainly fail to see anything myna-like in this. The bird is not even said to come from India.

Aelianus (*N. An.* 16, 5) also tells a curious story of the **hoopoe**, claiming that it was common both in India and in Greece. According to this account, the Brahmins tell of a pious young prince, who, unable otherwise to bury his deceased parents, split his head open with a sword and then buried them in his own body. The all-seeing Sun saw this and rewarded his piety by turning him into the beautiful bird. Aristophanes (*Aves* 471ff.), as was also known to Aelianus, tells a similar story of a lark which buried its dead father in its head. No parallel to this is found in India. Instead of filial piety, the bird is better known for the great care taken by parents of their offspring, which explains its Indian name *priyaputra* or *putrapriya*.⁴⁸³ Be that as it may as concerns the legend, Aelianus certainly errs in claiming that the Indian hoopoe is twice as large as the Greek and much more beautiful. The same hoopoe (*Upupa epops*, Ali 1977, n. 136) is common in both countries. It is true that the hoopoe is easily tamed and thus may have been kept by Indian kings as claimed by Aelianus.

The orion and catreus and some other birds of India were described by Cleitarchus, F 21f. in Aelianus, *N. An.* 17, 22f. and F 20 in Strabo 15, 1, 69. The **orion** (ὠρίων, F 22) is a heron-like long-legged bird with dark (blue) eyes, a sweet voice, and strong amorous propensities. On not too strong grounds this bird has been identified as the hill myna (*Gracula religiosa*).⁴⁸⁴ The myna, however, is much smaller than the heron and does not have long legs. Pearson suggested that Cleitarchus would have derived this sweet-voiced bird from his father, the historian Deinon, who seems to have located the ancient fable of

⁴⁸³ On the hoopoe in India see Dave 1985, 162f. Dave quotes texts where the name is explained by interpreting the characteristic sound of the hoopoe as “putra putra” (cf. to the similar onomatopoeic names in Greek and Latin, ἔποψ and *upupa*). Thompson 1936, 99 refers to Sinclair 1874 as an Indian parallel to Aelianus, but he has read carelessly. Though published in *Indian Antiquary*, Sinclair was not telling an Indian story, but first gave one from Spain (Sinclair 1873), and then a parallel version “from a Syro-Arabic source” (Sinclair 1874). I also cannot agree with Lassen 1858, 320f., that the legend looks so much like an Indian one that probably it really comes from India, even if we do not find extant parallels.

⁴⁸⁴ Jacoby’s note on Cleitarchus. Lassen 1874, 685f. identified *orion* as the *Gracula religiosa*, of which he probably had no good description. Thompson 1936, 338 wisely refrains from making guesses. Unfortunately Vian 1988 was unavailable to me.

Sirens in India.⁴⁸⁵ But if Deinon was involved at all as one of his son's sources, the end of the next passage would make a much better case.

The beautiful and sweet-voiced **catreus** (κατρεύς, Cleitarchus F 21) is of the size of the peacock and multi-coloured, with emerald wing-tips, a vermilion face and blue-grey head with saffron speckles. Its legs are orange in colour, and it is so much admired in India that its use as food is prohibited. A prohibition of animal food was not yet so common, even the pious Aśoka allowed peacocks (which also were much admired) to be slaughtered. As to the identification of this bird, its great size and bright colours seem to point to South Asian pheasants, perhaps the monal pheasant (*Lophophorus impeyanus*), as has been suggested,⁴⁸⁶ though it most certainly does not have a melodious voice comparable to the nightingale, like the catreus. The distribution of the monal reaches Eastern Afghanistan and thus the bird may well have become familiar to Alexander's men. Some further candidates for the monal pheasant are mentioned below. In later literature both the *orion* and the *catreus* were mentioned in Nonnus' epic.

Cleitarchus (F 21) further mentions a bird entirely scarlet, of the colour of purest flame, flying in flocks resembling clouds.⁴⁸⁷ Unlike in Greece, there are in India some completely red small birds, but they certainly do not form such enormous flocks. At the end of the fragment a mottled bird apparently of a modest appearance, but with a surpassingly beautiful singing voice comparable to that of the Sirens, is mentioned. This, rather than the *orion*, is perhaps related to the fragment of Deinon mentioned below. Excellent singers with a modest appearance are found in India as well as in Europe, for instance among thrushes.

Peacocks – although already known and bred in the West, too⁴⁸⁸ – and other exotic fowl were much admired by Alexander and his men.⁴⁸⁹ According to Curtius (9, 1, 13), a number of wild peafowl were seen in a grove near the Hyarotis. Aelianus mentions peacocks in several passages. *N. An.* 5, 21 is a general description of the peacock and its habits derived from different sources, perhaps partly even from direct observation.⁴⁹⁰ He refers to Rome, but the famous quotation of the orator Antiphon concerns the situation in fifth-century Athens, and at the end of the passage it is stated that Alexander greatly admired these birds in India and forbade his men to kill them. As an afterthought, in

485 Pearson 1960, 226f. on Cleitarchus F 22 (Aelianus, *N. An.* 17, 24) and Deinon F 30 (Pliny, *N. H.* 10, 70, 136). Cf. Jacoby's note on Cleitarchus F 22.

486 Lassen 1874, 686 identified the *katreus* as a kind of cuckoo (not *kokila*), while Ball 1885, 305 suggested the monal pheasant. McCrindle 1901, 76, note 1, was contented approvingly to quote Ball, while a renewed analysis by Thompson 1936 led him to the same conclusion. Unfortunately Vian 1988 was unavailable to me.

487 Lassen really seems not to have been good at identifying birds. Here (Lassen 1874, 686f.) he thinks of cranes, which as rain-bringers were poetically compared to lightning. A great flock of birds – and I remember here the parrots of Mathura – can easily resemble a cloud, and this does not mean that this particular bird is therefore a rain-bringer.

488 They were bred in Samos as Hera's birds in the early fifth century B.C. and commonly sold in Athens at the end of the same century. The name "Median bird" reveals the route by which it came to the West. See Karttunen 1989a, 27 (with references).

489 See also McCrindle 1896, 362f.

490 To this can be compared Pliny's somewhat similar account in *N. H.* 10, 22, 43f.

N. An. 5, 32, he makes some remarks about their nesting. Perhaps from Megasthenes comes the account of royal gardens in India in *N. An.* 13, 18, where tame peacocks and pheasants are kept. In *N. An.* 16, 2 it is briefly stated that the peacocks of India are larger than anywhere else.

Ptolemaeus displayed peacocks in his great Bacchic procession, together with other Indian animals such as elephants, dogs, oxen, and parrots (Athenaeus, *Deipn.* 5, 200). Aelianus, *N. An.* 11, 33, tells of a peacock of extraordinary size and beauty presented to the king of Egypt (Ptolemaeus) from India and kept in the temple of Zeus. Then follows a story about a gluttonous young man who wanted to eat the bird and therefore attempted to steal it. Both in India and in the Roman West peacocks were eaten.⁴⁹¹ In Roman times peacocks were reared in large farms.⁴⁹²

The peafowl is easily tamed and was probably so tamed rather early in India.⁴⁹³ In nature it moves in small flocks and keeps on the ground, spending the nights in the trees. It feeds frequently in cultivated fields, on grains, seeds, lentils, groundnuts and tender shoots of crops, in forests on flower buds, berries and wild figs, also on small insects, centipedes, lizards, scorpions and snakes. The dance of the peacock was often represented in art and became a literary theme. Hippocleides' dance in Herodotus (6, 129) is a striking parallel to Indian stories of the peacock revealing its private parts in dance and thus losing the chance of becoming the king of the birds. In nature, the dance coincides with the onset of the rainy season, which made the peacock a herald of rain, renewed life and fertility, of love and longing. It is also favoured in India as a snake-eater (*sarpāri*). The peacock is very popular in literature, singing of its love for the clouds, and in art. Its flesh was eaten, and tame peacocks were kept in royal gardens. The peacock's flesh, heart, and fat were used in Indian materia medica.⁴⁹⁴

Common fowl, too, came originally from India, but in our period they were entirely familiar in the West, and their real origin was not known. In early sources (Aristophanes) it was called the Persian or Median bird, which reveals the route of its coming to the West.⁴⁹⁵ In Indian literature domestic hens are mentioned as early as the *Gautama-dharmasūtra* 17, 29.⁴⁹⁶ Ctesias (F 45, 8) mentioned large cocks in India, and Aelianus

⁴⁹¹ On India, see e.g. Aśoka RE I, and Caraka, *Sūtrasth.* 27, 64, and further references in Chakravarti 1906, 363f.; on the West, e.g. Aelianus *N. An.* 3, 42; Lucianus, *Navigium* 23. According to Pliny, *N. H.* 10, 23, 45, and Aelianus, *N. An.* 5, 21, Hortensius (died c. 50 B.C.) was the first in Rome to slaughter peacocks for a banquet.

⁴⁹² For further details about peacocks in the Roman period see Steier 1938, 1417ff., and Toynebee 1973, 250ff.

⁴⁹³ The bird is often represented in the art of the Indus civilization, but it is impossible to decide whether these are tame or wild birds. See Conrad 1968, 251f.

⁴⁹⁴ The role of peacocks in Indian literature, art, and history has been often discussed. For a recent account, see Kadgaonkar 1993.

⁴⁹⁵ See e.g. Hehn 1911, 326ff., Orth 1913, Peters 1913, Thompson 1936, 33ff., Jennison 1937, 13f., and Toynebee 1973, 256f. In the first century A.D. the bird was already familiar in Italy and there were different breeds (Pliny, *N. H.* 10, 77, 156).

⁴⁹⁶ The archaeological evidence – bones – does not tell whether the animals were domesticated or only hunted. Conrad 1968, 238ff. finds domestication likely in the Indus civilization. For Indian literature, see Chakravarti 1906, 372f.

(*N. An.* 16, 2), perhaps going back to Ctesias (so McCrindle) or to some author writing on Alexander's campaign, gives a description of them. Their long, peacock-like tail and bright colours led Lassen to identify these birds as the monal pheasant (*Phasianus*, i.e. *Lophophorus impeyanus*).⁴⁹⁷ When Ptolemy (7, 2, 23) mentioned bearded cocks in Northeast India or Southeast Asia, he may have been referring to pheasants with prominent throat feathers.

It is somewhat difficult to identify accounts in classical sources referring to various kinds of South Asian **pheasants**. We have seen that several passages have been thus explained by scholars. The common pheasant (φασιανός, also τέταρος) originated in Western Asia (Colchis),⁴⁹⁸ and the only instance I have found of these words used in an Indian context is in the above-mentioned passage of Aelianus, *N. An.* 13, 18, about tame peacocks and pheasants kept in royal gardens in India. In another passage of Aelianus, *N. An.* 17, 33, a gay-coloured bird flying upside down and barking like a dog, has been tentatively identified by Thompson as "one of the more splendid of the pheasants, such as the manāl".⁴⁹⁹ This curious account, however, is not located in India, but in the neighbourhood of the Caspian Sea. Monals were perhaps also the pheasants (τετάρους) imported by Ptolemaeus Euergetes from Media.⁵⁰⁰ A partridge larger than a vulture, included among the presents brought by the Indian embassy to Augustus, has been explained as a kind of pheasant.⁵⁰¹ A further case will be discussed below under the phoenix.

Of Indian **birds of prey** Western sources have little to say. The Ctesianic accounts of falconry practised in Northwest India and of fabulous griffins guarding gold in Central Asia have been discussed on an earlier occasion.⁵⁰²

In *N. An.* 16, 4 Aelianus briefly described a large, big-mouthed and harsh-voiced Indian bird, which he called *celas* (κήλας). This has been identified as the **adjutant stork** (*Leptoptilos dubius*).⁵⁰³ The name has been connected by Thompson with the Greek κήλη 'hump', 'tumour' as referring to the characteristic goitre of the adjutant, and this certainly fits better than κηλάς 'mottled'.

In connection with the geranomachia motif of the Pygmaean tradition **cranes** are often mentioned in an Indian context, for the first time by Megasthenes, but originally the

⁴⁹⁷ Lassen 1852, 644 = 1874, 647, on Ctesias, so also Ball 1885, 305, Keller 1913, 146, and Thompson 1936, 131, hesitatingly Warmington 1928 (1974), 362 (note 30).

⁴⁹⁸ See e.g. Pliny, *N. H.* 10, 67, 132 (*laudatissimae... phasianae in Colchis*); cf. Hehn 1911, 355ff., Keller 1913, 145f. Thompson 1936, 281f. & 298ff., and Toynbee 1973, 254f.

⁴⁹⁹ Thompson 1936, 131.

⁵⁰⁰ Athenaeus 14, 654c (τά τῶν φασιανῶν οὓς τετάρους ὀνομάζουσιν... ἐκ Μηδίας), so identified by Keller 1913, 145.

⁵⁰¹ Strabo 15, 1, 73. Ball 1885, 305 the monal pheasant, Thompson 1936, 237 a kind of pheasant.

⁵⁰² Karttunen 1989a, 160ff. on Ctesias F 45, 24 & 45g (falconry) and 177ff. on F 45, 26 & 45h (griffins).

⁵⁰³ Ball 1885, 305f., followed by Thompson 1936, 139; Lassen 1858, 322, declared it a pelican. On the bird see Ali 1977, n. 20.

motif belongs to Ethiopia. Occasionally we also meet **partridges** as large as geese in connection with the Pygmaei.⁵⁰⁴

In *N. An.* 17, 33 Aelianus describes a kind of long-legged **snipe**, found in Caspia and India. It has a purple-marked back, a scarlet belly and a white head and throat, it is of the size of a goose, and makes a sound like a goat. There are snipes in India,⁵⁰⁵ but these are not brightly-coloured. If the goat's voice is not so accurate as the description and it does not refer to snipes, we could perhaps accept Thompson's suggestion that flamingoes were meant.⁵⁰⁶

There are many stories about **fabulous birds** connected with India. Often it happened that stories originating elsewhere were later located in India as the country became known as the home of all marvels. Thus the Herodotean story (3, 111) of a fabulous giant bird collecting cinnamon as building material for its nest belongs more properly to Arabia, which was then considered to be the place of origin of cinnamon. Aristoteles (*H. An.* 8, 616a) mentioned the same without giving a location. Only Aelianus (*N. An.* 2, 34), though referring to Aristoteles, added that it originated in India.⁵⁰⁷ In his version, as earlier in Herodotus, the real country of origin of cinnamon is still a mystery, the bird carries it to the Indians, but nobody knows whence.

Many legends and tales later told of India by Arabs and early European travellers can be traced back to the classical accounts of India and other distant countries, often to the very beginning of Western knowledge of India, i.e. to Herodotus and Ctesias. An interesting echo of the cinnamon bird and of the Herodotean account of the method of obtaining the precious bark is found in the story told by Muslim authors (the *Arabian Nights*) and European travellers (Niccolò Conti) of the way of obtaining diamonds.⁵⁰⁸

Another fabulous bird, which a late tradition came to ascribe to India, was the **phoenix**. Originally the story seems to belong to Arabia and Egypt, but then it was assumed, perhaps on account of the old confusion between India and Ethiopia, that the bird properly belonged to India and only after every 500 years came to Egypt in order to die and through death to propagate itself.⁵⁰⁹ The voluntary death in the fire was, of course, associated with the Gymnosophists (so expressly by Lucianus), which was an additional reason to think of India.

⁵⁰⁴ Cranes in Megasthenes F 27a (Strabo 2, 1, 9) and 29 (Pliny, *N. H.* 7, 2, 26); both cranes and partridges in Megasthenes F 27b in Strabo 15, 1, 57; on the motif see Karttunen 1989s, 128ff., on partridges (*tittiri*) and their relatives in India e.g. Dave 1985, 279ff.

⁵⁰⁵ E.g. the painted snipe (Ali 1977, n. 82) and the fantail snipe (Ali 1977, n. 100, with the characteristic "goat's voice" produced not by the throat but by air going through the feathers).

⁵⁰⁶ Thompson 1936, 131. A further passage of Aelianus (*N. An.* 17, 38) describing a crimson-backed large bird living on the islands of the Caspian Sea has also identified by Thompson as "an imaginative account of the flamingo".

⁵⁰⁷ In *N. An.* 17, 21 Aelianus quotes the same from Herodotus and correctly locates it in Arabia.

⁵⁰⁸ Ball 1884, 241 on Conti. Cf. *ibid.* 242f. on García da Orta.

⁵⁰⁹ A good account of the phoenix legend is found, for instance, in Pliny, *N. H.* 10, 2, 4f., and Aelianus *N. An.* 6, 58; it was connected with India by Aelius Aristeides 2, 426 (the Indian bird born in Egypt); Dionysius, *Ixeutica* 1, 32; Lucianus, *De morte Peregr.* 27 & *Navigium* 44; and Philostratus, *V. Ap.* 3, 49.

We have seen that Deinon,⁵¹⁰ the father of the historian Cleitarchus, claimed that the **sirens** with their charming song were Indian birds. A related passage of Cleitarchus (F 21) is mentioned above. We can only say that Pliny was wise in doubting its veracity. It is just another example of tales located at the rims of the world, which were still rather close in the time of the *Odyssey*. With widening geographical knowledge these tales tended to migrate farther afield.⁵¹¹

To round up this survey of real and fabulous Indian birds we may note that according to Aelianus (*N. An.* 14, 13), the Indian king ate the **eggs** of swans, ostriches (in India!) and geese. Caraka (*Sūtrasth.* 27, 85) lists as edible the eggs of the goose, cakora (a kind of quail), hen, peacock, and sparrow.

According to Aristoteles (*H. An.* 8, 28, 606a), there are many large bloodless (i.e. invertebrate) animals and reptiles in India. The passage appears immediately after a fragment of Ctesias (F 45kα) and probably forms part of it. In the time of Alexander Nearchus⁵¹² wrote that many reptiles were to be found in India. However, we rarely find any other reptiles described than snakes, though large multi-coloured Indian **lizards** are especially mentioned in histories of Alexander.⁵¹³

In Indian sources the most important lizard is the large, edible varan or **monitor** (*godhā*). The common Indian monitor (*Varanus monitor*) is found all over India, in Sri Lanka and Burma. It is carnivorous (and a carrion-eater), a fast runner; it climbs in trees and swims well. Its flesh is eaten and used as a medicine; its eggs are also edible. Its young ones are erroneously supposed to be poisonous.⁵¹⁴ According to Watt, in Sri Lanka its skin was used for shoes and its fat as medicine (but not internally, as it is said to be poisonous). Froth from the lips of the closely-related *Varanus salvator* is supposed to be one of the ingredients of the famous Sinhalese poison *kabara-tel*. It has been suggested that this animal might be the poisonous *scincus* or land-crocodile of Dioscurides and Pliny. It is paler than a crocodile and its scales are arranged differently. Its salted meat was imported to Rome, and both authors knew several medical uses for it.⁵¹⁵

The Indian **chameleon** is briefly mentioned by Pliny (8, 51, 120), who claims that these animals are more numerous in India than in Africa.

Crocodiles of the Indus (and of the Nile) were already known in the West long before Alexander. They are referred to by Herodotus (4, 44) and perhaps also in Ctesias'

⁵¹⁰ *FGrH* 690, F 30 in Pliny, *N. H.* 10, 70, 136.

⁵¹¹ A parallel case is seen in the Eastern Ethiopians of Homer, whom Herodotus located in India and later authors in Southeast Asia. See Karttunen 1989a, 134ff. According to Tammisto 1997, 247, note 309, the sirens as birds may perhaps be identified as bee-eaters.

⁵¹² Nearchus F 10b in Strabo 15, 1, 45.

⁵¹³ Curtius 9, 8, 2 *lacertarum quoque ingentium pelles et dorsa testudinum* given to Alexander by the Malloi; Aelianus, *N. An.* 16, 49 (Polycleitus F 9); and Pliny, *N. H.* 8, 60, 141.

⁵¹⁴ On *godhā* in Indian literature see Lüders 1942, 23ff., on the animal Watt s.v. *Lizards*, and Satyamurti 1962.

⁵¹⁵ Dioscurides 2, 66; and Pliny, *N. H.* 28, 30, 119f. Cf. Warmington 1928 (1974), 165f.

account of the giant worm skolex.⁵¹⁶ We have seen that their presence in both rivers was one of the starting-points for the comparison between the Indus and the Nile, and between India and Egypt.⁵¹⁷

Strabo's *Geography* contains several accounts of Indian crocodiles. In 15, 1, 25 he says that Alexander saw them in the Hydaspes; in 15, 1, 45 he quotes from Aristobulus (F 38) that they are found in the Indus, but are neither numerous nor harmful to man; and in 15, 1, 72 from Artemidorus that crocodiles and dolphins are found in the Ganges or the Oidanes. The latter is confirmed by Curtius (8, 9, 9), who calls the river Diardanes. Aelianus too (*N. An.* 12, 41) mentioned fishes, turtles and two kinds of crocodiles of the Ganges. It is easy to identify them: the one which is completely harmless is evidently the gavial (*Gavialis gangeticus*), the voracious one the marsh crocodile (*Crocodilus palustris*). The latter, according to Aelianus' source (Megasthenes?), was used by Indians to implement capital punishment on criminals. Both are also found in the Brahmaputra.

