

IV. THE NATURAL SCIENCES

The other major category of classical literature where, in addition to history, India was extensively dealt with, was science. Observations on nature had been an essential part of early Greek ethnography from its very beginnings in the sixth and fifth centuries B.C. India was here dealt with quite often; even the first monographs on the country (Scylax and Ctesias) appeared long before Alexander. During his eastern campaigns Alexander is said to have let his staff collect scientific material. While we do not have much extant textual evidence that can be directly connected with such collection of material, observations on Indian nature form an important part of the subject-matter of the fragments of some of his historians.

With Aristoteles and his school science became an independent discipline, and again India and its rich nature played a major role as one of the most important remote countries. The accounts of Hellenistic science, to a great extent lost to us in their original form, were copied in learned compilations of the Roman period, and thus carried through the Middle Ages. Thus, for instance, in the great zoological works of the sixteenth (Gessner) and seventeenth (Aldrovandi) centuries we still meet many accounts going back to Aristoteles and his followers, and Theophrastus long ruled in botany.

1. Old and New Sources of Knowledge

First we must consider the question of Alexander's so-called "scientific" staff. Patrocles stated that the army took only a hasty view of India, but Alexander with his special staff had the whole country described. The description was later entrusted to Xenocles, the treasurer, who then gave it to Patrocles himself.¹ It has been suggested that this description was perhaps used by Theophrastus,² but after him it completely disappears from sight. Strabo (15, 1, 26) assures us that Alexander himself had the lion's share in the discovery of India.

Alexander's scientific staff have been frequently mentioned in modern literature, and often with such anachronistic notions that we must here ask, what was its real nature? Were there really specialized scientists among them, or was it only a minor sideline of

¹ Patrocles F 1 in Strabo 2, 1, 6. Cf. also Strabo 15, 1, 2.

² So Bretzl 1903, still accepted by Brown 1949, 79ff., but see also the critical remarks by Joret 1904, 499f.

military intelligence? While this staff could and did include physicians, engineers, surveyors and mining experts, it did not have zoologists and botanists, as such did not exist.

Occasionally we seem to meet some members of this crew. They include Diognetus and Baeto, the Bematists, who measured and wrote down all the distances travelled during the campaign, and are occasionally quoted on the subject of India.³ In the Pañjab, in the country of Sopheithes, "good mines, both of gold and silver, are said to exist... as Gorgos the miner has testified."⁴ This Gorgos, about whom we know nothing more, was perhaps one of Alexander's expert staff, a mining expert (μεταλλευτής). It has also been suggested that Aristobulus perhaps served Alexander as an engineer or architect.⁵

In every large army there is at least one department with some scientific expertise and even the ability to study nature. But even of Alexander's medical staff we know no more than a few names, and nothing at all of any studies undertaken (see however V.5 below). When Alexander was wounded in the battle against the Malli, he was attended by a physician variously called Critobulus or Critodemus of Cos.⁶ In the list of the trierarchs at the Hydaspes (Arrianus, *Ind.* 18) Critobulus, son of Plato from Cos, is briefly mentioned. Suda further names a certain Draco, a great-grandson of the great Hippocrates, who had been Alexander's personal physician and succeeded in healing Roxane.⁷

In a way we can also include the historian Callisthenes. He was a pupil and relative of Aristoteles, and on the recommendation of his master he gained a position which has been rightly compared with that of "a specially privileged journalist".⁸ For our present task, of course, he is less important, because he died, or at least was deprived of his literary opportunities, well before Alexander reached India.

But apart from this specialist staff, a general interest in nature and especially in the wonders of nature is seen among most historians of Alexander's campaign (with the exception of Ptolemaeus). Especially important here is Aristobulus. The naval expedition headed by Nearchus brought a great number of new observations, although the admiral himself was not too good at describing them. Onesicritus was interested, but very unreliable.⁹ In a way, he can be compared with Ctesias, but there is an important difference to Ctesias: now there was already something which can be styled a scientific tradition, especially represented by Aristoteles, but by others too, a kind of scientific criticism which had originated with the Sophists.¹⁰

³ See Pliny, *N. H.* 6, 21, 61f. (= Baeto F 2a; Diognetus F 1), 6, 22, 69 (Baeto F 4), Athenaeus 10, 59 (B. F 1), and Strabo 11, 8, 9 (B. F 2b) and 15, 2, 8 (B. F 3). See also Aly 1957, 145ff.

⁴ Strabo 15, 1, 30 (Loeb translation). Cf. Berve 1926, s.v.

⁵ Pearson 1960, 151.

⁶ Critobulus in Curtius 9, 5, 25ff., Critodemus of Cos in Arrianus, *Anab.* 6, 11, 1.

⁷ Pédech 1984, 146.

⁸ Pearson 1960, 23, referring to O. Jaeger.

⁹ Brown 1949.

¹⁰ Of course, in strict chronology some leading Sophists from the fifth century B.C. preceded Ctesias, but in these times, with bad and slow communications, we cannot suppose that every new idea was soon known and accepted everywhere. Cf. Karttunen 1989a, 80f.

The place of **Aristoteles** in the development of the Greek awareness of India lies somewhere in the middle between old tales (like those he obtained from Scylax, Herodotus and Ctesias) and new information supplied by Alexander's staff. Although Aristoteles outlived his pupil by one year (he died in 322 B.C.), the main part of his extant work belongs to the earlier period. From Pliny (*N. H.* 8, 17, 44) we receive the impression that Alexander ordered scientific information to be sent to his teacher,¹¹ but only occasionally do we have a glimpse of it in his works (see V.3 below on elephants). The bulk of his references to India do not presuppose the campaigns of Alexander and new information obtained by him.¹²

What Aristoteles knew of India is seen in various notes scattered throughout his works. The majority of them are found in the zoological books. These include eight or nine books¹³ on the *History of the Animals* in general, five books on the *Generation of the Animals*, four books on *Parts of the Animals* and one book each on *Movements of the Animals* and the *Gait of the Animals*.¹⁴ Seven animals are mentioned as coming from India, and the main source seems to be Ctesias, perhaps for all of them. It is perhaps in order to take up and re-examine this question in some detail.¹⁵

Ctesias is mentioned by name, though critically, in three cases, in passages dealing with the elephant,¹⁶ martichora¹⁷ and the supposed absence of pigs in India.¹⁸ Reese (1914) is perhaps too positive in stating that Aristoteles must have had better sources for these animals, because he did not accept the account of Ctesias. Independent criticism and reason were important to Aristoteles, and although he did not believe what Ctesias had told, he had no further knowledge to offer. Therefore I suppose that we have here no more than his own critical opinion.

In other cases no criticism is involved, and, according to the then accepted mode of reference, Aristoteles left his source unmentioned. But a comparison of the Aristotelian account of the Indian one-horned ass with that of Ctesias shows a clear relationship.¹⁹ We do not have much left of Ctesias' account of the parrot (just one sentence in Photius), but

¹¹ According to Athenaeus 9, 398, Alexander gave Aristoteles 800 talents in order to finance his zoological studies.

¹² See also Karttunen 1989a, 94f. Recently Romm 1989 has attempted to deny any information sent by Alexander to Aristoteles, but the arguments are not quite convincing. Even the estrangement of the two remains a hypothesis, though likely, and in any case it took place only when the expedition had proceeded to Iran. See also Bosworth 1993, 413.

¹³ The authenticity of the so-called tenth book, at least, is quite suspect, although Balme in his introduction to the new Loeb edition has argued on behalf of its genuineness, at least as a separate tractate written by Aristoteles ("On failure to generate").

¹⁴ *Περὶ ζώων κινήσεως* and *Περὶ ζώων μορίων*.

¹⁵ See also Bolchert 1908, Reese 1914, 98ff. (examining also the possibility of Aristoteles having made use of Hecataeus), and Karttunen 1989a, 94f.

¹⁶ *H. An.* 3, 22, 523a, *Gen. an.* 2, 2, 736a, Ctesias F 45, 7 and 45b. The Aristotelian passages are given as F 48 of Ctesias. There is much more about elephants especially in the *H. An.*, see V.3 below.

¹⁷ *H. An.* 2, 1, 501a, Ctesias F 45, 15 and 45d. Cf. V.2 below on tigers.

¹⁸ *H. An.* 8, 28, 606a, Ctesias F 45, 27 and 45k.

¹⁹ *H. An.* 2, 1, *Gen. an.* 3, 2, Ctesias F 45, 45 and 45q.

Aristoteles contains nothing that could not easily have come from the earlier author.²⁰ Aristoteles' small snake²¹ is not mentioned among the remains of Ctesias' work, but the earlier author was certainly very fond of such details, which in a way belonged to his domain as a physician.

We are left only with the fierce dogs of India.²² Ctesias certainly mentioned them, and gave an account of their great courage, but still we can here suspect an independent source of information for Aristoteles. The pedigree of these dogs from a repeated cross-breeding between a tiger and a dog comes rather improbably from Ctesias, who hardly knew tigers at all, if not in the distorted form of his fantastic martichora. From Herodotus and Xenophon²³ we know that Indian dogs were also bred in the West long before Alexander, and Aristoteles may well have had other sources of information on them. He mentions them no less than four times. Here too, the account of Ctesias might be the origin of his account, but there is no other evidence of a knowledge of tigers before Alexander.²⁴ Therefore one is bound to ask whether the story of cross-breeding reached him from Alexander's Indian campaigns.

Other works of Aristoteles contain only a few short notes on India, these, too, mostly going back to earlier literature. The existence of black and white people in India²⁵ is known from Ctesias, too, and the statement on the difference between the Indian king and his subjects is ascribed by Aristoteles²⁶ to Scylax, the very first Greek author to deal with India. The Indus river was of course well known to the Greeks through such authors as Scylax, Hecataeus, Herodotus and Ctesias,²⁷ although very few had actually seen it (like Scylax), and the righteousness of remote peoples was a topos often applied to Indians.²⁸ In all our early sources India was also generally considered to be the easternmost of all countries.²⁹

Some additional notes on India are found in Pseudo-Aristotelian texts, which are generally ascribed to his school, but here the problems of dating are considerable. Important for our Indian viewpoint is the work *De cosmo*, but we only know that Apuleius, who translated it into Latin in the second century A.D., thought it to be genuine,

²⁰ *H. An.* 8, 12, 597b, Ctesias F 45, 8.

²¹ *H. An.* 8, 29, 607a.

²² *H. An.* 2, 1, 499b, short references in *Gen. an.* 2, 7, 746a, *De part. an.* 1, 3, 643b and *Probl.* 10, 45, 895b, Ctesias F 45, 10. Cf. also V.2 below.

²³ Karttunen 1989a, 163ff.

²⁴ Or should we take as such Nearchus' claim that the Greeks applied the name tiger to spotted jackals? See F 7 in Arrianus, *Ind.* 15, 3 and V.2 below. For us it would be much easier to believe in a cross-breeding between dogs and jackals than between dogs and tigers, but the ancient world did not have our knowledge of genetics and had many queer ideas about the possibilities of cross-breeding between entirely different species.

²⁵ *De soph. el.* 5, 167a, cf. Ctesias F 45, 19.

²⁶ *Pol.* 7, 13, 2, 1332b = Scylax F 5.

²⁷ *Meteor.* 1, 13, 15, 350a, cf. Scylax F 1, Hecataeus F 296, 299, Herodotus 3, 98 and 4, 44, and Ctesias F 45, 1, 14, 46 etc.

²⁸ *Top.* 3, 1, 116a, cf. Ctesias F 45, 16 & 45, 30. On τόποι see Karttunen 1989a, 122ff.