The Indus crocodile is the same marsh crocodile as is also found in the Ganges. Pliny (*N. H.* 6, 23, 75) had heard of watch-crocodiles kept in a canal in the Indus country.⁵¹⁸ The third kind of Indian crocodiles, the large estuarine crocodile (*Crocodilus porosus*) perhaps lies behind the story of the sea-serpents ascending the mouths of the Indus in the *Periplus* 38. Their local name, γράαι, can be compared with OIA grāha.⁵¹⁹

Of the land tortoise (OIA *kūrma*, *kacchapa*) our Western sources have little to say. Among the presents brought by the Malli to Alexander were turtle-shells (*dorsa testudinum* in Curtius 9, 8, 1f.), and Aelianus (*N. An.* 16, 14) mentions both large river-turtles and land-tortoises found in India. The latter burrow in fields, resembling large earth clods. They are dug up by people and eaten, as they are fat and sweet-fleshed. They are said to be able to shed their shell.⁵²⁰

The account of the river-turtles of the Ganges probably came from Megasthenes. According to Aelianus (*N. An.* 12, 41), these turtles have enormous shells, comparable to a jar holding 20 amphorae. Another account, in the above-mentioned passage (*N. An.* 16, 14), compares the size of the shells to ten medimni of pulse. A brief fragment of Polykleitus (F 10 in *Parad. Vat. Rohd.*) also mentions these giant turtles of the Ganges. While

⁵¹⁶ F 45, 46 and 45r, see Karttunen 1989a, 190ff. and Ball 1885, 306ff., cf. Pliny, *N. H.* 9, 17, 46, and Philostratus, *V. Ap.* 3, 1. Goossens 1934, 417, explained it as a mythic serpent or Nāga.

⁵¹⁷ The existence of crocodiles in both rivers is mentioned by Arrianus, *Anab.* 6, 1, 2, and *Ind.* 6, 8 (Onesicritus F 7); Philostratus, *V. Ap.* 6, 1 (together with Onesicritus' hippopotamus); and Pausanias 4, 34, 2.

⁵¹⁸ In India crocodiles kept in moats are very rare in literature. In the very south of India, however, the town of Veñci (Karur) was defended by large man-eating crocodiles kept in its broad moat (*Manimekalai* 28 quoted in Kanakasabhai 1904 [1966], 15f.).

⁵¹⁹ Accepted as the crocodile by Weber 1870, 624, McCrindle 1879, ad l., and Gossen & Steier 1922, 1957, as sea-serpents by Schoff 1912, 165. On crocodiles in general see also Lassen 1858, 318f., Keller 1913, 260ff., and Gossen & Steier 1922. For the name see Goossens 1946.

⁵²⁰ On the tortoise in India see Arole 1987. For tortoise or turtle flesh eaten in India see *Suśruta, Sūtrasth.* 46, 109f. (confirming the sweetness). It is one of the five five-toed animals allowed to be eaten, while the others were completely forbidden (e.g. *Manu* 5, 18 *śvāvidhaṃ śalyakam godhām khaḍga-kūrma-śaśāms tathā | bhakṣyān pañcanakheṣv āhur*), and in ritual it was acceptable to ancestors (e.g. *Manu* 3, 270). Cf. Chakravarti 1906, 369f. and Lüders 1907.

the size is evidently greatly exaggerated, perhaps imitating the similar account of giant sea turtles, Scholfield in a note on the Aelianus' passage identifies this animal as the mud turtle *Trionyx gangeticus*, without stating his grounds.⁵²¹ A river-turtle with a shell three cubits long was among the gifts presented by the Indian embassy to Augustus.⁵²² In Indian tradition giant turtles are found only in the sphere of mythology.

More important in classical tradition were, however, the large **sea turtles** of the Arabian Sea, which were first reported by Nearchus' crew, though not mentioned in the summary given in Arrianus' *Indica*. Roofs made of a single turtle-shell were ascribed to the Chelonophagi of Carmania, a tradition perhaps originating in Onesicritus.⁵²³ Their immense size was much lauded. According to Agatharchides, a people called the Chelonophagi was also living on the Red Sea coast and a similar account was given of them.⁵²⁴ Naturally the diet of the Chelonophagi also mainly consisted of turtle flesh. In *N. An.* 17, 3 Aelianus briefly mentioned tortoise-shells containing six Attic medimni as coming from the Red Sea. Pliny (*N. H.* 9, 12, 35f.) gave another account of turtle-hunting and turtle-shells used as roofs. There soon arose a third tradition assigning the turtle-shell huts to the Taprobanians.⁵²⁵ The story is common enough, migrating from one part of the Indian Ocean to another,⁵²⁶ but it is not known from India. The actual shells of the largest sea turtles (such as *Dermochelys coriacea* and *Chelonia mydas*) have a length of between one and two metres, which is large enough otherwise, but hardly enough to allow a hut roofed by a single shell.

Turtle-shell was soon imported to the West. According to Lucanus (*Pharsalia* 10, 119–121), ivory and Indian turtle-shell were seen in the palace of Cleopatra. The *Periplus* mentions it several times as a trading article. In chapters 4, 6f., 10 and 13 it is mentioned as produced (the hunt mentioned in ch. 15) or traded on the southwestern coast of the Red Sea, while according to ch. 17, the turtle-shell obtained from Azania in East Africa is second in quality only to Indian, which, according to chapter 56, is obtained in South Indian marts. There are two kinds, one originating on the Chryse Island, another on the islands off the Limyrica coast. In the *Periplus* 63 it is again confirmed that the best turtle-shell came from Chryse in Southeast Asia. In chapter 30 both land-tortoises and sea

⁵²¹ *Trionyx sp.* also in Ball 1885, 306.

⁵²² Nicolaus Damascenus F 100 in Strabo 15, 1, 73.

⁵²³ Pliny, *N. H.* 6, 28, 109f. (Nearchus or Onesicritus); Mela 3, 75; Ptolemy 6, 8, 12.

⁵²⁴ Agatharchides F 47 in Photius (*GGM* 1, 138f.) and Diodorus 3, 21; Strabo 16, 4, 14 (Agatharchides quoted through Artemidorus); Pliny, *N. H.* 9, 12, 35 (the Indian Ocean in general and specifically the islands of the Red Sea).

⁵²⁵ In Strabo 2, 1, 14 tortoise-shell is mentioned as merchandise, not as roofing material, in Taprobane (so also in the *Periplus* 61); as roof in Pliny, *N. H.* 6, 24, 91, and Aelianus, *N. An.* 16, 17. These passages have been commented on by Weerakkody 1992a, 63f., who, however, does not know the Hellenistic references to Carmania and the Red Sea.

⁵²⁶ Tomaschek 1899, 2231, briefly refers to similar accounts in Arabian literature and mediaeval Italian travel accounts.

turtles are listed among the products of Soqotra. In the Diocletian Edict Indian turtle-shell is mentioned among merchandise.⁵²⁷

A source of lasting fascination for Alexander's men were the many, and often dangerous, **snakes** of India. They will be dealt with separately below in chapter V.6.

Fishes and other sea animals of India and of the Indian Sea were all said to be very large.⁵²⁸ Again the first report was given by the participants of Nearchus' sea voyage, who saw **whales**⁵²⁹ along the Gedrosian coast. On one occasion the navy met a shoal of whales which were 25 orgyias long and spouted water. The men were understandably terrified by the sight, but the pilots advised that the animals could be frightened away by noise and the sound of trumpets.⁵³⁰ This is also described by Pliny (9, 2, 5f.), but curiously he claims that the animals were *not* scared by shouts and noise, but only by impact.⁵³¹ Onesicritus seems to have located the event in the Gulf, which is hard to accept, if Nearchus is to be relied upon at all.⁵³² These whales were known to be occasionally stranded on the Gedrosian coast, and the whale-bones left on the shore were used by the Ichthyophagi for their houses. The ribs were thus used as roofbeams and the jaws as doorposts.⁵³³

While other authors mainly quoted early Hellenistic sources, Strabo was also able to add some contemporary information. Those who sailed to India in his time (οἱ νῦν πλέοντες εἰς Ἰνδοῦς) claimed that the animals were occasionally seen, but not in shoals. It was said not to be true that they were afraid of sounds, but in any case they did not attack ships.⁵³⁴

⁵²⁷ 16, 1 quoted in André & Filliozat 1986, 163. See also Lassen 1858, 315f. and Warmington 1928 (1974), 166f.

⁵²⁸ Aelianus *N. An.* 16, 12 names several kinds of fish which here grow much larger than in the Mediterranean. See also *N. An.* 16, 13 (large skate) and 17, 6, and Lassen 1858, 318.

⁵²⁹ I have decided to discuss whales here, in connection with fishes, though it was known in classical times, too, that whales are mammals (cf. Toynebee 1973, 205). In any case, it is not always possible to keep accounts separate. While the Latin *balaena* is undoubtedly a whale, *pristis* may refer to large sharks as well as to smaller whales. For whales of the Indian Ocean in classical sources see Lassen 1858, 316f., Ball 1885, 283f., and Hinüber 1985, 1134.

⁵³⁰ The event was remarkable enough to be mentioned by many authors. In addition to the main account, Nearchus F 1 in Arrianus, *Ind.* 30, see Strabo 15, 2, 11ff. (F 1b); Diodorus 17, 106, 7; Curtius 10, 1, 11f.

⁵³¹ Pliny, *N. H.* 9, 2, 5f. Translating the words *tanta ut alias thynnorum multitudine* as "at other times such vast shoals of tunnies are encountered", McCrindle (1901, 116) supposes that Pliny here turned the original whales into tunnies, but *alias* can also be interpreted locally, as by Rackham: "in such a multitude, like the shoals of tunnies in other places".

⁵³² Onesicritus F 28 in Pliny, *N. H.* 6, 26, 99 (quoting via Juba) *hydri marini vicinum cubitorum adnatantes terruere classem*. We note that Nearchus (F 28 in Strabo 16, 3, 7) also mentioned a stranded whale of 50 pēchys seen in the Gulf. On the other hand, Aelianus, *N. An.* 17, 6, quoted Onesicritus (F 31) and Orthagoras (F 4) on water-spouting whales seen on the Gedrosian coast.

⁵³³ Nearchus F 1 in Arrianus, *Ind.* 29, 16 and 30, 8f., also mentioned by Strabo 15, 2, 13, and Pliny, *N. H.* 9, 2, 7 (used by *Gedrosi*). Cf. Diodorus 3, 19, 2 (Agatharchides F 43b) for a similar account on the Ethiopian coast.

⁵³⁴ Strabo 15, 2, 13. There are further references to whales of the Indian Ocean by Pliny, *N. H.* 9, 3, 8, and Aelianus, *N. An.* 16, 12. Aelianus claims that they are five times larger than the largest ele-

There is nothing to be wondered at in these accounts. Several large whales have been seen or stranded on Indian coasts even in the modern period,⁵³⁵ when centuries of whaling have brought all large whales almost to the point of extinction. In ancient times, when there were no effective whaling methods, they must have been much more common. Even the measurements are partly acceptable. The blue whale, the largest of all, has a length of 22.5–23.5 m (34 m at its largest) and a weight of 80–85 tons. It is interesting to note that sea monsters of the western sea are also mentioned in Indian sources.⁵³⁶ Of whale-bones used for huts we have no other evidence, though they have been thus used in the Arctic.

There were other kinds of **sea monsters** mentioned in classical literature. These were herbivorous and amphibious in nature, coming onto land by night and eating crops and other plants. As regards their heads they resembled cattle, horses and other land animals. The origin of these stories seems to be the history of Onesicritus; according to Strabo, he mentioned these animals in the sea around Taprobane. Without mentioning his source Aelianus gave a more elaborate account. They have heads resembling those of various land animals, satyrs and women, and some had a completely indescribable appearance. In addition to crops, they were fond of dates.⁵³⁷ Some scholars have attempted to identify these animals as dugongs, which are certainly herbivorous marine animals, but in fact they never do come onto land.⁵³⁸ A good parallel to this is seen in Indian sources (Jātakas, see also *KA* 2, 26, 5), where the sea around the island is described as being full of various sea monsters.

These animals were also described by Pliny (*N. H.* 9, 2, 7), but his account is located on the Gedrosian coast. One could speculate that this was the real origin of the story, perhaps given by Nearchus or Orthogoras, and transferred by Onesicritus to distant Taprobane. On the other hand, the account of Taprobane in Onesicritus was probably given at the beginning of the coastal voyage, starting from the mouths of the Indus, which was also the starting-point of Onesicritus' informants for their voyages to Taprobane.

phants, have ribs of 20 cubits and jaw-bones of 15 cubits. Curtius 9, 9, 22, claimed that the violent tides at the mouth of the Indus carried *beluae terribiles* to the river (cf. Pliny 9, 2, 5). It was not actually claimed by Nearchus that the whales were attacking his ships, but such a claim was later made both of some whales and of some large fishes (such as the swordfish).

535 Prater 1971, 309ff., lists the blue whale (*Balaenoptera musculus*), the Finner whale or common rorqual (*Balaenoptera physalis*), the sei whale (*Balaenoptera borealis*), the piked or lesser rorqual (*Balaenoptera acutorostrata*), the humpbacked whale (*Megaptera novaeangliae*), the pygmy sperm whale (*Kogia breviceps*), and once the sperm whale (*Physeter catodon*).

536 Rāmāyaṇa 4, 41, 8:

tataḥ paścimam āsādhyā samudraṃ draṣṭum arhatha |
tīminakrāyutajalam akṣobhyam atha vānarāḥ ||

The geographical context is found in verse 12 (*sindhusāgarayoś caiva saṃgame...*).

537 Onesicritus F 12 in Strabo 15, 1, 15; Aelianus, *N. An.* 16, 18.

538 Keller 1909, 414f., followed by Scholfield in a note on Aelianus, and Pédech 1984, 148. Of course, it can be noted that they were supposed to land only by night, and nobody saw them. In Keller's opinion, when the embellishment is removed from Aelianus' account, it exactly corresponds to the dugong, but in this case I fail to see such a close resemblance. What is embellishment to Keller, i.e. unsuitable to his hypothesis, may be significant, and I ask whether herbivorousness and occasional human-like appearance are really enough for such an identification.

Pliny was often careless in his quotations and it is quite possible that he gave the context of the main story instead of that of the excursion.

In the passage mentioned above (*N. An.* 16, 18) Aelianus further mentioned whales, tunnies, and dolphins seen around Taprobane. The dolphins are of two kinds, the one savage, sharp-toothed and dangerous to fishermen, the other naturally gentle and tame. It is possible that the former is actually a shark, while the second may well be accepted as a real dolphin.

The **river dolphin** (*Platanista gangetica*) of the Indus, Ganges and Brahmaputra was known in the West, too. The spurious letter of Craterus to his mother Antipatra (in Strabo) mentions whales in the Ganges, and Pliny knew of the river dolphin, which he called *platanista*.⁵³⁹ Strabo (15, 1, 72) further quoted Artemidorus on crocodiles and dolphins in the Oidanes, and Curtius (8, 9, 9) mentioned dolphins, crocodiles and unknown sea beasts in the Diardanes.

The river dolphin is perhaps also meant by Aelianus in his account of the Ganges already quoted for crocodiles and turtles (*N. An.* 12, 41). Here the river is said to breed monstrous fishes or whales (κήτη). They were caught by Indians, who manufactured oil from their fat. In later times, at least, the oil obtained from river dolphins has been used in India as lamp oil, as medicine for rheumatism and for other purposes.⁵⁴⁰

Of the fishes of India and the Indian Ocean there is not much to be said. A further curiosity of the Indian Ocean was the poisonous **sea-hare** (λαγώς θαλάττιος), described by Aelianus and briefly by Pliny.⁵⁴¹ It swims fast on surface waters, is very difficult to catch and is so poisonous that one touch is sufficient to cause death, if not treated. The identification of this fish is not made easy by the claim that it closely resembles the common land-hare, the only difference being its prickly and erect hair. Lassen and Scholfield (note on Aelianus) identified it as the globe-fish (also called porcupine fish, *Diodon hystrix*).

Megasthenes could have been the original author on the sea-hare. In his F 24 (Aelianus, *N. An.* 8, 7) a **small fish** living at the bottom of the Indian Ocean is described. When dead it floats on the surface, and if someone touches it, he faints and later dies. Actually it comes rather close to the sea-hare. Both are normally caught only when dead, both are poisonous to the touch, but according to Aelianus, the sea-hare *lives* in surface waters and never dives deep. The bottom fish has tentatively been identified as an electric eel,⁵⁴² but for this the description seems rather dramatic.

Pliny further mentions enormously long **eels** found in the Ganges.⁵⁴³ According to McCrindle, these could be water snakes, though their length has been enormously exaggerated. One may ask, why not real eels (with their length enormously exaggerated)? Large eels and morays are indeed also found in Indian waters.

⁵³⁹ Letter of Craterus in Strabo 15, 1, 35; Pliny, *N. H.* 9, 17, 46.

⁵⁴⁰ Prater 1971, 314, Watt s.v. *Whales*.

⁵⁴¹ Aelianus, *N. An.* 16, 19; and Pliny, *N. H.* 9, 72, 155. Cf. Lassen 1858, 317f.

⁵⁴² Lassen 1874, 685 (1852, 679).

⁵⁴³ Pliny, *N. H.* 9, 2, 4 *anguillae quoque in Gange tricenos pedes*. Cf. McCrindle 1901, 116.

Aristobulus seems to have been the only author to note **fishes in the Indus**. In F 38 he commented on fishes and prawns in the Indus, where fishes were much more numerous than in the Nile.⁵⁴⁴

Athenaeus quotes Theophrastus on an Indian **fish coming out of the water**.⁵⁴⁵ It is said to wander so far from water that people believe that it rained fishes. The same is probably described by Aelianus (*N. An.* 16, 12), who suggests that they come from the rivers when they are in flood during the rainy season. When the floodwater abates, the fish remain in hollows and marshes and are easily caught by cultivators. The same is told more succinctly by Pliny (*N. H.* 9, 35, 71). There are in fact several different fishes in India which are able to survive and even travel on moist ground from one pond or river to another, for instance murels (*Ophiocephalidae*), climbing perches (*Labyrinthici*), and, of course, eels (*Muraenidae*).⁵⁴⁶

Without giving his source Philostratus (*V. Ap.* 3, 1) described the **peacock fish** (τοὺς ἰχθῦς τοὺς τὰώς) found in the Hyphasis only. They have blue fins, spotted scales and golden tails, which they can fold and spread. Much in Philostratus' account of the Hyphasis comes from the realm of fantasy, but it is quite possible that this fish had some real model.

In India proper fish have never been particularly important, though fishing is attested archaeologically already in Harappan times (Belcher 1993). However, the inhabitants of the barren coast of Gedrosia ate fish as their staple diet and were therefore called by the Greeks Ichthyophagi, 'fish-eaters'.⁵⁴⁷ In late sources⁵⁴⁸ they were also dressed in fish-skins. In addition to fresh fish, which they ate raw, Nearchus (Arrianus, *Ind.* 28, 8) told that they ate meal ground from baked fish. Their fishing methods have also been described by Nearchus (*Ind.* 29, 9ff.). Their eastern neighbours, the Oreitae, too, ate dried fish (Cleitarachus F 27 in Pliny 7, 30).

In one passage Aelianus (*N. An.* 13, 18) described royal gardens with fish-ponds and large tame fishes in India. Such are attested in Indian sources, too.

Of Indian insects and other invertebrates there is not much to say. For instance, we cannot say for certain what was meant by the large winged **scorpions** in India, mentioned by Megasthenes.⁵⁴⁹ Real scorpions, mentioned by Aristobulus (F 38 in Strabo 15, 1, 45),

⁵⁴⁴ Aristobulus F 38 in Strabo 15, 1, 45. Cf. Pearson 1960, 175.

⁵⁴⁵ Theophrastus F 171 in Athenaeus 8, 332. But Aelianus, *N. An.* 5, 27, quotes the same from Theophrastus as coming from Babylonia.

⁵⁴⁶ Satyamurti 1965, 39f. (murels), 58ff. (climbing perches), 76f. (eels).

⁵⁴⁷ The name is generic. There were other Ichthyophagi on the West coast of the Red Sea described by Herodotus (3, 19ff.), Agatharchides FF 30ff. (Photius 250 & Diodorus 3, 14ff.), and Strabo (16, 4, 13).

⁵⁴⁸ Philostratus, *V. Ap.* 3, 55; *Alexander's letter to Aristoteles*; then in Mediaeval literature (see Wis 1984). According to Pliny (*N. H.* 6, 24, 109), clothes made of fish-skin (*coriisque piscium vestiti*) were used by the Chelonophagi of Carmania.

⁵⁴⁹ Megasthenes F 21a in Strabo 15, 1, 37, and F 21c in Aelianus, *N. An.* 16, 41. A suggestion like McCrindle's large hornets (1901, 46) does not help us much.

are common in India, but never have wings. Aelianus (*N. An.* 16, 42) referred to Pamenes, who had claimed to have seen winged scorpions in Egypt.