²⁹ *Meteor.* 2, 5, 14, 262b, *De coelo* 2, 14, 298a, cf. Herodotus 3, 96 and 4, 40, Ctesias F 45, 4.

which it certainly is not. This can also be seen from its few accounts of India. While references to India as the easternmost country in Asia and to the eastern Ocean as "Indian" could well be Aristotelian, it would be quite a surprise, despite Onesicritus, to have a mention of Taprobane in a genuine work of Aristoteles.³⁰

Theophrastus continued the work of Aristoteles, now with full reference to the scientific results of Alexander's campaigns, perhaps going back to information sent to Alexander. He was born in 372/71 or 371/70 B.C., became the head of the Peripatetic school in Athens after the death of his master, and died only in 288/87 or 287/86 B.C. Like most scholars of his time he was a polyhistor, but the major part of his extant work (very much is lost to us) is formed by two large works on botany: Nine books on the *History of Plants* (*Historia plantarum*) and six books on *Causes of Plants* (*Causae plantarum*). In addition to several brief notes the former contains a lengthy excursus on Indian plants (4, 4, 4–11). Many parallels to fragments of Alexander's historians clearly indicate his source. In addition to the use of literary sources, we must here, as with Aristoteles, count on possible oral information coming from Alexander's campaigns.³¹

Another direct pupil of Aristoteles, **Clearchus** of Soloi (born before 342 B.C., died c. the middle of the third century), had, according to a recent hypothesis, himself visited Bactria and Northwest India.³² The hypothesis is in fact very open to criticism; here it is enough to mention that among his fragments India is mentioned only once, in that curious piece where it is claimed that the Jews are descendants of Indian philosophers.³³ Perhaps he obtained it from Megasthenes, who has a related fragment (F 3). The musicologist **Aristoxenus** of Tarentum (contemporary to Theophrastus) had also heard Aristoteles, but does not interest us much here.³⁴

Another pupil of Aristoteles and Theophrastus (with whom he later quarrelled) was **Dicaearchus** of Messene. Exceptionally little is known about this man, who seems to have had an important place in the history of ancient science. Strabo counted him among the great geographers and his measurements for some Greek mountains are quoted. He possibly discussed (or at least mentioned) Indian orography, too, and perhaps he was the first geographer to conceive of Indian mountains as a continuation of the Taurus. However, I am less certain about the claim that he was the first to mention the Himalayas in Greek literature.³⁵ Another noted geographer was **Timosthenes** of Rhodes (in the

³⁰ See André & Filliozat 1986, 135f. and note ad locum.

³¹ Bretzl 1903 is important, but not always right (cf. criticism in Brown 1949 and V.1 below).

³² See Robert 1968, 443ff.

³³ Quoted twice, by Josephus, *Contra Ap.* 179 and Diogenes Laërtius. F 6 and 13 Wehrli.

³⁴ On his fragment (F 53 Wehrli) on a supposed meeting of Socrates and an Indian sage in Athens, see Karttunen 1989a, 110f.

³⁵ Herrmann 1938, 7 & 24. In the first passage, on the Taurus, Herrmann dates his work to 320 B.C., in the second to 300! This supposed importance of Dicaearchus is here stated as a fact without any supporting arguments. Herrmann's text (p. 24) is somewhat unclear; he also ascribes the introduction of the Himalayas to Megasthenes, and perhaps means that D. was the first to put them on the map. Thompson 1948, 134, emphasized that Dicaearchus' merit lay in the theory of the continuous mountain chain Taurus–Elburz–Hindukush–Himalayas forming a west–east parallel on

middle of the third century B.C.), the admiral of Ptolemaeus II Philadelphus, who wrote a book about sea coasts and ports (*Περὶ Λιμένων*, a kind of *Periplus*), and was probably used by Eratosthenes. We cannot say how much he wrote about India; among the meagre fragments we only find the commonplace notion of India situated in the east.³⁶

While Aristoteles dealt with zoology and meteorology, and Theophrastus is considered the founder of botany, scientific geography really originated with **Eratosthenes**. Like his predecessors, this librarian of the Ptolemies in Alexandria in the third century B.C. was a polyhistor, who also wrote learned works on chronology, literary history, mathematics and astronomy, even poetry, but he is best remembered for his geographical work. His was the first attempt at a systematic physical geography (see IV.2) and it had great influence on later geographers. Unfortunately this, as well as his other works, is lost, but from the lengthy fragments preserved by Strabo (especially in book 2) we gain a fairly clear idea of his system. In 15, 1, 11–14 Strabo, who presents him as the most reliable source, gives us a summary of the Eratosthenian account of India. The great esteem he was held in as an authority on India is testified to also by Arrianus, *Indica* 3, 1. Though we are entitled to some extent to criticize his grounds for dismissing as unreliable so many authors on India (such as Megasthenes), his opinions are also valuable, because he, at least, knew them all and worked on original texts, while many extant compilers often relied on secondary sources (like Eratosthenes himself).³⁷

Among later Peripatetics we must mention the historian and geographer **Agatharchides** of Cnidus (2nd century B.C.), whose interesting account *De mari rubro* is known mainly from Diodorus and Strabo and from the excerpt in Photius (codex 250).³⁸ It has been claimed that he was mainly dealing with what we understand as the Red Sea and, of course, this was what he could most easily find information about in Alexandria. However, his fragments on Soqotra (F 105ab), with a connection with the Indian coast, on the Ichthyophagi not only of the Red Sea but also of the Carmanian³⁹ and Gedrosian coasts (F 31 ab), and on the sea extending from Arabia to India and Gedrosia (F 47a) show that the Indian Ocean was at least not wholly excluded. Of his other, historical, works nothing but meagre fragments are preserved.

Between Eratosthenes and Strabo's extant work we must still name one scientific geographer interested in India (as Poseidonius was apparently not): **Hipparchus**. This

the eastern map just like the Mediterranean on the western. The text of Dicaearchus' fragment, preserved in Agathemerus 5, is given in Berger 1880, 173 and as F 110 in Wehrli.

³⁶ F 7, cf. Gisinger 1937, 1315f. McCrindle 1877, 7, mentioned him together with Daimachus and Megasthenes, which apparently led some scholars to suppose that he, too, was one of the Hellenistic ambassadors to India (e.g. Nilakanta Sastri 1967, 89).

³⁷ For Eratosthenes and India see e.g. Lassen 1874, 741ff. = 1852, 736ff., and Brown 1957, 15f. & 24, more generally Thomson 1948, 123ff. Some details will be discussed in subsequent chapters.

³⁸ All edited together in the *GGM* 1, but now better to be consulted from the separate editions of the said authors, modern translation and commentary in Burstein 1989. In the *FGrH* 86 are only the remains of his historical works, not of the *De Mari Rubro*.

³⁹ Nearchus (F 1 in Arrianus, *Ind.*) made it quite clear that the Ichthyophagi originally belonged on the Gedrosian coast, and Carmania began only after them, but in later literature this difference was often discarded. The tradition of the other Ichthyophagi on the Red Sea coast seems to begin with Agatharchides (F 30ff.).

astronomer and geographer came from Nicaea in Bithynia, and lived in the second century B.C. His geography contained sharp criticism of Eratosthenes. It is known mostly through Strabo (book 2), but it has been suggested that Strabo, as an eager admirer of Eratosthenes, did not always do him full justice. In a way Hipparchus' career as a scientist was a failure. In geography, he accepted grossly exaggerated distances for India, and in astronomy, his criticism of the heliocentric system of Aristarchus, erroneous in principle, although providing better mathematics, was victorious. With Ptolemy this victory remained in effect for many centuries, until Copernicus.

Perhaps the most important of the first century B.C. scholars was **Poseidonius**.⁴⁰ Unfortunately, we do not have much by him on India; probably he did not write a great deal about the country. For us, the most important thing is his fragments on Eudoxus' naval and commercial venture (see VII.2 below). According to Pliny (*N. H.* 6, 21, 57), he supposed, with the round world (but too small), that the east side of India faces the west of Gaul. Another question is, how much did he influence Dionysius Periegetes? In the case of India certainly not as much as was supposed by Herrmann (1938, 42f.).

Another late Hellenistic geographer was **Artemidorus** of Ephesus, he, too, in the first century B.C. He is known to have criticized Eratosthenes and was used by Marcianus. Strabo and Diodorus apparently obtained their information on Ethiopia and the Red Sea coasts from him, though the ultimate source was Agatharchides.

The early Roman period adds to our sources a few important scholars, who often drew from Hellenistic sources. The famous physician **Dioscurides** in the first century A.D. wrote a *Materia medica*, which is one of the most important sources of classical botany after Theophrastus. As is shown in chapter V.1 below, he discussed nearly all the Indian plants which were then known in the West, and in many cases he is the first to mention them.⁴¹ Then follow two Romans, **Pliny**⁴² with important chapters on geography, animals, plants, and jewels in his *Natural history*, and Claudius **Aelianus**, a Roman Sophist, who wrote in Greek his book about the *Nature of Animals* (Περὶ ζῴων ἰδιότητος) in the second century A.D.

⁴⁰ *FGrH* 87.

⁴¹ His information was then excerpted by some later scholars – such as Oribasius. Their references are easily found in the Dioscurides edition of Wellmann, and are generally not given in my notes.

⁴² The younger Pliny in his interesting letters never mentions India, so I can always refer to his uncle simply as Pliny.

2. Physical Geography: Size and Boundaries of India

While his sources contained widely differing accounts of Indian geography, Eratosthenes attempted to form a critical synthesis. Generally his estimate of the then existing literature on India (written by Ctesias, by the historians of Alexander and by Hellenistic ambassadors) was harsh, in many cases too harsh. But perhaps his criticism e.g. of Megasthenes was somewhat justified, after all. Eratosthenes was looking for geographical information, not for ethnography. Megasthenes was certainly well informed (in spite of some fabulous peoples), but his fragments do not necessarily show him to be a good geographer. On the other hand, Ctesias and Onesicritus served Eratosthenes (and us!) as examples of plain fantasy. But the reliable Patrocles, who was Eratosthenes' main authority on India, had in fact some very queer ideas about geography, which he passed on to Eratosthenes. Because of the great fame of the latter, and despite the criticism of Hipparchus, they could never have been corrected before the Portuguese came with new first-hand information at the end of the 15th century.

For Eratosthenes, India was still the easternmost country of the inhabited world.⁴³ It formed the first *sphragis* of his system. Beyond it lay the ocean, which was supposed to surround all the continents. The idea of this ocean was old, having been mentioned as early as Homer. For a while it was criticised (e.g. by Herodotus), but at least since Aristoteles it was again scientifically respectable. Perhaps it must be said that it is here wholly irrelevant that the three combined continents of Europe, Asia and Africa actually *are* surrounded by ocean. For Aristoteles and Eratosthenes it was only theory, a hypothesis, which happened to be correct, but not in the way they thought. Of the real extent of the continents or of the Pacific and Polar Seas they had no idea at all.⁴⁴

The first question for ancient geographers was the size of India. According to a variety of opinions it was no less than the rest of Asia (Ctesias), a third of the habitable world (Onesicritus), the greatest of all countries (Philostratus), or something more reasonable – always very wide. For Megasthenes the distance “from the southern sea to the Caucasus” was “above twenty thousand stadia”, for Daimachus “at some places above thirty thousand stadia”. Nearchus only stated that it took four months to cross the Indian plains. From Patrocles Eratosthenes took the breadth of 15,000 stadia and attempted to support it by comparisons with corresponding western distances. Hipparchus criticized

⁴³ Strabo 1, 4, 5, Pliny, *N. H.* 6, 21, 56. For Eratosthenes' account of India see also Lassen 1874, 741f. (= 1852, 736ff. I have here taken Lassen as the representative of early views and have thus discarded references to the 19th-century histories of classical geography such as the works of Mannert, Ukert, Forbiger, and Bunbury), further Wecker 1916, 1269f., Stein 1932, 284f., Brown 1957, 16ff., and Hinüber 1985, 1086f.