The **gold-digging ants** of Herodotus, Nearchus and Megasthenes I have already discussed on an earlier occasion.⁵⁵⁰ The story was not very popular in later literature, but they are mentioned e.g. by Strabo (15, 1, 69, adding that some of them are winged), and Aelianus (*N. An.* 3, 4) knew that they do not cross the river Campylinus.⁵⁵¹ **White ants** and their houses are mentioned by Aelianus.⁵⁵²

Bees and honey were probably too familiar to the Greeks to be frequently mentioned; they were much more fascinated by the reed honey (sugar). Aristobulus (F 41 in Strabo 15, 1, 61) told that the Brahmans of Taxila made cakes from honey and sesame. In India honey was much appreciated and consumed.⁵⁵³

Large **locusts** of India are referred to in a passage of Pliny (*N. H.* 11, 35, 103). Their length is said to be three feet, and their dried legs and thighs can be used as saws. The rest of the passage is not included by André and Filliozat (1986), but is discussed as Indian by Lassen (1858, 313f.). The beginning of this continuation, *est et alius earum obitus* "they also have another way of dying", seems to refer to the Indian locusts mentioned just before, not to common locusts discussed at the beginning of this chapter (where also a different way of dying is described). Their peculiar way of dying depends on the fact that they are gregarious and migratory; the swarms are carried by the wind and often end up in the sea or in a marsh. In fact the enormous swarms of migratory locusts originate in Africa, but for the Greeks and Romans their country of origin was unknown and India was supposedly close to Ethiopia.

Another account really belonging to Africa is that about **mosquitoes, scorpions, and spiders** of the country of the Rhizophagi in India, told by Aelianus (*N. An.* 17, 40). In the neighbourhood of Lake Aoratia these animals occur in such great numbers that they have expelled all men and made the country a desert. This passage comes immediately after a fragment of Megasthenes (F 21b) and is clearly located ἐν Ἰνδοῖς. However, the Rhizophagi or 'root-eaters' belong to Ethiopia, and there are several parallels to our account, where it is located in Ethiopia.⁵⁵⁴ It also seems that the River Astaboras is the same as the Atbara. It is possible that Aelianus was misled into locating his account in India, because *Indian reeds* are mentioned in the same country even in accounts locating it in Ethiopia (Strabo).

When **silk** first came to the West, it was often supposed that it came from India, too. From Aristoteles, *H. An.* 5, 19, we know that an inferior kind of silk was early produced in Cos in Greece. It was probably different from real silk, and when the latter was introduced, its real nature as an animal product was not understood at all. Real silk was

⁵⁵⁰ Herodotus 3, 102ff.; Nearchus F 8ab in Arrianus, *Ind.* 15, 4, and Strabo 15, 1, 44; and Megasthenes F 23ab in Arrianus, *Ind.* 15, 5ff., and Strabo 15, 1, 44; see Karttunen 1989a, 171ff.

⁵⁵¹ See further Mela 3, 62; Aelius Aristides 1, 25; Callimachus F 202, 58f.; Dio Chrysostomus 35, 24; Libanius, *Orat.* 25, 23; Lucianus, *Gallus* 16 & *Saturnalia* 24; Pliny, *N. H.* 11, 36, 111.

⁵⁵² *N. An.* 16, 15; see Ball 1885, 309.

⁵⁵³ Gopal 1969.

⁵⁵⁴ Agatharchides F 60 in Photius and Diodorus 3, 30; Strabo 16, 4, 9.

probably first mentioned by Nearchus,⁵⁵⁵ then by Pliny (*N. H.* 21, 8, 11). In the literature of the Roman period silk is often supposed to be combed from trees, and the first factual statement of its real animal origin was given only by Pausanias in the second century A.D.⁵⁵⁶

The **lac insect** (*Tachardia lacca*) was described by Ctesias,⁵⁵⁷ but is not found (with one exception) in later sources. In addition to lac, this coccid produced a red dye, which was the point made by Ctesias. Much later the *Periplus* (6) gave its Indian name λάκκος (< MIA *lakkhā* < OIA *lākṣā*).⁵⁵⁸

What are the **worms** (σκόληξ) found in the date-palm, fried and served as a delicacy for the Indian king (Aelianus *N. An.* 14, 13) I am unable to say. The long account of various items of food in Caraka (*Sūtrasth.* 27), including many kinds of animal food later strictly forbidden in Hindu custom, does not contain anything comparable.

In the above-mentioned fragment Aristobulus (F 38 in Strabo 15, 1, 45) mentioned fishes and **prawns** in the Indus. Aelianus, (*N. An.* 16, 13) knew of large prawns with large claws which live in the sea and travel up the Ganges.

Quoting the lost *Periplus maris Erythraei* of a certain Alexander (not to be confused with the extant *Periplus*), Aelianus⁵⁵⁹ told of giant **crabs** living somewhere in the Indian Ocean. Their shell measured one foot across in all directions and they had enormously long claws. Nearchus mentioned large crabs and sea-urchins in the Gulf, and Pliny knew of four-cubit-long **langusts** in the Indian Ocean.⁵⁶⁰

Of **pearl oysters** we hear often, mainly because of pearls, which will be discussed in V.6 below. The *Periplus* (59) rightly located Indian pearl fishery in Colchoi opposite Sri Lanka, while Aelianus (*N. An.* 15, 8) spoke of the town of Perimula ruled by King Soras. Pliny (9, 54, 106) knew that Perimula in India, Taprobane, the Gulf and the Red Sea were the best producers of pearls. Though Ptolemy⁵⁶¹ has Perimula in Southeast Asia, the name Soras corresponds closely to Cola, thus indicating a location in Tamil Nadu. As he is said to have been a contemporary of King Eucratides of Bactria, we seem to have again to do with the unknown Indo-Greek source of Aelianus.

The account of the habits of pearl oysters in Aelianus (15, 8) and Pliny (9, 54, 107) is entirely fantastic. The oysters are said to have leaders (ἡγεμόνες), as the bees have

⁵⁵⁵ Nearchus F 19 in Strabo 15, 1, 20 (τὰ Σηρικά, supposedly made of dried bark). Cf. Herrmann 1938, 25.

⁵⁵⁶ References to silk are collected in Cœdès 1910. About the introduction, trade and knowledge of silk in the West see e.g. Lassen 1858, 25ff., McCrindle 1901, 26, note 2; Schoff 1912, 263ff., Warmington 1928 (1974), 174ff., and Scharfe 1968, 185ff. This will be dealt with in more detail in the next volume of my studies.

⁵⁵⁷ F 45, 39, see Karttunen 1989a, 183 with note 225.

⁵⁵⁸ See McCrindle 1879, 13, Schoff 1912, 73, and Warmington 1928 (1974), 178f., on the word Mayrhofer *EWA*.

⁵⁵⁹ *N. An.* 17, 1. It is a fascinating thought to identify him with the Alexander from whom Ptolemy acquired so much information about the Indian Ocean. I shall return to this in the next volume of my studies.

⁵⁶⁰ Nearchus F 28 in Strabo 16, 3, 7; Pliny, *N. H.* 9, 2, 4.

⁵⁶¹ Ptolemy 7, 2, 5, cf. Stein 1938, 799ff. Pliny, *N. H.* 6, 23, 72, locates Perimula in South India.

“kings” (it was found out only much later that they are actually queens). The pearl-fishers try to catch these leaders, and when a leader is caught the whole leaderless swarm can be easily secured. In spite of Aelianus’ reference to the Indo-Greeks, this account seems to originate with Megasthenes, after whom it is told by Arrianus.⁵⁶² In India mussels and oysters are not eaten, which was also known in the West. The Ichthyophagi, however, were not so particular, and collected crayfish, oysters and mussels, in addition to fish. Nearchus with his crew also used the supplies of the Gedrosian coast. After sailing off from the mouth of the Indus they stopped twice to collect oysters.⁵⁶³ Referring to historians of Alexander, Pliny (*N. H.* 32, 21, 63) stated that in the Indian Ocean there were oysters one foot long.

5. Snake-Bites and Elephants’ Diseases: Indian Physicians

An important place in classical accounts of India was reserved for Indian snakes. In this (as often) Ctesias was the predecessor with his account of the marvellous snakes of India. We have seen (IV.1 above) that Aristoteles’ small snake, too, probably goes back to Ctesias. Another tiny snake living in the hottest part of India is mentioned in his fragments.⁵⁶⁴ Then the historians of Alexander’s campaign firmly established India’s fame as the land of both fabulous giant snakes and small, but extremely venomous snakes. When discussing these accounts it is good to keep in mind that unlike in later, Christian, Western traditions the snakes were not seen by the Greeks and Romans as evil creatures, but were rather held in esteem.⁵⁶⁵

As Ctesias’ account contains interesting parallels to later sources and as there is no recent discussion of it, we must look at it a little closer. His snake is only one span long, of a bright purple colour and white-headed. It has no fangs, but is able to spit its putrefying venom. Indians catch this reptile and hang it up by the tail and collect the oozing venom in a bronze vessel. The venom is amber-coloured, and causes instant and violent death when given to someone in even a small amount. When it comes from a dead snake the venom turns black, and in this case death takes much longer, even a year or two, and comes by consumption.

As often, Ctesias told rumours of distant lands which he had heard in the Persian court, and they cannot be accepted as straightforward information. In the first place, there

⁵⁶² Megasthenes F 14 in Arrianus, *Ind.* 8, 9. See Hinüber 1985, 1111, and Watt s.v. 122.

⁵⁶³ Arrianus, *Indica* 21, 13 and 22, 10 on Nearchus’ men collecting mussels and oysters, 29, 14 on the Ichthyophagi eating them. See further Philostratus, *V. Ap.* 3, 53 & 3, 57.

⁵⁶⁴ Ctesias F 45, 33 (Photius) and 451 in Aelianus, *N. An.* 4, 36.

⁵⁶⁵ Toynebee 1973, 223.

is no purple snake with a white head in India. Their small size as such is no difficulty. Early authors tried to overcome the problem by searching for a species otherwise acceptable, leaving out the curious colours. We need here only mention one particular point in their attempts, namely that Wilson's worm-snake (*Typhlops*) and Ball's biscopra lizard are not really, but were *believed* to be deadly poisonous even by the named scholars.⁵⁶⁶ It seems possible that even in Ctesias' time we have to do with similar beliefs.

With a few exceptions not found in India snakes do not spit their venom, but in India it was commonly claimed that even the sight of a snake is venomous. Snake-venoms are really effective only when introduced into the blood circulation; taken internally they ought to be relatively safe, though there are risks involved, which make experiments not very tempting. In other respects Ctesias' account seems rather acceptable. Snake-venom can be easily dried and then it looks somewhat like amber and keeps its virulence for years. The black colour of the poison from the dead snake may be due to putrefaction. The method for obtaining the poison is the same as Ctesias mentioned in his account (F 45, 46 and 45r) of the giant worm *scolex* of the Indus. In both cases the product obtained has a burning character, as snake poison also has, according to Indian ideas. A third parallel will be soon mentioned from the histories of Alexander.

From Nearchus⁵⁶⁷ we have a passage quoted about numerous reptiles (τὸ τῶν ἐρπετῶν πλῆθος) in India. During the rains these animals escaped the floods by entering houses and for this reason the Indians had high beds. There are several kinds of snakes. Some are small, some huge, the small ones being dangerous because of the difficulty of protecting oneself against them, the huge ones because of their strength. Vipers attain a length of 16 cubits. The fragment is concluded by an account of Indian physicians curing snake-bites (below). The shorter version of the same in Arrianus briefly mentions the dappled and swift snakes of India.

From the fragments of Nearchus it becomes clear that his book, mainly an account of his own career as Alexander's admiral, contained a description of India. Here it seems that he had put together the experience of snakes obtained in different phases of Alexander's Indian campaigns and therefore given separately by other authors.

With the exception of giant snakes our classical sources never mention the numerous non-poisonous snakes of India. All accounts speak of poisonous snakes and, as is perhaps suitable in the land of superlatives, they are all described as deadly poisonous. According to Strabo (15, 1, 45), Aristobulus (F 38) told of many vipers and asps and small snakes, and from Cleitarchus we have a fragment⁵⁶⁸ mentioning 16-cubit-long snakes and many which are shorter, but mottled as if painted, or bronze-striped with

⁵⁶⁶ Wilson 1836, 57f.; Ball 1885, 326. See further Yule & Burnell s.v. *Biscobra*. Though wrongly claiming that the worm-snake is poisonous Wilson then proceeded to identify the poison as opium, which, however, became known in India only a thousand years or more after Ctesias, and its OIA name, *aphiphena* 'snake-spittle' seems to be merely a popular etymology for the older *aphena*, and this was derived *via* Arabic *afyûn* from Greek ἄπιον (Mayrhofer, *KEWA*). On worm-snakes see Deoras 1978, 105f., and Daniel 1983, 64f.

⁵⁶⁷ Nearchus F 10b in Strabo 15, 1, 45 (cf. 10a in Arrianus, *Ind.* 15, 10).

⁵⁶⁸ Cleitarchus F 18 in Aelianus *N. An.* 17, 2.

stripes descending from head to tail, others silvery, others stained red, others with a golden sheen. They all kill quickly.

From Diodorus and Curtius⁵⁶⁹ we find the closer geographical context to these accounts. The former, apparently following Cleitarchus (though not naming him), claimed that numerous snakes, small and variously coloured, were seen by Alexander's men in the Pañjab. Some looked like bronze rods, others had thick, shaggy crests, and their bites brought sudden death. Curtius, too, mentioned numerous snakes in the Pañjab, with scales brilliant as gold and a deadly bite. It is perhaps possible to compare these characteristics with various kraits, vipers and other snakes of India, but here it would take too long.

The small snakes, which are extremely dangerous because not easily noticed, as mentioned by Nearchus (F 10b), belong to another geographical context, though there is some difficulty concerning the exact location. In the barren sand hills of Gedrosia there grew a herb and under its leaves tiny snakes lived. They were easily passed by unnoticed, but when they struck, their bite was instantly fatal.⁵⁷⁰ One asks whether the same is meant in the above-mentioned fragment of Aristobulus (F 38), who told of a slender snake one span long. It was found hidden in tents, baggage (or vessels) and hedges (or rushes), and its bite killed quickly, if immediate treatment was not forthcoming, but fortunately Indian roots and drugs were found to be effective against it. We note that the length was exactly the same as with Ctesias' tiny snake, though the description is otherwise quite different.⁵⁷¹ But there is one further parallel to Ctesias.

Immediately after the above-mentioned passage Strabo mentioned the Oreitae and their poisoned arrows and goes on to tell the famous story of how Ptolemaeus was wounded and how Alexander himself in a dream saw the curative herb. He does not mention that snake-venom was actually used for coating the arrowheads, but in the light of the parallel passages this seems clear.⁵⁷² In the Vulgate tradition the incident is set not in Gedrosia, but in the lower Indus country, where snake-venom was used by the inhabitants of the Brahmin town of Harmatelia, a neighbour of King Sambus, for their arrows and swords. The story of Ptolemaeus' wound and Alexander's dream is then told in similar fashion as by Strabo.⁵⁷³ What is remarkable is that the method used for obtain-

⁵⁶⁹ Diodorus 17, 90, 5ff.; Curtius 9, 1, 12.

⁵⁷⁰ Strabo 15, 2, 7, also in Pliny, *N. H.* 12, 18, 34 and 19, 4, 19.

⁵⁷¹ Lassen (1874, 684) must have thought of this passage with his "spannenlange, höchst giftige Schlange", although his reference is to Cleitarchus. In any case he identified it with Ctesias' snake. Eggermont 1975, 112 identified Ctesias' and Aristobulus' snakes and that of Alexander's dream as the "Indian karait snake", but the three species of kraits (genus *Bungarus*) described by Deoras 1978, 126ff. (also Daniel 1983, 107ff.), have a length of between one and two metres.

⁵⁷² So it was taken e.g. by Eggermont 1975, 126, who further identifies the healing herb as the same under which the snakes lived and this with *Nerium odorum*.

⁵⁷³ Diodorus 17, 103; Curtius 9, 8, 20ff. (poisonous swords); Justinus 12, 10 (the town of King Ambus). With his characteristic gift of combination, so hard for us to follow, Eggermont 1975, 107ff., connects this with Ctesias (F 45, 33 above) and with Curtius' (9, 1, 12) and Diodorus' (17, 90, 5ff.) accounts of snakes in the Pañjab, both being supposedly derived from Cleitarchus, who took them from Aristobulus. The bronze snake of Diodorus is thus the same as the purple snake of Ctesias. The original author (Ctesias' role is not explained) is Aristobulus, who gave his

ing the venom, as described by Diodorus, is exactly the same as in Ctesias. Here, too, the carcasses of snakes were left to decompose in the sunshine and the liquid oozing from them used to poison the weapons.⁵⁷⁴

The most remarkable among Indian snakes, however, were the giant ones. We have already referred to the 16-cubit-long viper (ἔχις, ἔχιδνα), mentioned in the fragments of Nearchus (F 10b) and Cleitarchus (F 18). Probably following Cleitarchus (as both speak of snakes, not of vipers), Diodorus (17, 90, 1) stated that 16-cubit-long snakes were found in the mountains of the Pañjab. These were probably meant by Curtius, too, when he referred to the snakes of unheard-of size seen in the Pañjab where timber was sought for building ships for the navy.⁵⁷⁵ Rejecting Onesicritus' account (below) of giant snakes kept by Abisares as untrustworthy, Strabo (15, 1, 28, perhaps repeating Eratosthenes) admitted that others, too, spoke of giant serpents caught in the Emodi mountains and kept in caves. According to Nearchus, a snake of 16 cubits in length was actually caught by the Macedonians,⁵⁷⁶ and this instance could well have been the origin of our accounts.

Aristobulus (F 38), however, was more cautious and gave the viper a length of something more than nine cubits, and he clearly stated that he never saw snakes larger than this. A cubit (πῆχυς) has several local variants varying from 37 to 55 cm, but here we probably have the Attic cubit corresponding to approx. 49 cm.⁵⁷⁷ The viper should thus have a length of 8 or at least 5 metres. The real vipers and other poisonous snakes of India rarely exceed a length of two metres,⁵⁷⁸ though the king cobra (*Naja hannah*) with its 4.5 to 5.4 metres or more would suit Aristobulus' measurements. If we accept the measurement of eight metres we must thus suppose that the snake in question was not a viper at all, but, although it is non-poisonous, the Indian python (*Python molurus*), though even for this a maximum of seven metres is stated. The still larger *Python reticulatus* may attain even ten metres (8.4 m recorded), but belongs to Southeast Asia.⁵⁷⁹

Commenting on Aristobulus' five-metre-long viper, Strabo (15, 1, 45) notes that he had himself seen one such in Egypt, where it was brought from India. We might ask whether the viper seen by Strabo was really imported from India or rather from the part of Ethiopia often known as "India". Quoting the History of the Ptolemies written by a cer-

account in connection with the Pañjab. The story of Ptolemaeus' wound and Alexander's dream is fictitious, invented as Ptolemaic propaganda, perhaps by Cleitarchus, the inventor borrowing all his facts from Aristobulus. The herb really does grow in Gedrosia, and the Gedrosian version is thus the original, Harmatelia being a real town there, and the lower Indus version a later elaboration.

574 Considering only the Ctesianic giant worm *scolex*, Goossens 1934, 418 refers to the Indian legend found in the *Harivaṃśa* of the divine serpent Śeṣa performing a penance hanging from a tree for a thousand years, distilling the kālākūṭa poison from its mouth and thus burning the world. Poisoned arrows are known in India as early as the *Rigveda* (6, 75, 15).

575 Curtius 9, 1, 4 *magnitudinis invisitatae serpentes*.

576 Nearchus F 10a in Arrianus, *Ind.* 15, 10.

577 KP s.v. *Pechys*.

578 On poisonous snakes see Deoras 1978, 126ff., and Daniel 1983, 107ff. E.g. for the common Russell's viper (*Vipera russelli*) 1.6 m or a little more is given.

579 On the python see Deoras 1978, 107ff., and Daniel 1983, 71ff. Several authors have accepted our serpent as the python, e.g. Hinüber 1985, 1124. André & Filliozat 1986, 356, note 128, allow only 6 metres for a real python.

tain Nymphis, Aelianus (*N. An.* 17, 3) mentions giant vipers of 15 cubits in length as found on the Troglodytic coast of the Red Sea. On the other hand, at least occasionally large snakes were brought from India. Thus according to Nicolaus Damascenus,⁵⁸⁰ among the presents brought by the Indian embassy to Augustus (20 B.C.) were large vipers and a serpent ten cubits long. According to Cassius Dio (69, 15, 2), Hadrian in the second century had an Indian snake, too.

Another report probably founded on and usually explained as the Indian python, though somewhat exaggerated, came from Megasthenes, who had heard of snakes large enough to be able to swallow stags and bulls whole.⁵⁸¹ The same is quoted from Eratosthenes by Strabo (2, 1, 9) among examples intended to show how unreliable were the accounts of Daimachus and Megasthenes. Here it is especially mentioned that the stags were devoured with their horns. Perhaps a third version of this story can be seen in Aelianus' account (*N. An.* 16, 22) of the enormous snakes which seize and devour flocks in the Indian country of the pygmy Sciratae, while another kind of snake sucked their blood. This second kind belongs to a widely-known Western tradition of blood-sucking giant snakes of India or Ethiopia, as we have already mentioned in connection with elephants.