⁴⁴ See Alexander's speech at the Hyphasis in Arrianus, *Anab.* 5, 26, 1f. While the speech itself is fictitious, it clearly reflects the thinking of the early Hellenistic age. It was commonly supposed that both in the northeast and in the east Alexander had turned back, when only a short distance remained to the Ocean. In both cases it was wrong, of course.

this, basing his opinion on Megasthenes and Daimachus. Strabo himself, who has preserved all these accounts, is as ready as Eratosthenes to reject the two ambassadors on account of their stories about the fabulous peoples.⁴⁵ It was never understood that all the sources were here wholly dependent on hearsay. Not even Megasthenes could examine the matter himself. The numbers were more or less arbitrary, as "no observations for longitude were feasible, and the few available for latitude were very vague or wrong".⁴⁶ From Indian literature we see that the Indians themselves had only very vague ideas.⁴⁷

The distortion in Eratosthenes' numbers and the following map of India is clearly seen in Strabo 15, 1, 11, where the distance from the Caucasus to the mouth of the Indus is 13,000 stadia⁴⁸ and the additional distance to the latitude (parallel) corresponding to the southernmost point of the subcontinent only 3,000 stadia. But in this system the entire subcontinent was heavily distorted to the east. According to Megasthenes and Eratosthenes the length of the country from west to east, measured (or estimated) to the mouths of the Ganges was 16,000 stadia.⁴⁹ From here Eratosthenes had the peninsula turn further eastwards so that its southern end was 3,000 stadia more to the east than the mouths of the Ganges (giving 19,000 for the total length).

For Eratosthenes India was thus a heavily distorted rhomboid⁵⁰ with longer sides around the southeastern tip than around the northwestern. What is actually the southern end, was carried to the southeast so that it was not much further south than the mouth of the Indus and clearly further east than the mouth of the Ganges. The sides of this rhomboid were measured as 16,000 stadia in the north, 16,000 in the east, 19,000 in the south, and 13,000 in the west. The criticism of Hipparchus contained still greater numbers and had a still more northerly location for India, but this was not accepted by Strabo.⁵¹

The problem with the Eratosthenian system hailed partly from the exaggerated numbers given in all his sources, and partly from theoretical conclusions. According to Eratosthenes, life was possible only in the middle zone, while the extensive heat in the equa-

⁴⁵ See Strabo 2, 1, 4 (Eratosthenes F III B 6 and Hipparchus F II 3, Megasthenes F 6d, Daimachus T 3); 2, 1, 14 (Daimachus F 2b); 2, 1, 17 (Daimachus F 2c); 15, 1, 12 (Ctesias F 49b, Onesicritus F 6, Nearchus F 5, Megasthenes F 6c, Daimachus F 2a); see further Philostratus, *V. Ap.* 6, 1; Arrianus, *Ind.* 3 (Eratosthenes F III B 10, Ctesias F 49a, Onesicritus F 6, Nearchus F 5, Megasthenes F 6b); Pliny, *N. H.* 6, 21, 56ff. (with Eratosthenes F III B 8). As was already noted by Vogel 1874, 7f., the close similarity of the accounts in Strabo and Arrianus shows that both were actually quoting Eratosthenes. It seems that Arrianus had himself read neither Ctesias nor Onesicritus. Strabo, however, also knew Onesicritus directly.

⁴⁶ Thomson 1948, 134, see also Schulze-Gävernitz 1931, 12f. The difficulty was added to by the fact that the stadium was not standardized; different measures for it were used in literature and often quoted without thinking of the difference. The situation was, however, rapidly changing during the Hellenistic age and it became possible to define the latitude with some degree of precision. The discovery of two relatively good sundials at Ai Khanum (Veuve 1982) shows that this new technology was also known in the Farther East.

⁴⁷ Cf. Hinüber 1985, 1086f.

⁴⁸ In 15, 2, 8 the same is given as 12,000 or 13,000 stadia.

⁴⁹ Strabo 15, 1, 11 with Megasthenes F 6c and Eratosthenes F III B 6. In this they disagreed with Patrocles (F3a = Strabo 2, 1, 7), who allowed only 15,000 stadia.

⁵⁰ Strabo 2, 1, 22 and 2, 1, 31.

⁵¹ Strabo 2, 1, 27.

torial region and the extreme cold in the polar region made both uninhabitable. Allowing room for Taprobane (which was also supposed to be much larger than in reality – 3,000 stadia) in the still habitable extreme south (Strabo 2, 1, 14), he had put the southern end of India on the parallel of Meroe, which was already much too far to the north. After this the exaggerated numbers of Megasthenes and Daimachus would move Bactria, known to be fertile land with a rather mild climate, to the far north and the Central Asian steppes to the uninhabitable northern zone. In order to avoid this he accepted Patrocles' 15,000 stadia and compared it with the similar distance from Meroe to Athens.⁵² But if the 15,000 stadia for India, actually, but only by pure chance, correspond to the real distance rather well,⁵³ in the West it was grossly exaggerated.

In the above-mentioned passage of Strabo it was stated that the measurement of India from north to south was, according to Megasthenes, approx. 20,000 stadia and, according to Daimachus, at most over 30,000 stadia. Even with the unfortunate theory that Diodorus must always have had a single source in each particular passage, it is therefore difficult to understand how this source could be Megasthenes (as it undoubtedly was for the seven classes and in several other passages), when in the very first passage of his account it is stated that India from north to south extends 32,000 stadia (and from west to east 28,000). Of course, Diodorus was an entirely non-independent compiler, but it does not demand brilliant talent to compile from two or three sources. One wonders if his measures hail (perhaps not directly) from Daimachus.⁵⁴

Next we have to consider the boundaries of India.⁵⁵ In the Eratosthenian picture, all seems quite clear. The Indus in the west, the mountains in the north, the sea in the east and south. But quite often areas to the west of the Indus were also included in India.⁵⁶ With later sources (our extant works of the Roman Imperial period), it is not always easy to say which period is meant, as the boundaries were certainly changing.⁵⁷ The Mauryas pushed them far to the West. For the Greeks, only the western and partly northern boundaries were actually known (but in the south and east it was the Ocean).

The problem is accentuated by the general question of the concept of boundary in ancient geography. It seems that rivers were readily taken as boundaries in a theoretical, geographical sense even where the real political or ethnic boundaries were known to be somewhere else. Thus it was quite common to suppose that the Nile was the actual boundary of Asia and Africa, although it was clearly situated in the middle of a uniform civilization.⁵⁸ Similarly the Oxus (Amu Darya) was considered to be the geographical

⁵² Strabo 2, 1, 2.

⁵³ According to Bevan 1922, 359, the difference is approx. 75 miles.

⁵⁴ Cf. Murphy 1989, 46 note ad l.

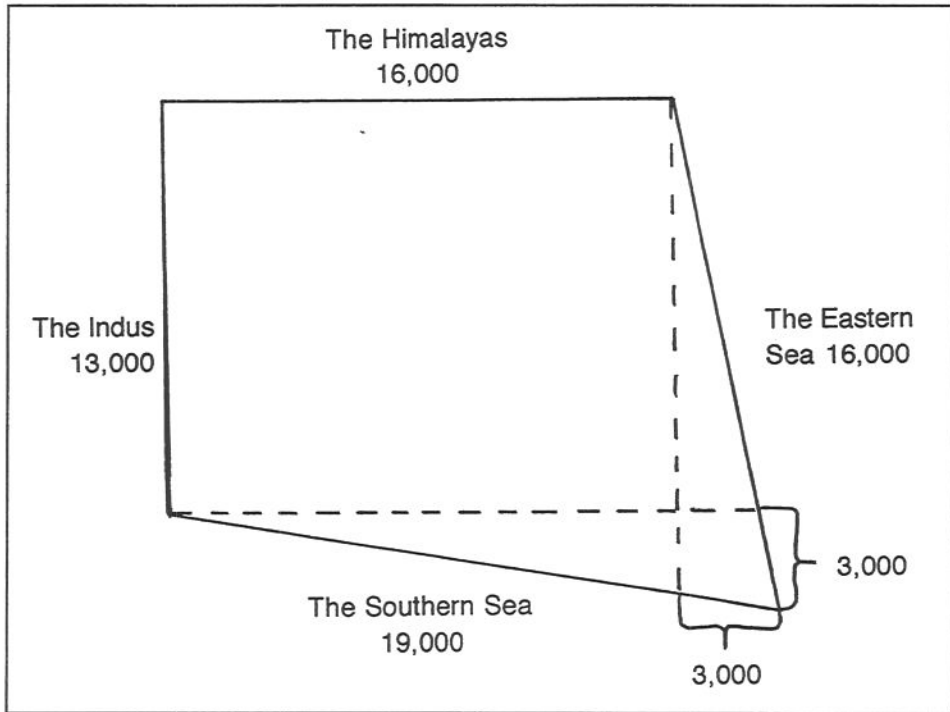
⁵⁵ Strabo 2, 1; 15, 1, 10f. (partly from Eratosthenes); 15, 2, 1 & 9f.; Diodorus 2, 35 (perhaps from Megasthenes); Arrianus, *Anab.* 5, 6, 3 and *Ind.* 2; Dionysius Perieget. in McCrindle 1901, 189, and Cosmas *ibid.* 161. See also Wecker 1916, 1269.

⁵⁶ Arrianus, *Ind.* 1, 1.

⁵⁷ See also Karttunen 1989a, 157ff.

⁵⁸ The Nile as a boundary was the opinion of the Ionians (Hecataeus?). This was strongly criticized by Herodotus (2, 15ff.), who keenly saw the cultural unity of Egypt. See also Pearson 1960, 121.

**Schematic Map of India
according to Erastosthenes and Strabo
(After Bevan 1922)**



boundary between Bactria and Sogdiana, and Jaxartes (Syr Darya) that between Sogdiana and Scythia.⁵⁹ Thus we can see how easily the Indus was taken to be the western boundary of India, and that this does not necessarily refer to a period when it really was a political or ethnic boundary. It was not necessary that this theoretic boundary corresponded to the actual situation. For historians of Alexander it was no problem to make the Indus the western boundary of India, and then to speak of Indians living west of it.⁶⁰ The notion of the Indus as the western boundary of India was new. Before Alexander's campaigns India was considered to be the country on both sides of the Indus, which also derived its name from the river. Its boundaries in three directions were or were supposed to be deserts, while in the south was the sea. This is the India we find in the fragments of Hecataeus, in Herodotus and in Ctesias.

⁵⁹ E.g. Strabo 11, 11, 2. See Holt 1989, 20ff., and Lyonnet 1993.

⁶⁰ See Arrianus, *Anab.* 5, 4, 3 and *Ind.* 1, 1 (with Brunt's note). Pearson 1960, 119 with note 31.

3. Snow-capped Mountains

The orography of India and adjacent countries was an important part of ancient geography. A continuous chain of mountains was generally (and rightly) accepted as the northern boundary of India, but erroneously it was given an exact direction from west to east. This was pure theory; no Westerner had ever explored or even seen more of it than the westernmost part. A curious interpretation soon to become part of geographical theory made the Taurus, Caucasus, Elburz, Hindukush, and the Himalayas or Emodus-Imaus into one continuous chain of mountains traversing and thus dividing the whole of Asia into a northern and a southern half.⁶¹ As a divider it was an abstraction created by Dicaearchus and Eratosthenes, though its roots may be slightly earlier. Strabo and Arrianus state quite clearly that the Macedonians called the Hindukush by the name Caucasus.

As a name for this giant chain the names of its different parts were used: the Caucasus,⁶² Taurus,⁶³ and, for the eastern part only, Paropanisus or Paropamisus (with many various lections), (H)emodus and Imaus.⁶⁴ There seems to be no real reason to suppose that a clear difference between the Hindukush, Pamir and Himalayas was understood at all. They were rather considered different parts of the same continuous chain.