There are still much larger giants mentioned in classical accounts, but their existence was only founded on rumours. We have seen that Aristobulus (F 38) emphasized that he had not seen any snakes larger than nine cubits. Nearchus (F 10a) and many others had apparently seen a python of 16 cubits, but Nearchus goes on to say that the Indians claim that there are much larger ones, too. Perhaps both historians had in mind the famous serpents of King Abisares. The story originates with Onesicritus, who had perhaps exaggerated the enormous measurements of these snakes, but otherwise it may be of Indian origin. According to him, the envoys coming from Abisares to Alexander reported that the king kept in a cave two serpents of no less than 150 and 80 cubits in length. Alexander had a great desire to see them, but as we know he never visited Abisares' country.⁵⁸²

When Alexander heard of giant snakes and wished to see them, it was a natural development of the Alexander legend to have him actually see them. As the legend in other respects, too, seems to have used much material from Onesicritus, it seems clear that some early form of it was the source of Aelianus, *N. An.* 15, 21. It seems that we have here a contamination of the real python of 16 cubits and of the fabulous serpents of Abisares. The Indian monarch is left out as unnecessary as Alexander himself passes the cave of a giant serpent, measuring 70 cubits in length and with eyes as large as Macedo-

⁵⁸⁰ Nicolaus F 100 in Strabo 15, 1, 73. The parallel account in Cassius Dio 54, 9, 8–10 does not list all the presents and does not mention snakes.

⁵⁸¹ Megasthenes F 22 in Pliny, *N. H.* 8, 14, 36, explained as the python (often with the old name *Boa constrictor*) e.g. by Lassen 1858, 315 & 1874, 684 (1852, 679), Ball 1885, 308, and McCrindle 1896, 361. Goossens 1934, 417 connected this, like the giant snakes of Abisares, rather with the mythical Nāgas.

⁵⁸² Onesicritus F 16a in Strabo 15, 1, 28 (quoted from Eratosthenes) and 16b in Aelianus, *N. An.* 16, 39 (and brief 16c in Tzetzes).

nian shield (*aspis*). The Indians asked Alexander not to disturb the animal and the king was kind enough to comply.

A similar explanation probably also lies behind the account of Maximus of Tyre,⁵⁸³ who told of a giant snake kept by Taxiles and shown to Alexander. It was five plethra (approx. 150 m) long and kept in a cave. It ate cattle and sheep and was considered to be holy to Dionysus.

While these giant snakes are completely incredible in comparison to real pythons, not to speak of other snakes of India, there are still larger serpents mentioned in Indian mythology, where they occasionally have really cosmic dimensions.⁵⁸⁴ It has been noted by Vogel, and recently confirmed by Stöcker,⁵⁸⁵ that Abisares' snakes were probably not real serpents, but mythical Nāgas, whose cult is known to have been important in Kashmir and the Pañjab. Stöcker also rightly emphasizes the fact that many sources have the serpent kept in a cave and points out that nobody actually says why.⁵⁸⁶ The why seems to be a Nāga temple situated in a cave. We may note here that one of the mythical serpents of the Vedic period, Vala, has a name which also signifies 'cave'.⁵⁸⁷

⁵⁸³ Quoted in McCrindle 1896, 361 (as *Diss.* 38; according to Stöcker 1979 the reference is 1, 8, 139).

⁵⁸⁴ The classic account of Indian serpent lore and mythology is Vogel 1926.

⁵⁸⁵ Stöcker 1979, however, makes the case much too simple, and several parts of his argument are open to serious criticism. He seems to be ignorant of half of the relevant text passages and to have no understanding of the development of Alexander literature. It is rather characteristic that he several times refers to Dahlqvist 1962 as an authoritative source, although Dahlqvist's speculative arguments have been rejected by most critics. As Stöcker 1979 in any case is a rather recent contribution, a few words of comment are needed. Thus it is quite likely that some early version of the Alexander *legend* already existed in Strabo's time, though he did not much comment on it. Therefore Strabo's account, founded on *historians*, is no *terminus post quem* for legendary traditions. We know, though Stöcker apparently does not, of the enormous amount of lost Hellenistic literature about Alexander and of the fact that Aelianus knew many of these lost sources. The role of Taxiles in Strabo has no value for the interpretation of Maximus and Aelianus (15, 21). But Stöcker himself soon forgets that he had suggested that the story was made up after Strabo, and suggests that Aelianus 15, 21 should be accepted as a variant of F 16 of Onesicritus. It is completely irrelevant here that Tzetzes (F 16b) perhaps knew Aelianus 15, 21. The question is whether Aelianus had here used Onesicritus (directly or through some lost source), and the answer to this must be in the negative. The Aelianus passage may well represent a stage in the development of the Alexander Romance starting with Onesicritus (if not with Cleitarchus), but still it has no place as Onesicritus' testimony.

Though rather beyond the sphere of the present theme, I should like to make another comment to Stöcker's article. He briefly refers (p. 96) to the Syriac Pseudo-Callisthenes as a further elaboration of Aelianus 15, 21. Here Alexander no longer respects the pious wish of the Indians not to disturb the serpent, but slays it as a false god (text in Feldbusch 1976, 150). Stöcker points this out as an important development, but refrains from commenting, because a classical scholar cannot comment on a Syriac text. True enough, but if mentioned at all, a classical scholar is entitled to remark that in classical tradition it was no business of Alexander to slay false gods; on the contrary, he is often said to have worshipped local gods. And if a Syriac version contains such an additional passage, he may well ask whether this is not a Christian elaboration. If so, it has nothing to do with early traditions about Alexander.

⁵⁸⁶ Among other authors to accept the Nāga explanation we may quote Lassen 1874, 684f. (divine cobras), Wecker 1916, 1312, and Goossens 1934, 420f.

⁵⁸⁷ Mayrhofer, *EWA* s.v. *valā*, Macdonell 1898, 158f.

Giant snakes were known from Africa, too. These can well be compared to the measurements given in Indian accounts. Still reasonable were the large serpents brought from the south to Egypt in Ptolemaic times, measuring 14, 13, 8, 7, and 6 cubits.⁵⁸⁸ But Diodorus (3, 36f.) quoted Agatharchides (F 80b), who had heard rumours of one 100 cubits long and what he thought to be reliable information (the animal was supposed to have actually been brought to Alexandria to Ptolemaeus Philadelphus) of one no less than 30 cubits in length. This must also have been the source of Artemidorus, whose 30-cubit-long Ethiopian snakes Strabo (16, 4, 16) still found credible, while the still larger Indian ones – probably Onesicritus and Abisares' serpents were meant – were quite fabulous. Pliny and Pausanias, too, had heard of giant snakes found in India and Ethiopia.⁵⁸⁹ We may further briefly note that a confusion between the Caucasus proper and the Indian Caucasus was perhaps the origin of the story of Parthian giant snakes.⁵⁹⁰ Aelianus (*N. An.* 2, 21) has a story of 20-metre-long giant serpents in Phrygia.

While Philostratus' account, though referring to such an author as Nearchus, of snakes 70 cubits long bred in the Acesines was probably just a confusion of the Abisares tradition,⁵⁹¹ real water-snakes were also known in the West. Aelianus in *N. An.* 16, 8 mentioned both broad-tailed sea-snakes of the Indian Ocean and immense water-snakes (ὑδροποις) of lakes. It is not said that *Indian* lakes are meant, but the thought is close. The former could also be eels, but actually the real sea-snake (*Hydrophis caeruleus*) also has a flat tail used as a paddle. These animals are good swimmers and poisonous, their length is given as 0.7–0.8 meters. The related flat-tail (*Pelamis platurus*) is of the same size, but there are several larger, also related, sea-snakes, among them the 1.5 m long *Hydrophis spiralis*, often seen hundreds of miles from the coast.⁵⁹² The lake-snakes

⁵⁸⁸ Aelianus, *N. An.* 16, 39, probably from an unmentioned Hellenistic history.

⁵⁸⁹ Pliny, *N. H.* 8, 13, 35 (20 cubits), and Pausanias 2, 28, 1 (more than 30 cubits). As it is not clearly stated by Pliny which animal is meant (*generat eos Aethiopia Indicis pares, vicenum cubitorum...*), and as the preceding passage deals with both elephants and serpents, Rackham in his Loeb translation (and Scullard 1974, 218) has translated *eos* 'them' as 'elephants'. I think they are certainly 'serpents'. It was already stated by Pliny (8, 11, 32) that Indian elephants were larger than African ones (cf. V.3 above) and the measurement fits in well with the length of a fabulous serpent, as we have seen. And though with Scullard I find it a nice thought to have elephants forming a cluster and sailing over the sea to Arabia, using their erect heads as sails, in truth even one's imagination could accept this much more easily in the case of serpents. But Pliny also refers to Juba stating that these animals have crests (*cristatos Iuba crediderit*) and for this we have a clear parallel in Philostratus, who actually culled from Juba information about elephants, but here (in *V. Ap.* 3, 7) claims that a kind of giant serpent in India is actually crested. Philostratus used all kind of material without geographical scruples, and when he used Juba (writing about Africa) for elephants, why not for serpents, too?

⁵⁹⁰ Cf. the derisive account in Lucianus, *Quom. hist. conscrib.* 29.

⁵⁹¹ Philostratus, *V. Ap.* 2, 17, containing Nearchus F 12 and Orthogoras F 1. In this connection we may also note that Ctesias (F 35 in Aelianus, *N. An.* 16, 42), in addition to his river worms of the Indus, described a fantastic water-snake in a Persian river. It was black and white-headed, approx. 2 metres long. In daytime they swim underwater, but at night they kill everybody who comes to fetch water or wash their clothes. We are not told why clothes were washed at night.

⁵⁹² A list of sea-snakes of Indian waters in Deoras 1978, 101ff., description of *H. caeruleus*, *ibid.* 135f., of *P. platurus* in Daniel 1983, 120; *H. spiralis* (Daniel 1983, 118f.) or some closely related species is mentioned as *Hydrophis pelamis* by Ball 1885, 308, and Keller 1913, 301, as an explanation to Aelianus.

were explained by Ball (1885, 308) as crocodiles, but we could also here have a version of Indian stories about Nāgas living in waters.⁵⁹³

It is perhaps no wonder that we find a fantastic account of sea-snakes, too. According to the *Periplus of the Indian Sea* of Alexander, as quoted by Aelianus (*N. An.* 17, 1), there are sea-snakes no less than 40 cubits in length in the Indian Ocean. The extant *Periplus of the Erythraean Sea* mentions several kinds of sea-snakes on Indian coasts. Thus the proximity of the mouths of the Indus is observed from the serpents called graae (γράαι, chapter 38), and that of Barace from very large black snakes, while on other parts of the coast and around Barygaza smaller serpents of a bright green colour running into gold are seen (ch. 40). In Keralan waters a shorter variety of red-eyed black snakes is often seen (ch. 55).⁵⁹⁴

The Nāgas of Indian mythology were partly aquatic, too, and they were perhaps the origin of the much-related tradition of hatred between giant snakes⁵⁹⁵ and elephants, already referred to in V.3 above. There are several versions of this tradition, locating it in India or Ethiopia and having serpents hiding among tree-branches or in the water. We must take a somewhat closer look at these accounts, though for a start it must be understood that in any case it is a pure fable. In nature, there are no snakes capable of presenting problems to elephants.⁵⁹⁶

The earliest attested authority for this story seems to be Artemidorus (probably quoting Agatharchides), whose lost account is retold by Strabo and Diodorus.⁵⁹⁷ Strabo claimed that 30-cubit-long serpents are capable of overpowering elephants and bulls. Diodorus gave more details: They coil around the feet of elephants and blind them with their fiery gaze. The same is probably the origin of Aelianus' brief note (*N. An.* 2, 21) of Ethiopian elephants killing giant serpents, though their length is not given as thirty cubits, but thirty orgyias (approx. 60 m)!

It has been already stated that the account of Juba, probably located in Africa, was the most likely source of Philostratus' account of giant serpents killing elephants in India, as given in the *V. Ap.* 3, 6–8.⁵⁹⁸ He had heard of two or three different kinds of giant serpents, living in marshes, on plains or foothills and in mountains. The second kind has silvery scales, a crest and beard, and burning eyes, and it fights elephants, but ultimately

⁵⁹³ Such were often told by Chinese pilgrims, see Beal 1884, Index s.v. Nāgas. Real fresh water-snakes are small (one meter and less, cf. Daniel 1983, 104f.).

⁵⁹⁴ The word *grae* has been naturally identified as OIA *grāha*, but they really seem to be sea-snakes (Schoff 1912, 165, and especially Goossens 1946) rather than crocodiles (McCrindle 1879, 118).

⁵⁹⁵ It must be noted that the Greek word δράκων (with Latin *draco*) means a large serpent, never the winged dragon of later lore. The wings were only invented in the Middle Ages. See Keller 1913, 302.

⁵⁹⁶ Cf. Scullard 1974, 216f.

⁵⁹⁷ Strabo 16, 4, 15f. and Diodorus 3, 37, 9. The latter, as often, did not name his source, but his entire passage (3, 35ff.) on Ethiopian animals, including the rhinoceros, different kinds of baboons, carnivorous bulls, corocotta and our giant serpent, closely follows both Strabo and the excerpts of Agatharchides as given by Photius. The Diodorus passage (3, 37, 9) forms the end of Agatharchides' F 80b, but is missing in Photius (F 80a).

⁵⁹⁸ Stöcker 1979, 91f., note 2, comments on this without mentioning any parallels and searches for an origin in India!

both are often killed. The third kind, being the mightiest, with golden scales and a beard and a fiercely burning gaze, is able to catch elephants.

Pliny has three different versions, two set in India and one without a location indicated. In *N. H.* 8, 11, 32f., he tells of giant serpents of India having a continual feud with elephants. The serpent lies in ambush in a lofty tree, and when the elephant comes to eat the leaves, it drops down on top of it winding it entirely in its coils. It aims at the elephant's face, preventing it from breathing and lacerating its tender parts, often blinding it. But it also happens that eventually the falling elephant with its weight crushes its attacker still coiled around it. It has been already mentioned (V.1 above) that the mixed blood of the two animals was supposed to be the source of cinnabar.

In the second account (*N. H.* 8, 12, 34) the serpent lies in ambush in a river and attacks the elephant coming to drink. It coils around its trunk and bites inside the ear, sucking its blood dry. But it becomes intoxicated by the blood and is therefore often crushed by the dying elephant. No location is given, but the account seems to be related to that quoted from Statius Sebosus (Pliny, *N. H.* 9, 17, 46), who told of giant worms of a deep purple colour living in the Ganges and attacking elephants coming to drink, gripping their trunks with their teeth.⁵⁹⁹

Mela (3, 62) briefly mentions that India *immanes et serpentes alit, qui et elephantos morsu atque ambitu corporis afficiant*, while Aelianus, *N. An.* 6, 21 closely follows Pliny's first version.⁶⁰⁰

It seems that there are two main traditions (the geographical difference being secondary), one of a python-like giant serpent attacking an elephant from the branches of a tree and another of a blood-sucking water monster. We have already mentioned the possible influence of the Ctesianic giant worm *scolex* and of the *odontotyranus* of the Alexander legend in this story. Goossens (1946, 627f.) actually quotes an Indian parallel from Vogel.

There is not much to say from an Indian viewpoint about the fabulous winged snakes of Megasthenes.⁶⁰¹ They can hardly be the fruit-eating bats of Ball (1885, 280) as they are said to discharge a putrefying liquid during their nocturnal flights. Ball fails to show anything to explain this point. Actually, it seems that Megasthenes was here not relating genuine Indian tradition. While the story is not known from India, Arabian winged snakes were already known to Herodotus (2, 75f., and 3, 107–109), though the putrefying urine is not mentioned. This latter feature is rather similar to some accounts of Ctesias, who was evidently fond of this kind of story. According to Herodotus, the Arabian winged snakes were said to come to Egypt in enormous swarms, but on the way they were eaten by ibises. Herodotus had visited a place where he saw masses of bones

⁵⁹⁹ When the Loeb text reads *vermes branchiis binis sexaginta cubitorum*, I should like to translate this as "sixty-cubit-long worms with a pair of gills" rather than Rackham's "worms... that have a pair of gills measuring 90 ft.". André & Filliozat 1986, 89 read *sex cubitorum*, which well suits gills, but neither they nor Rackham have any critical note added.

⁶⁰⁰ See further e.g. Philo of Alexandria, *De aetern. mundi* 128f.; and Ambrose, *Hex.* 3, 9, 40.

⁶⁰¹ Megasthenes F 21a in Strabo 15, 1, 37, and F 21c in Aelianus *N. An.* 16, 41.

of these animals. If we take the bones as crusts, the whole story may well be a veiled account of migrating locusts.⁶⁰²

According to Herodotus (3, 107), the Arabian flying snakes were guarding the libanotus (frankincense) trees. Similar accounts of poisonous (but not necessarily winged) snakes guarding valuable shrubs in Arabia are also told by Theophrastus (*H. Pl.* 9, 5, 2, on cinnamon) and Pausanias (9, 28, 4, on balsam). This guardian of riches motif, here noted already by Schoff and Keller, we have encountered several times with other animals. In India the serpent gods of Nāgas were famous guardians of gold and other riches, but in the classical tradition of Indian snakes this motif appears only in late antiquity, when a Herodotus-like story about snakes guarding pepper-plants was related.⁶⁰³

Indian physicians and their skill in curing snake-bites were praised in histories of Alexander, and they thereafter enjoyed great fame in the West. Nevertheless, little actual knowledge of anything like the Āyurveda is found in Western sources of our period. In Indian tradition great skill in Āyurveda is ascribed to northwestern physicians. In Buddhist sources Taxila is mentioned as an important centre of medicine, where great skill was learnt.⁶⁰⁴ Our extant sources on the Āyurveda are all of a later date, but something similar must have existed even earlier.⁶⁰⁵

A sentence of Nearchus gives the general opinion of the Western world about Indian medicine. According to Strabo, he wrote that “charmners go around who are believed to cure the wounds [inflicted by poisonous snakes], and that this is almost the only art of medicine, for the people do not have many diseases on account of the simplicity of their diet and their abstinence from wine; but that if diseases arise, they are cured by the Wise Men.”⁶⁰⁶ From the second version of the same fragment we learn that Alexander hired Indian physicians, who were skilled in treating snake-bites, while Greek physicians were powerless. It is confirmed that they knew other kinds of cures, but that the Indians were a healthy people.⁶⁰⁷ Probably Nearchus was thinking of the situation in the Pañjab, where poisonous snakes killed a number of Alexander’s men, until he enlisted the aid of Indian

⁶⁰² Herodotus 2, 75f. and 3, 107–109; further Mela 3, 8 and Pausanias 9, 28. Keller (1913, 301f.) attempted to explain this as a vague knowledge of the flying lizards (*Draco sp.*) of South India and Southeast Asia (see Daniel 1983, 46f.), but these are probably too distant for Megasthenes and definitely so for Herodotus. As to that, there is even the so-called “flying snake” (*Chrysopelea ornata*) found in Southern and Eastern India, capable of performing at least short glides through the air (Daniel 1983, 87f.). Schoff 1912, 131ff., attempts a purely mythical explanation, which is hardly acceptable as such as Herodotus saw the remains of the winged snakes, but it is interesting for the guardian of riches motif.

⁶⁰³ See e.g. Isidorus, *Etym.* 17, 8, 8, and Schoff 1912, 215f. The guardian snakes are so numerous and dangerous that fire is needed to obtain the coveted berries. Schoff 1912, 225, quotes mediaeval stories (the *Arabian Nights*, Marco Polo, and Niccolo Conti) about Indian diamonds guarded by snakes.

⁶⁰⁴ Zysk 1982, Filliozat 1964, 9f.

⁶⁰⁵ See e.g. Filliozat 1964, 80ff.

⁶⁰⁶ Nearchus F 10a in Strabo 15, 1, 45, Jones’ translation. His opinion of the healthy habits of the Indians can be compared to Onesicritus’ account of the country of Musicanus and to Megasthenes. Cf. Pearson 1960, 126

⁶⁰⁷ Nearchus F 10b in Arrianus, *Ind.* 15, 11.

physicians.⁶⁰⁸ According to Diodorus, the antidote used was a medicinal root, and Aristobulus, too, mentioned Indian roots and drugs.⁶⁰⁹ This brings us back to the famous legend of Alexander's dream.

The various forms of this legend tell how many of Alexander's men were wounded by arrows or swords poisoned by snake-venom, among them the future King Ptolemaeus. Now Alexander saw in a dream a snake carrying a plant, and this plant was soon discovered to be an effective antidote to the poison.⁶¹⁰ As it was (wrongly) supposed in the Vulgate version that among the Malloi Ptolemaeus saved Alexander's life, it was rather fitting that Alexander, too, saved Ptolemaeus. But from Arrianus (*Anab.* 6, 11, 7f.) and Curtius (9, 5, 21) – F 26ab of Ptolemaeus – we know that in his own history Ptolemaeus denied that he was present when Alexander was wounded. He had every reason to tell the story if it was true; therefore it was probably false, although it is very often met with in Alexander histories. Perhaps it was invented by Cleitarchus or obtained by him from someone who produced propaganda for the cause of Ptolemaeus without being so scrupulous with facts as the king was himself, and the same origin can be assumed for the story of Alexander's dream and the recovery of Ptolemaeus. Still, it is possible that as far as poisoned weapons and healing drugs were concerned the story has a true foundation. In this case we can perhaps follow Strabo (15, 2, 7), who suggested that Alexander actually obtained the healing herb from his Indian physicians.