Nevertheless, we cannot here follow Herrmann's attempt (1938, 23) to show that the Paropanisus also included the western Himalayas. This he concluded from the fact that quite a number of authors (Aristoteles, Curtius, Pliny and Arrianus) locate the sources of the Indus in the Paropanisus. Of course, we know quite well that the real sources are in or rather beyond the Himalayas, but for the Greeks these were entirely unknown.

With a changing and increasing knowledge of Asian geography the conception of these mountains tended to change (Kiessling 1905, 2502), though earlier opinions were still repeated. An attempt to make all the evidence conform is therefore bound to be un-

⁶¹ Strabo 11, 1, 2f. & 15, 1, 1; Arrianus, *Anab.* 5, 5f. and *Ind.* 2, 2f.; Dionysius Perieg. 889ff.

⁶² Generally used by Arrianus (who was here following the Macedonian usage, cf. *Ind.* 2, 4) in the *Anab.* e.g. 3, 28, 5-7; 3, 30, 6; 4, 22, 4; 5, 3, 3; 5, 5, 3f.; and then by authors using him, e.g. *Itinerarium Alexandri Magni* 103 and Dionysius Perieg. 1134. Among other authors e.g. Polybius 11, 39; Strabo 11, 5, 5 & 11, 8, 1, in 15, 1, 11 specified as Macedonian usage; Curtius 7, 3, 19; Philostratus, *Vita Ap.* 3, 4. Cf. e.g. Anspach 1901, 3, note 12 Wecker 1916, 1270f. and André & Filliozat 1980, 88.

⁶³ Strabo 2, 5, 32; 11, 1, 2 & 8; 15, 1, 1 & 11; and 15, 2, 1; Arrianus, *Anab.* 5, 5, 2f. and *Ind.* 2, 2; Dionysius Perieg. 638ff. This was the name used by Eratosthenes, from whom Strabo (15, 1, 1) seems to derive the terms τὰ ἐντὸς τοῦ Ταύρου (μέρη) for the northern and τὰ ἔκτος τοῦ Ταύρου for the southern half of Asia, and perhaps before him by Dicaearchus. See also McCrindle 1901, 7, note 1.

⁶⁴ All three in Strabo 15, 1, 11, and Arrianus, *Ind.* 2, 3 (cf. also 6, 4), the latter two also in Pliny, *N. H.* 6, 21, 64, who made the Imaus an extension of the Emodus (*Imaus mons promunturium Emodorum montium*). Strabo 11, 8, 1 gives the whole chain the Macedonian name of the Caucasus and adds that among the barbarians the extremities of the north (East?) were called Paropamisus, Emoda, and Imaus. Imaus as the easternmost part also in Dicaearchus.

cessful. This was done by Wecker (1916, 2542), who endeavoured to show that the right order was always Paropanisus-Imaus-Emodus. This was the situation in Ptolemy, but to have it so even for sources depending on Hellenistic literature (Eratosthenes), Wecker had to deal with his sources in an entirely unacceptable way. He entirely discarded Arrianus (*Ind.* 2, 3 & 6, 4), dismissed one passage in Pliny as a plain error (*N. H.* 6, 21, 64) and ignored two others (5, 27, 98 and 6, 21, 60), and was thus able to claim that only Strabo (15, 1, 11) has a different order from Ptolemy's. The passage of Strabo is derived from Eratosthenes and is rather important for the Hellenistic geography of India. It seems very unlikely that he had made such an error just there. In any case the order Paropanisus-Emodus-Imaus is supported by Pliny and Arrianus, and by both in two different places, while there seems to be only slight evidence⁶⁵ for the inverted order before the Roman period.

That there were two names for the Himalayas interpreted as different parts of the mountains makes it very unlikely that both names could come from one author (Megasthenes, according to Kiessling).⁶⁶ Is it not much more likely that the two names, both originally of Indian origin, come from different sources? It could well be that the more western one, Emodus, comes from some history of Alexander, and the more eastern one, Imaus, from Megasthenes. The Macedonians perhaps did not themselves see the Himalayas, but it would be curious if Porus and other informants in the Pañjab had not told of the mighty mountains in the north and northeast. Moreover, in a passage (15, 1, 29) probably going back to some historian of Alexander⁶⁷ Strabo mentioned that the forest from which Alexander fetched timber for his river navy was situated near the Emodus mountains.

If the Greek name Emodus was already fixed for the western part of the mountains in the time of Alexander, then it would be used even by Megasthenes, who was familiar with his predecessors and made use of them. Therefore it is also no wonder that according to Artemidorus (in Strabo 15, 1, 72), the Ganges had its sources in the Hemodus.

A curious account in Philostratus, *Vita Ap.* 3, 4 made the chain turn south and reach the sea in the middle of India. Perhaps this was a misleading interpretation by an author who failed to understand or was unconcerned with geography from the conclusion that somewhere at its eastern end the Imaus actually reaches the sea, but, of course, the Eastern Ocean somewhere beyond the mouths of the Ganges was meant.

We must also consider the names. The Paropanisus (Παροπάνισος or Παραπάμισος, with numerous further variants) with the country of Paro(ra)pani(mi)sadae⁶⁸ corresponds

⁶⁵ Agathemerus 2, 9.

⁶⁶ Kiessling 1905, 2502, followed by Herrmann 1938, 24 (in footnote).

⁶⁷ Onesicritus is quoted in both 15, 1, 28 and 15, 1, 30. An account of the construction of Alexander's navy is very natural to him as a naval officer.