There are a few further passages referring to Indian medicines⁶¹¹ and, as we saw in chapter V.1, quite a number of drugs were imported from India in the early Roman period. Pliny and pharmacological authors such as Dioscurides, however, do not mention Indian physicians when commenting on them and their uses. More important is the Megasthenian account of Indian physicians.⁶¹² According to him, one class of the Sarmanes (those coming next to the Hylobioi in esteem) are described as physicians. Were they Āyurvedins? They place great emphasis on dietary cures, which speaks on behalf of this assumption. Further, they use ointments and plasters, these, too, common in the Indian system of medicine. Somewhat different seem to be the "Mountain Pramnae" of Strabo, who, in addition to drugs, use magic, enchantments and amulets in their cures.⁶¹³

⁶⁰⁸ Diodorus 17, 90, 7, and Curtius 9, 1, 12.

⁶⁰⁹ Aristobulus F 38 in Strabo 15, 1, 45. Aelianus (*N. An.* 12, 32), too, stated that India produces numerous snakes, but also herbs to cure their bites.

⁶¹⁰ Diodorus 17, 103; Curtius 9, 8, 20ff.; Strabo 15, 2, 1; Justinus 12, 10 (on him, see Eggermont 1975, 131f.). While other authors briefly state that Alexander saw the healing herb in a dream, Diodorus and Curtius state that it was shown by a snake. Strabo and Justinus mention poisoned arrows, while Curtius speaks of swords. Diodorus' σίδηρος 'iron' can be used both of swords and of arrow-heads. The story is further related, with some additional literary embellishment (the snake seen in Alexander's dream is the pet serpent of Olympias), by Cicero (*De divin.* 2, 66, 135; cf. Eggermont 1975, 127f.). The idea that the snakes themselves know the antidote to their poison is rather natural and is found in India as early as the *Atharvaveda* 8, 7, 23.

⁶¹¹ See e.g. Strabo 15, 1, 22, and Aelianus, *N. An.* 16, 19.

⁶¹² F 33 in Strabo 15, 1, 60. Cf. Filliozat 1864, 193f. Skurzak 1954, 98f., is hardly acceptable.

⁶¹³ Strabo 15, 1, 70 μετὰ γοητείας καὶ ἐπωδῶν καὶ περιάπτων.

In the Āyurveda, the *Suśrutasaṃhitā* (*Kalpasth.* 3, 28 – 5, 34) contains a long account of snakes and snake-bites, including an attempt at a classification of various snakes into five groups⁶¹⁴ and with many cures for their bites. Much shorter is the corresponding account in the *Carakasamhitā* (*Cikitsāsth.* 24, 124–164). Their various cures are reputed to be effective, but according to Deoras (1978, 12), no authentic records are available of these cures being actually prepared and used.

* * *

Several attempts have been made to find parallels between Indian and Western medicine. Undoubtedly there existed some possibilities of knowledge and of influence in both directions. However, it is often difficult to demonstrate whether a real relationship existed, and if so, which one would then be the more original.⁶¹⁵

Similarities in the respective doctrines of corporeal fluids in the Āyurveda and in the Hippocratic system have led some scholars (Weber, Filliozat) to suppose a dependency in either direction. And while details here are apparently not so convincing, Filliozat refers to the physiological and pathological theory in Plato's *Timaeus*, which, without any direct Greek parallel, is remarkably similar to the tridoṣa/tridhātu doctrine.⁶¹⁶ Like Āyurveda Plato explains three elements as the origin of physiological and pathological disturbances. It is easy to connect wind (πνεῦμα) with *prāṇa*, the bile or the cole secretion of the liver (χολή) with *pitta*, and phlegm (φλέγμα) with *śleṣman*.⁶¹⁷ It is important further that in Plato the cole secretion is connected with fire, while in India Agni is also the *pitta* of the waters as early as the *Atharvaveda*. Some further details of Platonic pathology have parallels with Āyurveda, and Filliozat supposed that they were borrowed *via* Achaemenid Persia.

According to Filliozat, another comparison was drawn between the pneumatic doctrine in the *Carakasamhitā* and the Hippocratic Περὶ φύσων (On the winds).⁶¹⁸ This text, perhaps written by a Sophist, was accepted as a genuine Hippocratic work in the early Hellenistic period and was certainly written long before Alexander. Although it is in

⁶¹⁴ In *Kalpasth.* 4, 10, *darvikara* 'cobra', *maṅḍalin* 'viper', perhaps also 'python' (more properly *ajagāra*), *rājimant* 'krait', and *nirviṣa* colubrids and other non-poisonous snakes. The cobra, viper and krait represent the three main types of snake poison in India. The non-poisonous group was much smaller than in zoology, because many of its members were wrongly supposed to be poisonous.

⁶¹⁵ Filliozat, who made good use of his original education as a physician, is important here again (1933b, 1947, 1956b, 1964). See also Kirfel 1948. As a curiosity we can mention the untenable hypothesis proposed long ago by E. Haas (1877), who explained the classics of Āyurveda as Mediaeval texts based on the Arabic form of the Hippocratic system. Even the name Suśruta he derived from an Arabic form of Hippocrates. It is also no wonder that a few Indian scholars have proposed Āyurveda as the main source of Hippocrates.

⁶¹⁶ Filliozat 1956b, 7, and 1964, 229ff.

⁶¹⁷ According to Filliozat 1964, 192, this Tridoṣa doctrine of the Āyurveda is referred to as early as by Kātyāyana (probably in the third century B.C.).

⁶¹⁸ Filliozat 1956b, 6f. and 1964, 196ff. Caraka, *Sūtrasth.* 12 (the corresponding chapter in the Suśruta, *Nidānasth.* 1, is more practical and less close to the Greek text).

many respects purely Greek in nature, the idea that all bodily functions are based on the wind, which can be either normal or violent, is common to both. Filliozat further notes that the attacks of tetanus and epilepsy are in Greece as well as in India explained as a mixing of winds. In conclusion Filliozat derived the Greek *pneuma* theory from India.

In a Babylonian tractate on prognostics, published by René Labat in the *Journal Asiatique* 240, 1952, 299–321, Filliozat suggested parallels with Āyurveda extending even to the form of exposition, though he accepted a Mesopotamian priority here.⁶¹⁹ The common Mesopotamian origin was also used to explain some more distant parallels in the Greek tradition of prognostics.

Parallels have been also suggested between the Aristotelian theory of embryology and the corresponding Āyurvedic theory.⁶²⁰ If some influence took place, which is perhaps likely, it is rather difficult to say in which direction it went. Here, too, we may suppose, with Filliozat, that a contact might have been established in the centres of the Achaemenid empire.

Less convincing is the attempt of Zysk (1986) to explain the curious method of dissection in the *Suśrutasamhitā* by Hellenistic influence. The method, founded on artificially quickened decomposition and scraping up tissue layers with bundles of grass or the like, seems to me completely un-Greek. A parallel in mediaeval medical texts hailing from Salerno is much more easily explained as influence from the Arabs, who knew the Indian systems and were greatly esteemed in Salerno, than as an oral tradition originating in classical times, though not mentioned in any extant medical works.

While there is some difficulty with the theory, parallels become easier to demonstrate in pharmacopea. Filliozat claimed that in the Hippocratic corpus, in addition to pepper, which was called the Indian Medicine and used for ophthalmic and gynaecological suppurations, an Indian method of cleaning the teeth is described in detail and with reference to India.⁶²¹

We might also note that while Indian physicians were known in the West in general literature, classical works on medicine do not mention them. Quite a number of Indian medicines were imported in the West at least in the Roman period (see V.1 above), but no scientific interchange seems to have been involved. It is beyond the scope of the present study, but it could be interesting to try to find out whether there is any similarity to the Āyurvedic prescriptions in the way Indian medicines were used by such authors as Galenus, Dioscurides, Celsus and Oribasius. Though they all belong to the Roman period (Hellenistic medicine is more or less lost to us), they probably often reflect earlier knowledge.

⁶¹⁹ Filliozat 1956b, 8, and especially 1952 (again in 1964, 258ff.).

⁶²⁰ My thanks are due to Dr. R. P. Das, who brought this question to my knowledge. See also Filliozat 1964, 237.

⁶²¹ Filliozat 1956b, 5 (but not mentioned in 1981, 99). Unfortunately, the original text of Filliozat 1956b is unavailable to me and I have to rely on my notes made 16 years ago and containing no reference. The passage in question seems to be *De morbis mul.* 2, 185. The preparation is in fact here called "Indian" (καλέεται δὲ ἰνδικὸν φάρμακον), but as it contains only anise, dill, myrrh and wine it does not seem particularly Indian.

6. The Country of Precious Stones

India and neighbouring Bactria have produced and exported precious and semi-precious stones ever since the prehistoric period. A famous example is the lapis lazuli of Badakshan, exploited by the Harappans and exported to the West as early as the third millennium B.C. The bead industry using many kinds of material flourished in the Indus country – it has shown a long sequence in archaeological excavations. Indian stones and beads are found in great numbers in the ancient Near East. In Rome Indian stones were much sought after, and even in the Middle Ages they found their way to the West.⁶²²

Unfortunately, there are not many competent studies of this material.⁶²³ Therefore even Ball (1884), though necessarily much antiquated, is still useful, because of the professional competence (he was a geologist) and local knowledge of the author. A special study of classical accounts of Indian stones and minerals would be very useful indeed. Here we can only offer some preliminary notes for such a work.

The classical tradition of Indian precious stones begins with Ctesias, who also included in his *Indica* information from Bactria. He described the curious magnetic stone called *Pantarba* (and mentioned a Bactrian merchant in this connection), which is still without a plausible explanation.⁶²⁴ According to Ctesias (F 45, 11 and again 45, 33), the main source of Indian precious stones were the Sardonyx mountains situated in the middle of the Indian desert (perhaps also mentioned by Ptolemy). It is difficult to accept for Ctesias a knowledge of a region so distant from the Indus, but if his Indian desert is the Thar desert, the mountains could perhaps be the Rajapippali, still known for their excellent carnelians apparently mined there since remote antiquity.⁶²⁵

The identification of various stones mentioned in classical literature often presents considerable difficulties. The names as such have in many cases been in use ever since,

⁶²² On the Indus bead industry and trade see Ratnagar 1981, 128ff., on lapis lazuli, 130ff. For the Middle Ages, Ball 1884, 242 (on Barbosa) and 243.

⁶²³ See e.g. Ball 1884; Laufer 1919, 503ff.; Warmington 1928 (1974); and Wojtilla 1973. There are, it is true, several studies about the mineralogy and gemmology of classical antiquity and the Middle Ages, but to include them would have surpassed the content of the present volume. A full study of this subject should also include the late classical lapidaries, now conveniently found and commented on in the Budé volume *Les lapidaires grecs* by Robert Halleux and Jacques Schamp (Paris 1985). As a cursory check of these text showed only two references to India (for diamonds and emeralds) and as these texts are mostly late I have decided not to include them in my discussion.

⁶²⁴ F 45, 6, also mentioned by Philostratus (*V. Ap.* 3, 46), Heliiodorus (*Aethiopica* 4, 8 and 8, 11) and Tzetzes (*Chiliades* 6, 647), all probably going ultimately back to Ctesias. There is an old reference to a Persian source (Nizām al-Mulk) proposed in Barthélemy d'Herbelot's *Bibliothèque Orientale* (the Hague edition 1777–79, vol. 3. s.v. *schahkevheran*, cf. vol. 2. s.v. *mahizer*; quoted by Baehr 1824, 266, also Steingass' references [ss.vv. *gauharān* and *māh-e zar*] seem to go back to this), but this is not confirmed by the editions of the text in question. I have checked the translation of Darke (1960) without finding anything comparable.

⁶²⁵ See Watt s.v. *Carnelian*.

but quite often they now signify different stones from in antiquity. The descriptions offered by Pliny and others are rarely exact enough to allow a certain identification.

Jewels and ornaments were frequently mentioned in the literature dealing with Alexander's Indian campaign. That India abounded in jewels and other mineral riches is affirmed by Curtius and Nearchus, and in another passage the former mentioned the richness of the land of Sopeithes in jewels and pearls.⁶²⁶ Nothing is unfortunately left of the account of jewels given by Chares.⁶²⁷ A general reference to rivers (the Acesines and the Ganges) producing gems is found in Pliny (earlier stated by Ctesias).⁶²⁸ Curtius claims that the sea casts jewels (not only pearls) onto the seashores (*gemmas margaritasque mare litoribus infundit*).⁶²⁹ Dionysius Periegetes mentioned precious stones of the Parnassus (Hindukush).⁶³⁰

The use of ornaments in India was noted by the historians of Alexander's campaign. Thus Nearchus and Curtius mentioned ear-rings and other ornaments.⁶³¹ Megasthenes knew that many ornaments with precious stones were commonly used in India (F 32 in Strabo 15, 1, 54). Strabo (15, 1, 69, perhaps from Cleitarchus) mentioned several jewels set on Indian furniture and vessels.

We see that Indian jewels and the use of jewels in India attracted attention. It seems likely that then, as later, the use of ornaments and the importance attached to stones was far greater in India than in Southern Europe. Both in India and the West, however, precious and semi-precious stones were not so much sought for as ornaments as for their supposed power. In Indian literature great medical and magical virtues were attached to jewels. They are supposed to be astrologically potent and effective antidotes against poisons.⁶³² There are scattered notes on precious and semi-precious stones (jewels, OIA *maṇi* or *ratna*) found from the Vedic period on, but the oldest and most important summary of Indian mineralogy, the 13th chapter of Narahari's *Rājanighaṇṭu*, belongs only to the 14th or 15th century.⁶³³ However, interesting information can also be culled from the *Arthasāstra*, from Varāhamihira's *Bṛhatsaṃhitā* and other works.⁶³⁴ In India the main area of jewel production lay in the South.

⁶²⁶ Curtius 9, 1, 2 (*gemmis margaritisque et auro atque ebore*), and about the land of Sopeithes in 9, 1, 29f.; Nearchus F 23 in Strabo 15, 1, 67 (φέρει δὲ καὶ λιθίαν ἢ χώρα πολυτελεῖ κρυστάλλων καὶ ἀνθράκων παντοίων).

⁶²⁷ He is mentioned among the sources on precious stones by Pliny, *N. H.* 1, 12, 37 (T 3b).

⁶²⁸ Pliny, *N. H.* 37, 76, 200; cf. also Ctesias F 45, 6.

⁶²⁹ Curtius 8, 9, 19. See Laufer 1915, 21ff., for Indian and Chinese legends about diamonds found in the sea.

⁶³⁰ Ball 1884, 232f., refers to Latin translation, verses 315 & 1107. The latter passage, apparently mentioning rubies and sapphires (*lapis lazuli*?) is found in the *GGM* text as 1103–1106, but the former seems not to be related to India.

⁶³¹ Nearchus F 11 in Arrianus, *Ind.* 16, 3ff.; Curtius 8, 9, 21 (*lapilli ex auribus pendent*). See Hinüber 1985, 1125 on ear-rings in India.

⁶³² Wojtilla 1973, 214f.

⁶³³ After 1375 according to Vogel 1979, 376. The author was living in Kashmir. Wojtilla 1980 places him in the 13th century. Other specialist works, edited a long time ago (1896) by Finot, are not much earlier (and some still later, see Wojtilla 1980).

⁶³⁴ See Wojtilla 1973, 215f. & 219f., with references to the *Arthasāstra*, Varāhamihira etc.

One of the earliest Western sources, Theophrastus' booklet on stones, contains only a couple of occasional references to India: Chapter 36 on Indian pearls (also quoted by Athenaeus), and chapter 38 on the Indian reed resembling coral. Though an Indian origin is not mentioned, we may further note chapters 23ff. on the emerald and sapphire (probably not the same stone as ours, see below).

Pliny's long account of precious and semi-precious stones based on several earlier, lost works and contained in book 37 of his *Historia naturalis* has been considered a masterpiece of ancient jewel-lore. It contains much about Indian stones (and some more can be found in book 36).⁶³⁵ Often a reference to lost Hellenistic authors is given. Unfortunately, we have no idea of who was the Democritus whom Pliny mentions several times as his authority on Indian stones. He could hardly have been the famous philosopher, who wrote long before Alexander. Perhaps he was an unknown Hellenistic author on science. He is referred to by Pliny in *N. H.* 21, 36, 62 (on *nyctegreton*); 24, 102, 161 (*achaemenis*); and 24, 102, 164 (*thalassaegle*).⁶³⁶

The list of Indian stones in Pliny is long and we cannot here discuss it in detail. Instead, we shall give a brief summary and then go on to discuss the most important of them in some detail.⁶³⁷ Many of these stones are known only from Pliny, and their identification, at least without specialist knowledge, seems impossible. In addition to those mentioned above, the stones ascribed a South or Central Asian origin by Pliny include: 36, 9, 51f. sand used for cutting marble, though inferior to Ethiopian⁶³⁸; 36, 12, 61 onyx marble or *alabastrites*; 36, 67, 197 Xenocrates on obsidian; 36, 66, 192 and 37, 9, 23 rock-crystal⁶³⁹; 37, 11, 36 & 39 & 46 Nicias, Ctesias and Archelaus on amber in India (see below); 37, 15, 56 the diamond (see below); 37, 20, 76–79 the beryl (see below); 37, 21, 80–22, 84 the opal (see below); 37, 23, 86–89 the *sardonyx* (see below); 37, 24, 90–91 Zenothemis on Indian onyx; 37, 25, 92–96 Indian and Carthaginian carbuncles (see below under ruby); 37, 28, 100–102 *sandastros* and *sandaresos*⁶⁴⁰; 37, 29, 103 the

⁶³⁵ See the notes by McCrindle 1901, 129–135, in the Loeb (Eichholz) and Budé (Saint-Denis) editions, and by André & Filliozat 1986, 108ff (here no fewer than 35 passages referring to India) & 368ff. (notes). Pliny's account has also been briefly discussed by Wojtilla 1973, 223f., but as he does not have much that is constructive to say and as his system of reference is not the same as followed in the Budé and Loeb editions, I have discarded it. (I have identified his 37, 62–65 and 76 as 37, 76–79 and 103). A detailed account is also found in Warmington 1928 (1974), 235ff.

⁶³⁶ In Diels & Kranz (*Vorsokratiker*) these are classified under the philosopher Democritus as F B 8 (on marvels) as "unechtes". See André & Filliozat 1986, 363, note 181 (*nyctegreton*), 364, note 184 (*achaemenis*), and 364, note 186 (*thalassaegle*).

⁶³⁷ In addition to those mentioned below, Warmington 1928 identifies several stones coming from Arabia or Africa or of unknown origin as really coming from South or Central Asia.

⁶³⁸ According to Warmington 1928 (1974), 247, emery-powder or corundum (OIA *kuruvinda*). See André & Filliozat 1986, 368, note 205.

⁶³⁹ In the first passage Indian glass made of rock-crystal, in the latter Indian rock-crystal is preferred to any other. Warmington 1928 (1974), 245f., briefly summarizes the crystal production of India. His reference to the *crystalla pocula* brought from Egypt in Martialis 12, 74, is not necessarily concerned with India. See also the long note 207 in André & Filliozat 1986, 368f.

⁶⁴⁰ According to Pliny, both are found in India (*sandastros* in Arabia, too) and often confused in the West, though they are actually different. Both names are supposed to refer to their place of origin in India. The *sandastros* is transparent, with a golden glitter, the *sandaresos* green. Warmington 1928

lychnis (perhaps the ruby, see below); 37, 31, 105 three kinds of Indian *sarda* (see below); 37, 33, 110 the *callaina* (see below); 37, 34, 113 the green *prasius* and the golden *chrysoprasus*⁶⁴¹; 37, 35, 114 the *nilion* (perhaps the sapphire, see below); 37, 37, 115 a kind of translucent green jasper resembling the *smaragdos*⁶⁴²; 37, 39, 120 the lapis lazuli (see below); 37, 40, 121f. amethysts including the so-called *socondion* (see below); 37, 42, 126 the hyacinth and chrysolith (see below); 37, 45, 128 the honey-coloured *melichrysus* or 'honey-gold' and the brownish yellow *xuthos*⁶⁴³; 37, 46, 130 a kind of *paederos* called *sangenon* (perhaps the opal, see below); 37, 47, 131 the *asteria* or star-stone of Carmania and India; and 37, 48, 132 the *astrion* or little star of the Patalene coast⁶⁴⁴; 37, 54, 140 agates (see below); 37, 54, 147 *atizoe*, *augitis* (perhaps the same as *callaina*) and the magnetic *amphidanes* or *chrysocolla* dug up by gold-digging ants⁶⁴⁵; 37, 56, 153 the *corallis*⁶⁴⁶; 37, 54, 155 the magic *chelonia*, supposedly the eye of the Indian tortoise (unidentified);⁶⁴⁷ 37, 58, 160 the *eumeces* of Bactria (unidentified); 37, 61, 170 the two kinds, red and colourless, of *indica* and the violet *ion*⁶⁴⁸; 37, 62, 171

(1974), 244 suggests that the *sandaistros* is the quartz called aventurine, but on page 247 he again identifies it as matrix of opal. Eichholz, who often follows Warmington, accepts both, Saint-Denis aventurine. For *sandaresus* Warmington 1928 (1974), 243 (with Eichholz and Saint-Denis) suggested quartz plasma. See further André & Filliozat 1986, 373, note 222.

- 641 There are several variants of *prasius*, such as the red-spotted and the white-streaked varieties. The *chrysoprasus* might be large enough to be carved into small cups. Warmington 1928 (1974), 242 notes that this is not the same as our chrysoprase (which is Pliny's green *iaspis*) and (243) identified the opaque red-spotted *prasius* as the chalcedony called bloodstone, and (250) the *chrysoprasus* as the corundum cat's-eye or chrysoberyl.
- 642 A long account of various jaspers (*iaspis*) produced in many countries follows. According to Warmington 1928 (1974), 242, these are chalcedonies, (243) the Indian variety being perhaps the green jasper; according to André & Filliozat 1986, 374, note 227, the Indian stone is green chalcedony or chrysoprase.
- 643 Warmington 1928 (1974), 248 explains *leucochrysus* (Pliny, *N. H.* 37, 44, 128 without origin indicated), *melichrysus* and *xanthos* (*xuthos?*, but see 37, 60, 169) as pale, honey-coloured, and orange-coloured sapphires or corundums, but then again (253) he identifies *melichrysus* with *chrysolithus* as hyacinth or zircon. The latter explanation also in André & Filliozat 1986, 374, note 230, while Eichholz (with Saint-Denis) prefers the former.
- 644 According to Warmington 1928 (1974), 244, *asteria* is the quartz cat's-eye, but later (249) he says that *asteria* and *astrion* "seem to include sunstone, moonstone, and girasol or star sapphire". Eichholz (with Saint-Denis and André & Filliozat 1986, 374f., notes 232f.) identifies the *asteria* as a very pale star-sapphire (with a question-mark) and the *astrion* as the moonstone. Warmington 1928 (1974), 254 remarks that the moonstone comes mostly from Ceylon and suggests the sunstone instead.
- 645 These stones seem never to be mentioned elsewhere and have remained without identification (so Warmington 1928 (1974), 256). See, however, the notes of Saint-Denis and André & Filliozat 1986, 375, notes 235f., on *atizoe* also Bidez 1935, 36 & 39f.
- 646 Red jasper according to Warmington 1928 (1974), 244 (with Eichholz, Saint-Denis, and André & Filliozat).
- 647 The stone *haematitis*, located by Pliny in Africa and Arabia in 37, 60, 169, has been discussed by Warmington 1928 (1974), 244, as Indian red jasper, bought from Ethiopian and Arabian middlemen. The same passage briefly mentions the brown *menui* or *xanthos* (or *xuthos*, see the critical note on the Loeb text), perhaps the same as *xuthos* in 37, 45, 128.
- 648 Warmington 1928 (1974), 252, explains the *indica* as the purple-tinted pyropes (garnet) or almandine, and the *ion* as the violet-tinted pyropes or syriam [*sic*] garnet. See further André & Filliozat 1986, 375, note 239.

the *lesbia glaeba*⁶⁴⁹; 37, 63, 173 the translucent *mormorion* (with *v.l. morio*) or *prom-nion*⁶⁵⁰; 37, 65, 177 the *opsianus*, with a reference to 36, 67, 197; 37, 70, 185 the *zoraniscaea* found in the Indus (unidentified). We may also note that according to 37, 20, 79 the Indians were capable of counterfeiting beryls and other precious stones by staining rock-crystal.

Though "diamond, emerald, sapphire and ruby can be placed among the precious stones, and opal, topaz, hyacinth and some others... can be classed the semi-precious stones",⁶⁵¹ we here take them all in alphabetical order (but move to the end those which are not really stones).

Among the most important chalcedonies must certainly be classed **agates**. Though found in many countries, Indian agates (*achates*) were specially mentioned by Pliny. They were large, workable and ascribed some medical virtues.⁶⁵² André & Filliozat inform us that the agate and steatite, two easily confusable stones, are commonly found in Gujarat and were already exploited during the Indus civilization. Referring to the mines of Gujarat and Deccan, Schoff identified the onyx stones (*ὄνυχινη λιθία*) of the *Periplus*, brought from Ozene in the north (48) and from Paithana in the south (51) to Barygaza and exported from there (49), as agates.⁶⁵³

Amethysts were much appreciated in Imperial Rome. Indian amethysts were extolled by Pliny (*N. H.* 37, 40, 121f.), lesser ones were found in the Near East. Here, as usual, he does not specify the Indian origin more closely, but at least later the main area of South Asian amethyst production has been Sri Lanka.⁶⁵⁴ There were several varieties of Indian amethysts; one of them had a colour somewhat resembling the sapphire and was called *socondion*, and Pliny explains that its colour was in India called *socos*.⁶⁵⁵ A pale variety was called *sapenos*. He is sceptical with regard to the magic powers ascribed to amethysts by Persian magi.⁶⁵⁶ Amethysts were also mentioned by Dionysius Periegetes (1122) in his brief account of Indian stones.

The **beryl** or aquamarine, closely related to the emerald, was another popular stone among the Romans and one of the first identifiable Indian stones mentioned in Western sources. In a passage derived from some Hellenistic description of India, Strabo states

⁶⁴⁹ Called thus because found on the island of Lesbos, but also in India. Unidentified.

⁶⁵⁰ According to Warmington 1928 (1974), 253f., this includes both jacinth (hyacinth) and jargoon (zircons or zirconium silicates of different colours).

⁶⁵¹ Wojtilla 1973, 211.

⁶⁵² Pliny, *N. H.* 37, 54, 140; briefly mentioned by Dionysius Periegetes 1075. Warmington 1928 (1974), 239 suggests that the large stones used in India for carving vessels in Philostratus, *V. Ap.* 3, 27, were agates.

⁶⁵³ André & Filliozat 1986, 375, note 234 (about the Indus civilization also Ratnagar 1981, 128); Schoff 1912, 193f. See also Warmington 1928 (1974), 239f. and Watt s.v. *Carnelian*.

⁶⁵⁴ Warmington 1928 (1974), 245.

⁶⁵⁵ Warmington 1928 (1974), 380, note 47 compares *socondion* to OIA *saguṇa*, but this, with meanings like 'virtuous, qualified' and 'furnished with a string' seems to have nothing to do with the amethyst or with colours and must thus be dismissed.

⁶⁵⁶ Among these was the power to prevent drunkenness, which is quoted from an Arabic source by Ball 1884, 239. Plutarch (*Quaest. conv.* 3, 1, 3, 647B), who did not believe in it, either, gave the wine-like colour of the amethyst as a reason.

that luxury furniture and vessels in India are often set with emeralds, beryls and anthraces (diamonds).⁶⁵⁷ Its Greek name, βήρυλλος, seems to be of Indian origin (MIA: Amg. *veruḷiya*, Pāli *veḷuriya*; OIA *vaiḍūrya*).⁶⁵⁸ We cannot easily say whether Diodorus was referring to India,⁶⁵⁹ but Indian beryls are described by Pliny (*N. H.* 37, 20, 76–79). He knows that it is similar in nature to the smaragdus and knows of several varieties. The most appreciated, he says, is the sea-coloured stone (our aquamarine), the next the golden yellow chrysoberyl. Like Pliny, Dionysius Periegetes (1119) claims that beryl is mostly found in India, and Ptolemy knows of beryl mines in Taprobane (7, 4, 1) and in Pounnata in South India (7, 1, 86).⁶⁶⁰ In an epigram preserved in the *Anthologia Graeca* (9, 544) the rhetor Adamas (c. 10 A.D.) praised a skilled gem-cutter working on Indian beryl.

Pliny also claimed that elongated beryls were extremely popular among the Indians, who claimed that this was the only stone that could be used without a gold setting and that they accordingly used it strung on elephants' bristles. In Indian literature, the *Arthaśāstra* lists a number of varieties, while Varāhamihira restricted his full discussion to the diamond, pearl, ruby and emerald, and only in passing listed other gems.⁶⁶¹ In the *Rājānighaṇṭu* 13 *vaiḍūrya* is dealt with in verses 192–196. It is classified in the second category in value (13, 200) and in astrology it belongs to the Ketu (13, 197).

The *callaina* of Pliny (*N. H.* 37, 33, 110–112), a pale-green stone found in the Hindukush and Central Asia beyond India and Iran, is probably the same as the

⁶⁵⁷ Strabo 15, 1, 69 λιθοκόλλητα τὰ πλείστα σμαράγδοις καὶ βηρύλλοις καὶ ἀνθραξιν Ἰνδικοῖς. The word, as the diminutive βηρύλλιον, was first used in the LXX (*Exodus* 28:20).

⁶⁵⁸ Old doubts against the meaning of *vaiḍūrya* etc. as 'beryl' seem to be unfounded. Though the word, with the earliest occurrence in the *Adbhuta Brāhmaṇa*, is defined as "Beryll nicht Lasurstein" in the *PW*, Garbe 1882, 85 claimed instead that it is the cat's-eye. The old idea that *vaiḍūrya* (in a later form with *d*) should be the lapis lazuli, hails from a 15th-century commentary and was still accepted by Wojtilla 1973, 218. Master 1944, however, has shown that in all early instances in OIA and MIA literature the word means a crystalline stone, and therefore cannot be the opaque lapis lazuli. The varying colour (to examples in Master 1944 add *KA* 2, 11, 30, and *Rājan.* 194) fits the beryl as well as the cat's-eye, and it seems that the word was independently borrowed into Persian and Arabic as *billaur*, *ballūr*, *bulūr* denoting 'crystal, beryl'. It is not impossible that the word may have stood for both. Mayrhofer in *KEWA* accepted only 'beryl', in *EWA* 'Chrysoberyll, Katzenauge'. Chrysoberyl is used for a yellowish beryl and some related stones (including the cat's-eye). Although this leaves some degree of uncertainty in translating *vaiḍūrya* etc. in Indian texts, there is nothing against the formally simple derivation of Greek βήρυλλος/βηρύλλιον from it through MIA *veruḷiya*. See also André & Filliozat 1986, 371f., note 216. G. R. Cardona, "I nomi del berille", *Incontri linguistici, Univ. di Trieste* 6, 1980–81, 63–96, was not available to me. It may be mentioned in passing that in early studies also the identification of classical *beryllus* as the beryl was questioned, but then settled (Blümner 1899, 320).

⁶⁵⁹ It is included in his chapter devoted to Arabia, but just before a reference is made to Ethiopia, Libya and India (2, 51, 4). In all these countries, as in Arabia, he claims, the influence of the sun causes peculiar growth in animals, plants, and (in 2, 52) stones. The passage lists rock-crystals, emeralds, beryls, chrysoliths and anthraces as such stones. It might contain Indian information, though at the end (2, 52, 9) he refers generally to *Arabian* stones. It has been suggested that he was here following Poseidonius.

⁶⁶⁰ The existence of South Indian beryl mines is confirmed by Warmington 1928 (1974), 250. It seems likely that the very name of the stone is derived from a South Indian place-name (Master 1944, Mayrhofer, *EWA*).

⁶⁶¹ *KA* 2, 11, 30; a list of 22 gems in *BS* 80, 4f. (including *vaiḍūrya*).

καλλεανός of the *Periplus* (39), where it is mentioned among the exports of Barbarike. Barbarike at the mouth of the Indus was a natural entrepot for stones found in the Hindu-kush. According to Pliny, the *callaina* is often large, but porous and full of flaws. A better variety comes from Carmania. It is easily worked, and the best kind has the colour of smaragdus. The description seems to fit well with turquoise; even the mining areas are correctly stated.⁶⁶²

For the **cat's-eye** it is here enough to note that there are actually two different stones known by this name. As was noted above, Warmington identified Pliny's *asteria* as the quartz cat's-eye and *chrysolprasus* as corundum cat's-eye. The former is found in the Deccan, Burma and Sri Lanka, the latter mainly in Sri Lanka.⁶⁶³

"Of the oxides of silicon grouped as quartzes and opals the most frequently used were the **chalcedonies** called agate, carnelian, sard, onyx, and so on." Most of these have been dealt with separately. The red carnelians were known as early as the Indus civilization. They were probably obtained, as they were later, from the Narmada valley, and imported to Sumer.⁶⁶⁴ We have seen that the *Periplus* (49) mentions ὄνυχινη λιθία among the exports of Barygaza; these could have been real onyxes, but also carnelians or agates.

The **chrysolith** of the Greeks and Romans was not the same stone as is now known as chrysolite or peridot (see under topazes). The *chrysolithus* of Pliny (*N. H.* 37, 42, 126) is known as χρυσόλιθος by Diodorus (2, 52, 3) and by the author of the *Periplus*. According to Pliny, it is found in India, Ethiopia and Arabia, but Eichhoff suggests that Arabian and Ethiopian stones, too, originated in India. In the *Periplus*, however, it is not Indian stone, but it is mentioned among the Western imports of Barbarice (ch. 39), Barygaza (49) and South India (56). It is difficult to combine these two accounts and accordingly there are different opinions about its true identity. According to Ball, this golden, transparent stone is the topaz; according to Warmington it is our orange zircon called hyacinth.⁶⁶⁵

There is hardly any doubt that the most famous stone of India has always been the **diamond** (OIA *vajra*). Though occasionally cast in doubt, it also seems quite clear that this was meant by the word ἀδάμας/*adamas*, when used of a stone. The same word was

⁶⁶² This also seems to have been accepted by scholars with exceptional agreement. Ball 1884, 234; Schoff 1912, 170; Warmington 1928 (1974), 255; Eichhoff and Saint-Denis on Pliny; André & Filliozat 1986, 374, note 225. See, however, the long note in Laufer 1913, 2f., where the identification of the *callaina* as the turquoise and any knowledge of the turquoise in classical antiquity is vigorously opposed.

⁶⁶³ Warmington 1928 (1974), 244 & 249, on quartz cat's-eye also Watt s.v. *carnelian*. See also the note above on the possibility that the OIA *vaiḍūrya* could have been used for the corundum cat's-eye.

⁶⁶⁴ Warmington 1928 (1974), 236ff. (quoted sentence in 236f., emphasis mine), 242; Watt s.v. *carnelian*; for the Indus civilization see Ratnagar 1981, 106 & 128ff.

⁶⁶⁵ Ball 1884, 235 (followed by McCrindle 1879, 37 and Schoff 1912, 167f.); Warmington 1928 (1974), 253 (with 245, where he suggests that the yellow quartz of Sri Lanka called citrine might be included under this name). Eichholz suggests a "yellow sapphire (oriental topaz), but perhaps also yellow zircon", while André & Filliozat 1986, 374, note 229, think, perhaps wisely, that exact mineralogical identification of ancient hyacinths and chrysoliths is impossible.

also used of the hardest kind of metal (steel), and it is clearly stated that it was the hardest of all stones.⁶⁶⁶ It is mentioned by Theophrastus in his book on stones (19). Though the Indian origin is not mentioned, this might be part of the information he obtained from Alexander's companions. The best classical account is given in Pliny, *N. H.* 37, 15, 55–61. Some of his inferior varieties may well have been other stones, but the best, including Indian (56), is clearly the diamond. It used to be extremely rare, known only to a few kings (*non nisi regibus et iis admodum paucis cognitus*). It is transparent, hexagonal⁶⁶⁷ and the hardest of all stones, the only one capable of scratching every other stone. Its splinters were much sought after by engravers, who used them for drilling other gems. The traditional method of drilling beads with diamond splinters is still in use in Cambay in Gujarat, and Gorelick and Gwinnett have analyzed such beads. A comparison of the microscopic features of drill-holes with other examples strongly suggested that this method was in use in India as early as Arikamedu (the early centuries A.D.), and Gorelick and Gwinnett suggest that it was then imported to Rome.⁶⁶⁸ After this, the existence of this most precious stone was never forgotten in the West.⁶⁶⁹

While Diodorus (2, 52, 3) can as well refer to Africa and Arabia, Indian diamonds are also mentioned by Dionysius Periegetes (1119f.). The *Periplus* (56) lists diamonds among South Indian exports. The River Adamas in eastern India is mentioned in Ptolemy 7, 1, 17 & 41; in 7, 1, 65, diamonds are found in Kosa in the Vindhya region, and in 7, 1, 80, numerous diamonds (Renou: steel) found among the Sabarai near the Ganges. This is perhaps not a real diamond area, but the stones may have actually come from inland.⁶⁷⁰

In India the diamond was known very early on, though *vajra* was originally not a jewel, but the weapon of Indra. But the meaning 'diamond', too, is found as early as the Brāhmaṇas (Mayrhofer, *EWA*). Like Pliny, the Indians have always considered the diamond the foremost among jewels. The *Arthaśāstra* (2, 11, 37–42) briefly mentions the major areas of diamond production, lists different varieties and defines the characteristics of a good diamond. There is a full chapter dealing with diamonds in the *Bṛhatsaṃhitā* of Varāhamihira. In the *Rājanighaṇṭu* the diamond is dealt with in 13, 174–180. In astrology, the diamond belongs to Venus (*Rājan.* 13, 197). Laufer has pointed out that the

⁶⁶⁶ Pliny, *N. H.* 37, 15, 57 *duritia est inenarrabilis*. See Laufer 1915, 21ff. on the hardness of diamonds, and 42ff. on the identification of *adamas* as diamond. Recently, Gorelick and Gwinnett 1988, 549f., have again pointed out that the passages of Pliny dealing with *adamas*, can only be explained as referring to the diamond.

⁶⁶⁷ This has occasionally caused unnecessary doubts. Diamond is crystallized in an octahedral form, and an octahedron is hexagonal (sexangular). In India, too, the diamond was called hexagonal (*ṣaṭkoṇa* in the *Rājan.* 174, cf. Garbe's note ad l.). See Laufer 1915, 44.

⁶⁶⁸ Gorelick and Gwinnett 1988. Warmington 1988, 236, points out that several diamonds have actually been preserved in antique rings and seals.

⁶⁶⁹ On Pliny see also Ball 1884, 233, and Schoff 1912, 224ff. (with mediaeval and Arabic parallels). For the Middle Ages also Ball 1884, 237f. on mediaeval and 238 on Arabic sources, further 240 (Marco Polo), 241 (Niccolò Conti), 242 (Varthema and Garcia d'Orta), etc.

⁶⁷⁰ On Ptolemy see Ball 1884, 235f., McCrindle 1884, *ad loc.*, and Oldham 1927.

medical and magical values ascribed to the diamond by Pliny, and in India and China are more or less the same.⁶⁷¹

The **emerald**, as we understand the name, is a kind of deep green beryl, though at least in Greek and Latin the name *smaragdus* was apparently used of a much greater number of green stones. It is never included among Indian stones, but some varieties came from the neighbourhood of India (Bactria). The Greek word *σμάραγδος* (also *μάραγδος*) is clearly related to OIA *marakata* (also known as *gārutmata*), but in this case neither of the names seems to be original. It has been suggested that both were actually borrowed from Semitic.⁶⁷² In the West emeralds were already known by Herodotus and Plato, and an account is given by Theophrastus (*On Stones* 23). Strabo (15, 1, 69) mentioned emeralds among the stones used in India, while Diodorus (2, 52, 3) included them among those produced by the heat of the sun in a hot climate. The great importance ascribed to the *smaragdus* in the Roman West is seen in the exceptionally long account by Pliny (*N. H.* 37, 16, 62–19, 75). It is the third in his order of gems, immediately after the diamond and pearl. The best variety came from Scythia, next were those from Bactria and Egypt, and there were several further, inferior, varieties.

In India the *Arthaśāstra* did not mention emeralds under its name, but perhaps the *śukapatravarna* type of *vaidūrya* (a beryl of the colour of a parrot's wing) in 2, 11, 30 is the emerald. In the *Bṛhatsaṃhitā* Varāhamihira (83, 1) briefly lists the qualities of good emeralds. Among the preferred shades the colour of a parrot's wing is mentioned here, too. In the *Rājanighaṇṭu* emeralds are discussed in 13, 164–168. In astrology, the emerald belongs to Mercury (*Rājan.* 13, 197).⁶⁷³

What Pliny and other authors wrote about Indian **hyacinths** (*βάκινθος*) seems again to refer to another stone than what is now known as the hyacinth or jacinth. The modern hyacinth is a red or orange zircon, while the ancient stone has been mostly identified as the blue sapphire (see below).⁶⁷⁴ According to Pliny (*N. H.* 37, 41, 125), the hyacinth is related to the amethyst and (42, 126) comes from India and Ethiopia. In the *Periplus* (56) the hyacinth is mentioned as exported from Muziris and Nelcynda. When Ptolemy (7, 4, 1) mentions hyacinths of Taprobane, Ball again suggests sapphires, which are actually found on the south of the island.

⁶⁷¹ Laufer 1915, 40f. For Indian accounts see also André & Filliozat 1986, 370, and Sastri 1990, 237ff.; for general information Watt s.v. *diamond*.

⁶⁷² Mayrhofer, *KEWA*, quoting Akkadian *barraqtu* and Hebrew *bāreḳet* as examples and connecting them with the root *brq* 'shine, glitter'. He also rejects the earlier idea that OIA *marakata* was borrowed from Greek.

⁶⁷³ On emeralds in India and in the West see Ball 1884, 233; Laufer 1913, 55 & 1919, 518; Warmington 1928 (1974), 250; and Wojtilla 1973, 217.

⁶⁷⁴ The arguments I have seen given for this identification do not seem very convincing, though accepted by many scholars. See e.g. Ball 1884, 236; Schoff 1912, 226f.; Warmington 1928 (1974), 247f. I have nothing better to suggest, but refer my readers to André & Filliozat 1986, 374, note 229, who also find exact mineralogical identification impossible. On the other hand, rejecting the identification of the hyacinth as the sapphire would apparently leave us completely without sapphires in the West (the stone called *sapphire* is out of the question, see below under lapis lazuli), which is rather strange considering the extent of the import of Indian jewels indicated by Pliny and the *Periplus*.

As to our hyacinth, according to Ball (1884, 235) this is the *asteria* of Pliny, while Warmington (1928, 253f.) suggested Pliny's *melichrysus*, *chrysolithus*, and *mormorio*. In India the stone seems to be OIA *gomedaka* 'hyacinth', mentioned already in the *Arthaśāstra* and discussed in the *Rājanighaṇṭu* (13, 187–191). In astrology, this stone belongs to Rāhu (*Rājan.* 13, 197).

The ancient **lapis lazuli** mines of Badakshan were exploited as early as the Neolithic period and during the time of the Indus civilization it was an important article of early international trade.⁶⁷⁵ Trade in this blue stone continued in the Achaemenid period.⁶⁷⁶ The main source seems always to have been Badakshan, though there was some competition from Iran. In Roman archaeology, this stone seems to be rather rare (and late), and it is rather difficult to identify it in literature. Possibly it was the "sapphire" of the Greeks and Romans (σάπφειρος, *sappirus*), as this blue stone is *not* transparent and is often mixed with golden spots. These characteristics are impossible for our sapphire. As the *Periplus* (39) mentions it among the exports of Barbarice, which, situated at the Indus mouth, is a natural emporium for Badakshan lapis lazuli, the identification seems likely.⁶⁷⁷ In India there seems to be no early evidence for lapis lazuli east of the Indus region. As OIA *rājāvarta*⁶⁷⁸ it is discussed only in the late *Rājanighaṇṭu* (13, 214–216). Here the most appreciated stone was dark blue in colour and without white spots.

Of the expensive **murrhine** or *myrrhina vasa* we need not say much here. They were described by Pliny (*N. H.* 37, 7, 18–8, 22), but their origin was in Parthia and Carmania, not in India. The *Periplus* (49) list of the exports of Barygaza is often mentioned here, but the *μουρρίνη* quoted from it is merely an emendation by Müller, while the manuscript reads *σμούρνα*. Although it is probably not right to accept this as myrrh, myrrh not being a product of India, this most certainly rules out the Indian origin of *murrhine* and theories based on this assumption.⁶⁷⁹

Opals (ὀπάλλιος, *opalus*) were discussed in rather great detail by Pliny, who claimed that they were found only in India.⁶⁸⁰ The opal is a multicoloured stone of the

⁶⁷⁵ Ratnagar 1981, 130ff., and Casanova 1993 with further references.

⁶⁷⁶ DSf 37f. *Kāsaka hya kapautaka utā sikabruś hya idā karta hauv hacā Sugudā abariya*: "the precious stone lapis-lazuli and carnelian which was wrought here, this was brought from Sogdiana." See Bleichsteiner 1930, 94ff. The lapis lazuli in Asian trade is also discussed by Laufer 1913, 43ff., and briefly by Holt 1989, 28.

⁶⁷⁷ Thus interpreted e.g. by McCrindle 1879, 36, Ball 1884, 234, Schoff 1912, 170f., and Warmington 1928 (1974), 251f. According to Pliny, *N. H.* 37, 39, 120, the *sappirus* is obtained from Media, according to Dionysius Perieg. 1105f. in Ariana. On ancient trade in lapis lazuli see also Laufer 1919, 520.

⁶⁷⁸ It has been interpreted (cf. Garbe 1882, note ad l.) as the stone suitable for the king's forehead (hence also *nrpāvarta*), but the real origin of the word seems to be New Persian *lājāvard*, *lāžūvard* 'lapis lazuli' (cf. the place-name Lāžvard in Badakshan), also the origin of our *lazuli* and related words. See Laufer 1913, 44 (note), and Mayrhofer, *KEWA*, s.v. *rājāvarta*.

⁶⁷⁹ See Ball 1884, 234; Schoff 1912, 193f.; and Warmington 1928 (1974), 238; who all suggested various Indian chalcedons. The real murrhine (as *μουρρίνη*), often interpreted as the fluorspat (e.g. McCrindle 1879, 34f.), is mentioned in the *Periplus* 6 as exported from Egypt to Ethiopia (Aduli).

⁶⁸⁰ Pliny, *N. H.* 37, 21, 80–22, 84 and 37, 46, 130. *India sola et horum mater* in the first passage (80). In both passages he mentions the stone called *paederos* as a possible variant of the opal.

size of a hazel-nut. This has been supported by an Indian etymology for the name, OIA *upala*, but this word originally meant merely a 'stone' and especially the 'upper mill-stone'.⁶⁸¹ On the other hand, the identification of this Indian stone as the opal has caused difficulties, as opals were supposedly not found in India at all, but in some sources the existence of opals in Kashmir has been claimed.⁶⁸²

In India one of the most important and valued jewels was undoubtedly the **ruby**, but again no Western account can be clearly identified with it. The most important bright red stone was ἄνθραξ, Latin *carbunculus*, but the word was used for red garnets as well. It has been noted that as the main deposits of real rubies (red corundums) are located in Burma, it was possible that the stones rarely, if ever, reached Rome from such a distant place. According to Watt, real rubies are occasionally found in South India and Sri Lanka, too, while the rose-coloured spinels of Badakshan have been worked for centuries.⁶⁸³

Greek ἄνθραξ is attested from Aristoteles and Theophrastus (*On Stones* 18) onwards, but it was then imported from Carthage and Massalia. Strabo mentioned it together with beryls and emeralds as used in India in inlays, and Diodorus classified it among his "tropical" gems.⁶⁸⁴ Athenaeus (*Deipnos*. 12, 539d), probably quoting the Hellenistic historian Phylarchus, recounted that the famous golden vine of the Persian monarchs, seen by Alexander and his men, had clusters of green crystals (σμαραγδίνους), of Indian *anthraces* and other gems representing grapes. Pliny (*N. H.* 37, 25, 92–96) defines his *carbunculi* as fiery red gems obtained from India and Africa. From a certain Satyrus he quotes the claim that Indian *carbunculi* lack brilliance and are generally flawed, and from Callistratus the assertion that the Indian variety can be large enough to be carved into vessels holding a pint of liquid. Several other authors (*multi*), however, state that the Indian stones are brighter (*candidiores*) than the Carthaginian.

Another stone tentatively identified as the ruby (but as the garnet, too) is the *lychnis* described by Pliny in *N. H.* 37, 29, 103. This red gem was found as near as Caria, but the finest examples came from India, a statement perhaps referring to red garnets and even real rubies.⁶⁸⁵

In India, the ruby (OIA *padmarāga*, *māṇikya*) was one of the most appreciated gems, mentioned in the *Arthaśāstra* (2, 11, 29), and described both in the *Bṛhatsaṃhitā* of Varāhamihira (82, 1–11) and in the *Rājjanighaṇṭu* (13, 146–151). To it was ascribed

681 The Indian etymology of ὀπάλλιος is considered possible by Mayrhofer, *EWA*, accepted e.g. by Wojtilla 1973, 218, and still Casevitz 1995, 25, but definitely rejected by Master 1944, 304, and André & Filliozat 1986, 372, note 217.

682 Not found in India according to Ball 1884, 233, and Warmington 1928 (1974), 246f.; Kashmir opals mentioned by Eichholz and Saint-Denis referring to S. H. Ball, *A Roman Book on Precious Stones*, 1943, p. 270 (not seen by me).

683 Watt s.v. *Ruby*. Warmington 1928 (1974), 249 & 252, accepts both kinds of rubies as well as red garnets as *carbunculi*, but André & Filliozat 1986, 373, note 221 garnets only. On Badakshan spinels or balas rubies see also Laufer 1913, 43ff.

684 Strabo 15, 1, 69 (and briefly in 15, 1, 67); Diodorus 2, 52, 4.

685 Warmington 1928 (1974), 249 & 252. On p. 254 he notes that red tourmalines, too, may have been included under the *carbunculi* and *lychnides* of Pliny. See also André & Filliozat 1986, 373f., note 223.

the power of preventing poisoning and disease (*BS* 82, 6) In astrology, the ruby belongs to the sun (*Rājan.* 13, 197). For garnets, though not rare in India, there seems to be no certain name. Perhaps they were accepted as inferior rubies.⁶⁸⁶

We have already seen that Greek *σάπφειρος*, an opaque stone, was not the sapphire, but probably lapis lazuli. As to the real **sapphire**, the most popular theory was mentioned above under the hyacinth. Long ago Lassen suggested that Pliny's *nilion* (*N. H.* 37, 35, 114), as OIA *nīla* 'dark blue, sapphire' (*nīlaratna, nīlamanī, indranīla*), could be this stone. Though Pliny's description does not fit this well, the *nilion* having only a weak lustre, and this probably yellow in hue, this identification has been often accepted. But Pliny further quotes Juba's claim that these stones are found by the Nile and derive their name thence.⁶⁸⁷ Among Indian sources on sapphires we may mention the *Arthaśāstra* (2, 11, 31) and the *Rājanighaṇṭu* (13, 181–186). In astrology, the sapphire belongs to Saturn (*Rājan.* 13, 197).⁶⁸⁸

The **sarda**, **sardonyx**, and **onyx** all belong to the chalcedony group already mentioned above. That sards, onyxes, and other stones were found in the mountains of India was already known to Ctesias,⁶⁸⁹ who had probably seen them during his stay in Persia. Pliny refers to several little-known authorities (Ismenias, Demonstratus, Zenothemis, and Sotacus) in his account (*N. H.* 37, 23, 86–89) of the Indian *sardonyx*. It is described as a banded chalcedony containing red and white layers comparable to "flesh superimposed on a human finger-nail."⁶⁹⁰ The red layer is called *sarda*, but must be our carnelian, as the word *sard* is now used for the brownish or yellowish variety. Pliny knows that it is common in India and found in mountains. Somewhat later, the description of *sarda* (37, 31, 105) seems to include both the carnelian and the *sard*, but the Indian variety was probably always our carnelian.⁶⁹¹ Ptolemy (7, 1, 20) knew of the Sardonyx Mountains producing the stones of the same name.⁶⁹² The Vindhya (Οὐίνδιον) is mentioned in the next sentence and thus an identification as Satpura lies close at hand.

⁶⁸⁶ André & Filliozat 1986, 373, note 221. Sastri 1990, 246f., is merely a summary of the *BS*.

⁶⁸⁷ Lassen 1858, 304; Warmington 1928 (1974), 248. For criticism see André & Filliozat 1986, 374, note 226.

⁶⁸⁸ See also Laufer 1913, 12, on Indian sapphires in Tibetan sources.

⁶⁸⁹ Ctesias F 45, 11 *περὶ τῶν ὀρῶν τῶν μεγάλων, ἐξ ὧν ἢ τε σαρδῶ ὀρύσσεται καὶ οἱ ὄνυχες καὶ αἱ ἄλλαι σφραγίδες.*

⁶⁹⁰ Pliny, *N. H.* 37, 23, 86 *veluti carne ungui hominis inposita*. The explanation is derived from a combination of the Greek words *σάρδιον* 'carnelian, sard' and *ὄνυξ* 'finger-nail'. See Eichholz, note *ad l.*

⁶⁹¹ See Warmington 1928 (1974), 237ff., 240f. (quoting some extant examples from Roman archaeological finds); André & Filliozat 1986, 372, note 219, and 374, note 224; Eichholz and Saint-Denis, notes *ad ll.*

⁶⁹² ὁ Σαρδόνυξ ὄρος ἐν ᾧ ὁμώνυμος λίθος. I cannot explain why Ball 1884, 236, claims that "under the name Bathana, a source of onyx is mentioned by Ptolemy". He wrote just a little too early to commit the rather common error of confusing Ptolemy's text and the translator's notes (they are printed in the same type and not clearly separated) in McCrindle 1885, 175f. (or had he seen McCrindle's manuscript or proofs?). The town of Βαρθάνα (with v.l. Βάθανα) is mentioned in Ptolemy 7, 1, 82, as the capital of Sirtioplemaeus, but no reference to the onyx is made here. Such a reference, however, is found in the *Periplus* 51, which states that onyxes were brought from

According to Dionysius Periegetes (1121), **topazes** were found in India, but normally these stones occur on the Troglodytic Red Sea coast. The account of the island of topazes there, called Ophiodes because of its numerous snakes, and of the brilliant stones found there comes from Agatharchides.⁶⁹³ Pliny (*N. H.* 37, 32, 107–109), who obtained his information from Juba (F 75), called it Topazus and stated that the name comes from the Troglodytic language. The confused account of Stephanus located the island of Topazus in India and referred to Alexander Polyhistor (F 136) as his source. According to Pliny, the topaz is large and rather soft for a gem. It is normally greenish in colour, but there is also a variant called *chrysopteros* ('gold-winged'). This is compared to the chrysoprasus, hence apparently yellow. As this fits in rather poorly with our topazes, it has been suggested that the stone here called topaz is the green peridot(ite) or chrysolite, which is actually found in the area. With the yellow variant, however, it seems possible that real topazes may have been included under this name.⁶⁹⁴ In India there seems to be no ancient account of the topaz. As OIA *pīta* it is mentioned in the late *Rājanighaṇṭu* (13, 169–173). In astrology, the topaz belongs to Jupiter (13, 197).

Of the **turquoise** there is not much left to say. In any case this stone does not come from India but from Iran. The supposed identification of *callaina* with the turquoise was mentioned above. In his interesting monograph on turquoise Laufer denied this and tried to show that even in Iran the mining and use of turquoises started only at a much later date, in the Mediaeval period.⁶⁹⁵ Other scholars, however, have accepted a much longer history for the Iranian turquoise industry, which now seems to have received archaeological confirmation.⁶⁹⁶ In any case, Laufer seems to be right in supposing that in India the turquoise became known only at a very late date. It is mentioned neither in the *Arthasāstra* nor in the *Bṛhatsamhitā*, and in the *Rājanighaṇṭu* (13, 217) its name, OIA *peroja* (also *haritāśman* 'green-coloured stone') is clearly a borrowing from New Persian *pīroza* 'turquoise'.⁶⁹⁷

The **pearl** (OIA *muktā*) is an animal product – as was known – but nevertheless it was classified as a stone. For Pliny (*N. H.* 37, 16, 62) the pearls of India and Arabia came next in value after diamonds, before all other precious stones. During and after Alex-

Paithana to Barygaza (εις την Βαρύγαζαν ἀπό μὲν Παρθάνων ὀνουχίνη λιθία πλείστη). Cf. Ball 1884, 242, on Lodovico Varthema (beginning of the 16th century).

693 *De mari rubro* 84abc (Burstein) in Photius codex 250, Diodorus 3, 39, 3–9, and Strabo 16, 4, 5–6. Cf. Tammisto 1995, 255, note 355.

694 Chrysolite in Warmington 1928 (1974), 253; and Burstein 1989, 138; both in Schramm 1937, who also commented on Blümner's attempt to exclude chrysolite. Blümner attempted to interpret Stephanus' Topazus as Sri Lanka, where real topazes are found, but Stephanus can hardly be excluded from other accounts and his location in India can easily be explained by the old confusion between India and Ethiopia. Schramm 1937 also refers to E. F. Glocker, *De gemmis Plinii inprimis de topazio*, Vratislaviae 1824 (not seen by me). Schoff 1912, 167f. identified the chrysolite (χρυσόλιθον) imported to Barbarike (*Periplus* 39) as real topaz coming from the Red Sea.

695 Laufer 1913, 38ff.

696 DSf *Kāsaka hya axšaina hauv hacā Uvārazmiyā abariya hya idā karta*: "the precious stone turquoise, this was brought from Chorasmia, which was wrought here." See Kent 1953, s. v. *axšaina* (uncertain), and Bleichsteiner 1930, 103f.; for archaeological evidence see Ratnagar 1981, 154ff.

697 Mayrhofer, *KEWA* s.v.; Laufer 1913, 1f.

ander's campaigns the Indian seas soon became famous for their pearls.⁶⁹⁸ Great numbers of pearls also came from the Gulf and from the Red Sea,⁶⁹⁹ but Indian pearls were always deemed the best.

In Megasthenes' account of the Indian Heracles, the Greek hero is said to have rid the land and sea of evil monsters, and discovered the pearl. Indian traditions concerning pearls, however, contain nothing comparable to this. A further curiosity is Megasthenes' claim that pearl oysters were fished using nets (not to speak of his oyster king). The flesh, as already stated by Megasthenes, is still not eaten and simply left to rot.⁷⁰⁰ Aelianus (*N. An.* 15, 8) has a similar account (oysters caught in shoals with their kings, the flesh left to rot), but dates it to the time when Eucratides ruled in Bactria. From another fragment we learn that in Sri Lanka large pearls were more common than in India.⁷⁰¹

Pearls early became an important export-ware of India and Sri Lanka. Even the Greek name μαργαρίτης (Latin *margarita*) was said to be an Indian word, though no satisfactory etymology has been offered.⁷⁰² Trade in pearls is well attested, e.g. in the *Periplus* (59), where the pearl fisheries of Southernmost India are mentioned as being owned by King Pandion.⁷⁰³ The work was carried out by convicted criminals. Pearls of good quality were available in great numbers in South Indian ports like Nelkynda and Bakare (*Periplus* 56) and in Taprobane (61). The South Indian and Sri Lankan pearl fisheries were also known to Pliny (*N. H.* 9, 54, 106) and Aelianus (*N. An.* 15, 8).⁷⁰⁴

Another animal product, the **red coral** (κοράλλιον), is Mediterranean in origin, but it soon became an important export product in trade with India. According to the *Periplus*, the red coral is exported to South Arabia (28), Barbarike (39), Barygaza (49), and South India (56). Pliny (32, 11, 21–23) says that the coral is highly valued in India, as highly as Indian pearls among Romans.⁷⁰⁵ Dionysius Periegetes seems to claim that coral is found in Ariana, but perhaps this means the jewel named after coral (the corallis of Pliny).⁷⁰⁶ In India, Western corals (OIA *pravāla*) were referred to as *alсандaka*, 'Alexandrian' (in

698 Strabo 15, 1, 67; Curtius 8, 9, 19; Pliny, *N. H.* 6, 28, 110; Philostratus, *V. Ap.* 3, 53; a long account in Athenaeus, *Deipn.* 3, 93BC (with references to Theophrastus, *On Stones* 36, Androsthenes F 1 and Chares F 3; on Chares cf. Pearson 1960, 57).

699 Pliny, *N. H.* 9, 54, 106 and 9, 56, 113; Aelianus, *N. An.* 10, 13; *Periplus* 35; Philostratus, *V. Ap.* 3, 57.

700 Megasthenes F 13a in Arrianus, *Ind.* 8, 8ff. On Indian tradition see Hinüber 1985, 1110f., also Lassen 1858, 305ff., for prehistory Ratnagar 1981, 138ff.

701 Megasthenes F 26 in Pliny, *N. H.* 6, 24, 81.

702 Stein 1932, 299.

703 The passage in question is rather corrupt and difficult to translate. The author may also have wished to say that not just the pearl fisheries, but the whole land belonged to King Pandion. The famous pearl fisheries of the Manar Gulf are what is meant. See also Schoff 1912, 239ff., Warmington 1928 (1974), 172f., and Sohoni 1970.

704 See further the long account in Warmington 1928 (1974), 167ff. For Indian knowledge of pearls see e.g. the *KA* 2, 11, 2–4, Varāhamihira, *BS* 81 (with Sastri 1990, 241ff.), and the *Rājan.* 13, 121–131 & 152–158. In astrology the pearl belongs to the moon (*Rājan.* 13, 197).

705 On the coral trade see Schoff 1912, 168; Laufer 1919, 523f.; and Warmington 1928 (1974), 263f.

706 Dionysius Perieg. 1103 λίθος ἐρυθροῦ κουραλίου; Pliny, *N. H.* 37, 56, 153. Lassen 1858, 308 thought that red coral could be found in Indian waters.

the *Arthaśāstra* 2, 11, 42) or even *romaka* 'Roman' (in the *Garuḍapurāṇa* and in some late *lithika*) and in Sri Lanka the Pāli commentary (*Vamsatthappakāsinī*) on the *Mahāvamsa* 34, 47, explains that the coral (*pavāḷajāla*) mentioned in the chronicle as used by Bhātikābhaya for his great stūpa comes from the country of Rome beyond the sea (*para-tīre romanukharaṭṭham*).⁷⁰⁷

Amber was supposedly also found in India. In Ctesias and in a fragment of Sophocles it is mentioned as an Indian product.⁷⁰⁸ Both fragments were transmitted by Pliny, who also quoted Nicias and Archelaus to the same effect.⁷⁰⁹ Amber is actually found in Burma, but it seems unlikely that Burmese amber could have reached the West in Ctesias' time and perhaps all these accounts are merely due to a tendency to find every kind of riches in India.

There is no clear equivalent in the West to the fantastic "animal jewels" of Indian tradition, found in the heads of serpents, elephants, and other animals. The magnetic "lynx-jewel" (*λυγροόριον*) in Theophrastus (*On Stones* 28) may perhaps be considered analogous, as it was supposed to be formed in male lynxes, being excreted with their urine. Another curiosity was the *aētites* or "eagle-stone", which was not formed in eagles, but nevertheless was intimately connected with eagles.⁷¹⁰ In any case, these have nothing to do with India.

India has been famous as the country of precious stones ever since (cf. Gregor 1964 on mediaeval sources) – and with good reason. As late as the 16th and 17th centuries European jewellers made journeys to India, and apparently with good profit (Fedrici, Balbi, Tavernier, Chardin etc.).

In this connection also some words must be said with respect to Western texts dealing with metals in South Asia.⁷¹¹ Herodotus knew of gold, Ctesias of iron, gold and silver in India (F 45, 9 & 45, 26). The general idea of India's great fertility and richness was

⁷⁰⁷ See further *Rājan*. 13, 159–163. In astrology coral belongs to Mars (13, 197). See Scharfe 1968, 317ff., and André & Filliozat 1986, 365, note 195, for Pāli sources De Romanis 1988, 39ff, and Weerakkody 1990, 166.

⁷⁰⁸ Here I should like to modify my earlier opinion, based on Laufer 1907, 225ff. In Karttunen 1977, and still in 1989a, 184, note 227, I referred to Chinese accounts of amber of Jibin (Chi-pin, Ki-pin, Kapiśa–Begram, here hardly Kashmir, cf. Tarn 1951, 469ff., but also Narain 1957) and compared them with Ctesias. But as excavations have shown, Begram was, in the early centuries A.D., a major entrepôt in international trade between Rome, India and China. This means that Chinese merchants were probably importing European amber via Begram. See also Laufer 1919, 521ff., and Warmington 1928 (1974), 270f.

⁷⁰⁹ Ctesias F 45o in *Nat. hist.* 37, 11, 39; Sophocles in 37, 11, 40; Nicias in 37, 11, 36; Archelaus in 37, 11, 46. Nicias' amber, however, is described as *gratiusque et ipso ture esse Indis*, and has therefore been explained as ambergris (cf. André & Filliozat 1986, 369, note 211).

⁷¹⁰ See Laufer 1915, 9, note 2. Laufer derives the account from India, because it is located in India in the *Physiologus*, but such a late source is hardly acceptable, when eagle-stones were already familiar to Pliny and Philostratus.

⁷¹¹ It is impossible to discuss this subject here in any detail, and we must restrict ourselves mainly to noting the classical accounts of metals in India. From the Indian viewpoint the question of metals has been dealt with e.g. by Rau 1974 and Falk 1991b, while Reedy 1992 I have found very useful from an archaeological perspective.

sometimes extended to metals, too (Diodorus 2, 36). On the other hand, we are assured that Indians were incapable of working their ores well.⁷¹² Ptolemy claimed that Taprobane produced all sorts of metals, which, according to Ball, hardly corresponds to reality, "Ceylon being rather poor in metallic ores".⁷¹³

Tin (OIA *trapu*, the often quoted word *kastīra* is only a late loan from the West⁷¹⁴) is no product of India, but was imported from the West. In literature this is testified to by the *Periplus*, mentioning tin and lead as imports of Barygaza (49) and South Indian ports (56).⁷¹⁵ Before the riches of Spanish tin mines became available in the East, Indians had probably imported tin from Iran and Afghanistan.⁷¹⁶ Though India is not completely devoid of tin ore, it was probably merely as a part of an idealized list with no reference to reality that tin was included in Diodorus' (2, 36) account of Indian mineral riches. Strabo (15, 2, 10) mentioned tin in Drangiana. The scarceness of tin in India was already emphasized by Ball (1884, 231f.), though the assertion of Lassen concerning the Indian etymology of *κασσίτερος* led him as a non-Indologist to suggest that ancient Indians could have been dealing in Malayan tin. A little later he is able to tell us that Lassen was led astray by Todd,⁷¹⁷ who had erroneously called a zinc mine near Udaipur a tin mine.

Silver (*hiranya*, *rajata*) in India is mentioned by Ctesias. Onesicritus mentioned silver and gold mines in the lands of Sopeithes and Musicanus, and Pliny near Mount Capitalia.⁷¹⁸ In another passage Pliny (*N. H.* 6, 22, 67) referred to the silver riches of the country of the otherwise unknown Setae (perhaps in the neighbourhood of the Dardae). Diodorus (2, 36) spoke of much silver and gold in India. To these we may add that Ptolemy (7, 2, 17) mentioned the Southeast Asian regions Argyra and Chryse, producing a great amount of corresponding metals.⁷¹⁹ In his account (7, 2, 29) of the island of Iabadiu (Java or Sumatra) he mentions plenty of gold produced there, and names a metropolis called Argyre. For Taprobane, too, both gold and silver are specifically mentioned (7, 4, 1).

There seem to be traces of ancient silver mining in Afghanistan, but in South Asia silver was scarce, and it seems likely that it was early on imported from Western Asia.⁷²⁰ In the Hellenistic and especially the Roman periods a great number of silver coins were

⁷¹² Onesicritus F 210 in Strabo 15, 1, 30, on Sopeithes' land; Megasthenes F 23b in Strabo 15, 1, 44, on Derdai.

⁷¹³ Ptolemy 7, 4, 1; Ball 1884, 236.

⁷¹⁴ Originally, but perhaps only through Arabic intermediation, related to Greek *κασσίτερος*, see Karttunen 1989a, 106. My thanks can no longer reach the late Dr. Wennergren (Gothenburg), to whom I owe the knowledge that OIA *kastīra* is, in addition to late lexicographers, also mentioned by Jagaddeva (*Traumbuch* edited by Negelein).

⁷¹⁵ See also Schoff 1912, 77ff., and Warmington 1928 (1974), 269f.

⁷¹⁶ Ratnagar 1981, 92ff., and Reedy 1992, 244.

⁷¹⁷ J. Todd, *Rajasthan* 1, 11, 230, 433, and Lassen *Indische Alterthumskunde* 1, 239 referred to by Ball 1884, 232.

⁷¹⁸ Ctesias F 45, 9 & 45, 26; Onesicritus F 21 in Strabo 15, 1, 30, & and F 24 in 15, 1, 34; Pliny, *N. H.* 6, 23, 74.

⁷¹⁹ For Argyra see Ball 1884, 236, for both VII.3 below.

⁷²⁰ Ratnagar 1981, 140ff., Reedy 1992, 258f. For silver in Indian literature see Falk 1991b, 111ff.

imported into India; especially in the South they were eagerly accepted and used (probably as bullion). This fact, so amply testified to by archaeology, is only mentioned in the *Periplus* (49) for Barygaza.

After silver we must tackle the problem of **gold** (*suvarṇa*) in India. Classical authors, beginning with Herodotus (the “ant-gold” brought to Darius) and Ctesias (the “griffin-gold”),⁷²¹ were unanimous on the subject of India’s great wealth in gold, but modern scholars generally disagree. Some of the early accounts are of a legendary nature. In my earlier study I tried to show that ant-gold and griffin-gold are variations of a Central Asian legend, also known in India and China.⁷²² Ant-gold was also known to Megasthenes, who located the story among the Dardai (Dards) and added that they sold the gold-dust obtained this way at a low price, as they did not know how to smelt it.⁷²³ Among classical authors the relationship between these two stories was noted by Mela (3, 62 *formicas... more gryporum aurum... custodire*).

The mysterious ant-gold was not the only source of India’s supposed wealth in gold. India’s general wealth in gold was established for the Greeks by Herodotus (3, 94 and 3, 106) and by Ctesias. Herodotus expressly says that in addition to ant-gold, mined gold is found in India, but not in great quantities.⁷²⁴ In 3, 106 he refers to alluvial gold found in India. According to Megasthenes F 27b (Strabo 15, 1, 57), gold dust was found in Indian rivers and part of it went in taxes to the king. Strabo in 15, 1, 69, referred both to ant-gold and to gold-dust washed down by the rivers. Curtius spoke of slow rivers as a source of this gold.⁷²⁵ Pliny (*N. H.* 33, 21, 66) again mentioned ant-gold and griffin-gold, but also alluvial gold in the Ganges (cf. Strabo 15, 1, 69). Less acceptable, at least to us, seems Ctesias’ account of a spring containing liquid gold.⁷²⁶ In the second century (?) A.D. Achilleus Tattius (2, 14, 9) knew of a lake in Libya said to resemble those of India and to contain gold.

As mentioned above, Strabo quoted Onesicritus on gold and silver mines in the land of Sopeithes (15, 1, 30), and in that of Musicanus (15, 1, 34). It has been suggested that it was perhaps only a part of Onesicritus’ Cynic idealization to claim that these mines were not exploited.⁷²⁷ In any case, Megasthenes (F 13a in Arrianus, *Ind.* 8, 13) knew of gold mines in India. Gold of the Derdae (ant-gold again) is briefly referred to by Pliny,⁷²⁸ and gold among Indian metals in Diodorus 2, 36. That in the Roman period gold coins were

⁷²¹ Ant-gold is mentioned by Herodotus 3, 106ff., griffin-gold by Ctesias F 45, 26.

⁷²² Karttunen 1989a, 171ff. See also Tarn 1951, otherwise Bazin-Foucher 1938; Bernard 1987c, and Vogelsang 1988.

⁷²³ Megasthenes F 23b in Strabo 15, 1, 44 (and briefly F 23a in Arrianus, *Ind.* 15, 5–7). Cf. Pliny, *N. H.* 6, 22, 67, quoted below.

⁷²⁴ Herodotus 3, 105 ἄλλος δὲ σπανιώτερος ἐστὶ ἐν τῇ χώρῃ ὀρυσσόμενος.

⁷²⁵ Curtius 8, 9, 18 *aurum flumina vehunt, quae leni medicoque lapsu segnes aquas ducunt*.

⁷²⁶ Ctesias F 45, 9, with Philostratus, *V. Ap.* 3, 45.

⁷²⁷ Fisch 1937, 133.

⁷²⁸ Pliny, *N. H.* 6, 22, 67, and again in 11, 36, 111.

imported into India seems, in addition to ample archaeological evidence, to be testified to both by the *Periplus* and in Tamil literature.⁷²⁹

In a way Herodotus was right in claiming that both alluvial and mined gold was available in India, but not in great quantities. While India was never rich in gold, there has always been some local production. Allchin mentions alluvial gold found in northern Pakistan, Kashmir and Ladakh, thus confirming the accounts of Alexander's companions,⁷³⁰ and in Chota Nagpur,⁷³¹ while the ancient gold mines in Karnataka were probably worked from the first century B.C. until the third century A.D.⁷³² In Indian literature, there is an important account of gold in the *Arthaśāstra* (2, 13). It lists several kinds of gold, both alluvial and mined, and gives a rather detailed account of working gold.

Southeast Asia was the gold country both for Indians and for the Romans. Its parts – we do not here go into the problems of identification – were variously known as the gold-land (*suvarṇabhūmi*, χρυσή χώρα), gold-island (*suvarṇadvīpa*, χρυσή), and the golden peninsula (Χρυσή χερσόνησος).⁷³³

Pliny (*N. H.* 34, 48, 163) stated that neither **copper** nor **lead** is found in India, but in fact both are found in India and neighbouring regions.⁷³⁴ Not a little copper and iron was mentioned instead in the idealized account of Diodorus (2, 36), and in another passage (2, 16) gold, silver, iron and copper.⁷³⁵ Nearchus commented admiringly on Indian copper works.⁷³⁶ In some areas, at least, the local product seems to have been insufficient as the *Periplus* attests the importation of copper, tin and lead into India (49 Barygaza, 56 South India).⁷³⁷ Ptolemy (7, 2, 20) knew of a copper country called Chalcitis in South-east Asia.

⁷²⁹ *Periplus* 39 (Barygaza, not South). Kanakasabhai 1904 (1966), 103 quotes *Puram* 126 for ships bringing gold over the Western Ocean to Kerala.

⁷³⁰ Allchin 1962, 196. Ball 1884, 229f., was thus on the right track when he suggested that there were ancient alluvial deposits of gold in Northwest India, which he supposed were exhausted. In the 16th century this gold was mentioned by Abu'l-Fazl (Ball 1884, 244). Referring to this alluvial gold and to ancient gold-mines in Afghanistan Reedy 1992, 259, assumes that there was no need for gold importation in the Northwest (Gandhāra). See also Ratnagar 1981, 106ff.

⁷³¹ Allchin 1962, 196, also Schoff 1912, 258, and Warmington 1928 (1974), 258. Counting the important sources of alluvial gold, Pliny (*N. H.* 33, 21, 66) mentions the Ganges beside the Tagus, Po and other rivers. The Ganges as a gold river also in Vergil, *Georg.* 2, 137.

⁷³² Allchin 1962, 197ff., briefly Ball 1884, 238. The *KA* 7, 12, 22ff. claims that gold is more abundant in the south than in the north.

⁷³³ χρυσή χώρα in Ptolemy 7, 2, 17; χρυσή in the *Periplus* 63 (mentioning gold-mines there) and *Mela* 3, 70; χρυσή χερσόνησος in Ptolemy 1, 14 and 7, 2, 5, 12 & 25; *Chryse promunturium* in Pliny, *N. H.* 6, 20, 55; etc. See e.g. Tomaschek 1899, ss.vv.; Pullé 1912; Schoff 1912, 258; André & Filliozat 1980, 77f.

⁷³⁴ Ratnagar 1981, 80ff. (copper) & 140ff. (lead); Reedy 1992, 243f. (copper) & 245 (lead); further André & Filliozat 1986, 367, note 199.

⁷³⁵ The latter passage has been commonly ascribed to Ctesias (as part of his F 1b), but see Daffinà 1990.

⁷³⁶ Nearchus F 23 in Strabo 15, 1, 67. See the similar account in Strabo 15, 1, 69.

⁷³⁷ Cf. Warmington 1928 (1974), 267f.

Discussion of the problem of the knowledge and use of **iron** in India, commenced with the extremely late date (6th/5th century B.C.) suggested by Wheeler, has now at least been settled in favour of such an early date that it need no longer bother us here.⁷³⁸

In the West the first mention of Indian iron is found in Herodotus (7, 65), who stated that the Indians in Xerxes' invasion army had iron heads to their reed arrows. Ctesias (F 45, 9) knew of iron in India, though he said that it was obtained from the same well as liquid gold. In any case he had seen Indian swords in Persia.⁷³⁹ He adds a curious remark on their use as a kind of lightning-conductor.

In later Western sources iron is only rarely mentioned in an Indian context, but now we also hear of Indian steel. We have already seen that Diodorus (2, 16) listed iron among Indian mineral riches. The Malloi presented Alexander, among other tributes, with one hundred talents of white iron.⁷⁴⁰ The *Periplus* (6) claims that Indian iron and steel were imported to Aduli from the interior of Ariake.⁷⁴¹ However, iron is never mentioned in the section of this work dealing with India. Indian iron (*ferrum Indicum*) was also mentioned as a trade article in the *Digesta* (39, 15, 5–7). In a much later age Arabic poets are said to laud swords made of Indian steel (Ball 1884, 234).

Schoff (1915) showed that the excellent Seric iron of Pliny (*N. H.* 34, 41, 145) hardly came from China and, referring to the *Periplus* passage mentioning Indian iron coming from the interior of Ariaca and to Pliny's account of the "Seric trade" of the Taprobanians, attempted to identify these iron-producing Seres with the Cheras of Kerala. In late antiquity Procopius surprisingly claimed that there is no iron in India.⁷⁴²

Among further mineral products, **rock-salt** is mentioned by Pliny (*N. H.* 31, 39, 77), whose salt mountain called Oromenus probably referred to the Salt Range. The mountain is inexhaustible as the salt mined there replenishes itself (*renascens*); therefore it is an important source of income for the king. His source seems to have been Cleitar-chus (F 28 in Strabo 5, 2, 6), who claimed that the salt diggings of India fill up again with salt.⁷⁴³ Onesicritus (Strabo 15, 1, 30) located rock-salt in the land of King Sopeithes in

⁷³⁸ The evidence against Wheeler's hypothesis was soon made available. E.g. Singh 1962 was able to claim that iron was rather common in a Painted Grey Ware context, and Chakravarti 1979, 24f., claimed that the use of iron in agriculture became common c. 800 B.C. (700 at the latest). While some have placed the beginnings as early as c. 1300 B.C., Ray 1990 claimed that "although the Iron Age in India started about 800 BC, its full impact was felt only from about 400–300 BC".

⁷³⁹ I fail to see why these swords must be made of steel and therefore cannot accept our passage as evidence for the beginnings of the steel industry in India (as, among many others, Schoff 1912, 70; Warmington 1928 (1974), 257; and Singh 1962, 216). According to Chakravarti 1979, 26f. steel (*tīkṣna*) is only rarely mentioned in Indian literature, for the first time in the *Arthaśāstra*.

⁷⁴⁰ Curtius 9, 8, 1 *ferrī candidi talenta C*. It has been suggested that this was steel.

⁷⁴¹ ἀπὸ τῶν ἔσω τόπων τῆς Ἀριακῆς σίδηρος Ἰνδικὸς καὶ στόμωμα. Cf. Schoff 1912, 70f. and Warmington 1928 (1974), 257f.

⁷⁴² Procopius, *de Bello Persico* 6, 13, 2. It may be that he was thinking of Ethiopia. On the barren coast of Gedrosia, however, it is no wonder that iron was unknown. Nearchus (Arrianus, *Ind.* 24) tells us that the spear-ends there were hardened by fire and that sharp stones were used instead of knives.

⁷⁴³ Lassen 1874, 680 (1852, 675) located this in the Salt Range, where the salt deposits are quite inexhaustible, and referred to a known salt-mine in the Pañjab as that of the land of Sopeithes (cf.

the Pañjab. Nearchus (Arrianus, *Ind.* 29, 14) observed that the Ichthyophagoi used locally produced (probably marine) salt.

Although salt does not replenish itself, salt seems to have been a very important source of income in the form of taxes and duties. This is clearly seen in the *Arthaśāstra* account of the duties of the salt commissioner. The medical classics list various kinds of salt including the *saindhava* coming from the Northwest (Sind), *sāmudra* as marine salt, and *raumaka* as rock-salt.⁷⁴⁴

Ctesias described a lake in India with oil floating on its surface.⁷⁴⁵ Though a lake, with fishes, and people collecting oil from boats is hardly plausible, this may be a veiled account of **mineral oil**. This is also mentioned by Pliny (*N. H.* 31, 14, 17), who quoted an anonymous historian of Alexander on the subject of an oil-spring. It was situated in the land of the Oratae and the oil was said to keep lamps burning bright. The Oratae or Oreitae lived in Gedrosia and the reference can thus be connected with the oil deposits of Baluchistan. Watt (s.v. *Petroleum*) quotes Townsend's report of petroleum at Khatan: "Oil was found flowing in small quantities from the surface, and issuing from fissures in rocks along with an abundance of hot sulphurous matter." Both in Baluchistan and the Pañjab local oil deposits were known and used by local people.

Asbestos was known from Western deposits, e.g. in Carystus, Arcadia and Cyprus. Laufer quotes several accounts, where it is known under different names, but eventually the word asbestos was established, especially in Latin. Asbestos of the Indian desert was described by Pliny (*N. H.* 19, 4, 19). It was a kind of incombustible linen, "growing" in the sun-scorched desert of India in the midst of deadly serpents. The mention of serpents makes the account somewhat doubtful, serpents guarding riches being a common τόπος of the story literature (e.g. in the Alexander legend). It has often been claimed that Pliny supposed asbestos to be a plant product, but Laufer has shown that there is really nothing to support this.⁷⁴⁶ Philostratus (*V. Ap.* 3, 15) seems to claim that the garments of Indian sages were made of asbestos.

Ball 1884, 244). See Stein 1939, 1158f., for occurrence of rock-salt in the Northwest and for the name Oromenus, which he derived from OIA *raumaka* 'rock-salt' (*rumā* 'salt mountain').

⁷⁴⁴ KA 2, 12, 28–32 (and 2, 15, 15); Caraka, *Sūtrasth.* 27, 300; Suśruta, *Sūtrasth.* 46, 313.

⁷⁴⁵ Ctesias F 45, 25 & 45s; cf. Vitruvius 8, 3, 8 *similiter in Aethiopia lacus est, qui... et India, qui sereno caelo emittit olei magnam multitudinem*. Reese 1914 gives this as a fragment of Ctesias.

⁷⁴⁶ Laufer 1916, 307 (and 302ff. on asbestos in classical literature). Rackham relies on this idea when he translates: "The plant grows in the deserts..." The passage in question has no word for the plant, only the passive verb *nascitur*, and this is used by Pliny of gems, too. What is left is the comparison with linen, and this is quite possible without making asbestos a plant. The idea of an asbestos tree is met with in Syriac and Arabian literature as well as in China (Laufer 1916, 308 and *passim*), but apparently never in classical sources. See also Warmington 1928 (1974), 255.