⁶⁸ Mediaeval manuscripts are full of curious variants of these names, and only with the best critical editions of authors with an exceptionally good textual tradition can we really say what was probably written by the author. To list some of the forms accepted in editions, we find Παροπάνισος in Diodorus 17, 83, 1; Ptolemy 6, 11, 1 & 6, 17, 1f.; and Παροπανισάδαι in Diodorus 17, 82, 1; Ptolemy 6, 11, 1; 6, 17, 1 & 3; 6, 18, 1 & 4; 6, 19, 1; 6, 20, 1; Παραπάμισος in Strabo 15, 1, 11 & 15, 2, 9; and Παροπαμισάδαι in Strabo 15, 2, 8ff.; Παραπάμισος in Arrianus, *Anab.* 5, 3, 3 &

to the name attested in Iranian (as Avestic **Parupairisaena* cf. *upairisaena* in Yasna 10). This is confirmed by the Accadian version of the Behistun inscription (corresponding to DB 1, 18), where *Paruparaesanna* is the equivalent of the OP Gandara.⁶⁹

The Emodus has been variously called Ἡμωδός,⁷⁰ Ἡμωδὸν ὄρος,⁷¹ or in the plural Ἡμωδῶ ὄρη,⁷² in Latin (*H*)*emodus* (Pliny 5, 27, 98), (*H*)*emodi montes* (Pliny 6, 24, 88), (*H*)*emodes montes*⁷³ or *Haemodes*.⁷⁴ It is very clearly an equivalent of the MIA **Hemoda* or **Hemota* corresponding to the OIA *Haimavata* (*parvata*):⁷⁵

The Imaus – Ἰμαός,⁷⁶ Ἰμαὸν ὄρος,⁷⁷ Ἰμαϊκὸν ὄρος (Arrianus, *Ind.* 6, 4), or Latin *Imaus*⁷⁸ – seems either to preserve the first part of Himavat (*hima* ‘snow’) or rather to be an MIA equivalent for OIA *Himavān*.⁷⁹ Pliny, who often mentions details missing in other sources, explains the name quite correctly.⁸⁰

5, 5, 3; *Ind.* 2, 3; 5, 10; 6, 4; and Παραπαμισάδαι in Arrianus, *Anab.* 4, 22, 5; 5, 3, 2; 5, 11, 3; 6, 15, 3; 6, 26, 1; *Ind.* 5, 11; *Parapanisus* in Curtius 7, 4, 31; and *Parapanisadae* in Curtius 7, 3, 6, & 7, 8, 9; *Paropanisus* in Pliny, *N. H.* 6, 18, 48; 6, 21, 60; 6, 23, 71; and *Paropanisidae* in Pliny 7, 23, 78; *Propanisus* in Mela 1, 81 & 3, 69; *Propanisadae* in Mela 1, 13. Further Παρνασσός in Aristoteles *Meteor.* 1, 13 (with the familiar name of the Greek mountain Parnassus, but as the source of the Indus, rightly identified as the Caucasus in the commentary of Alexander of Aphrodisias (c. 200 A.D.); the same as Παρνησός in Dionysius Perieg. 1097. Cf. Bosworth 1995, 28.

69 First shown by Marquart 1907, 73ff., see also Herrmann 1949, 1778f., Herzfeld 1968, 336f., and most recently Humbach 1995. The Accadian word also overrules the criticism of André & Filliozat (1980, 86f.), who only knew brief references to the Avestan word in Foucher (1947, 193 & 199) and in an earlier work of Herzfeld. Their own explanation, Sanskrit **Paropaniṣadha* (earlier suggested by Lassen 1874, 144 [1852, 135f.] and McCrindle 1877, 182) seems rather conjectural, and it is certainly not true that all place-names of the area quoted in classical literature are Indian and not Iranian. Our Iranian name has the additional merit of being easily explained from Iranian without any need for an Indian explanation. Even the Pañjab rivers were known to Macedonians in an Iranian form of their (originally Indian) names.

70 Arrianus, *Ind.* 2, 3 & 6, 4. In Strabo 15, 1, 11 one cannot say whether the accusative form Ἡμωδόν is meant to be masculine or neuter.

71 Diodorus 2, 35; Dionysius Perieg. 748 & 1146.

72 Strabo 15, 1, 28, 29 & 72; Ptolemy 6, 15, 3; 6, 16, 2 & 5; Dionysius Perieg. 1162. Without a critical edition one is always somewhat hesitant with Strabo. While the Loeb text reads in 15, 1, 29 τοῖς Ἡμωδοῖς ὄρεσιν, McCrindle (1901, 35) in his translation gives the masculine form *Emōdoi* and in a note gives the correct *Emoda* (with neuter plural ὄρη) as another form of the name.

73 Pliny, *N. H.* 6, 21, 56, 60 & 64. Mayhoff – a somewhat notorious text – reads always without an *h*, André & Filliozat 1980 with the *h*. Neither gives any comment.

74 Mela 1, 81 and 3, 68.

75 E.g. McCrindle 1877, 132, Kiessling 1905, 2503, more correctly Stein 1932, 286, André & Filliozat 1980, 81, and Hinüber 1985, 1084.

76 Arrianus, *Ind.* 2, 3; Strabo 15, 1, 11, although one cannot say for certain whether the accusative form Ἰμαὸν is meant to be masculine or neuter.

77 Agathemerus 5 (Dicaearchus F 110); Ptolemy, e.g. 6, 14, 1; 6, 15, 1; 7, 1, 1; 7, 2, 15.

78 Pliny, *N. H.* 5, 27, 98; 6, 21, 60 & 64; 7, 2, 11 (Baeto F 5). *Imavus* (*Imaus*, also *Himavus*, *Himavus*) seems to be a rather poorly attested variant and is not to be preferred, though its *v* seems to correspond to the Indian form (as was pointed out by Stein 1932, 286). In any case Pliny got the name from Greek, where *v* was still impossible.

79 E.g. McCrindle 1877, 132, Kiessling 1905, 2503, André & Filliozat 1980, 86 and Hinüber 1985, 1084. According to the last-mentioned scholar *himavaṃ* and *himavanta* are attested in the MIA.

80 Pliny, *N. H.* 6, 21, 64 *Imaus vocatur incolarum lingua nivolum <sic> significante*.

4. The Mighty Rivers of India

When Alexander's armies had crossed the Hindukush and arrived in Northwest India, it had already long been common knowledge that the Indus was the mightiest river of the known world. Scylax, Hecataeus, Herodotus, and Ctesias had written about it, but few Greeks had actually seen the Indus. Alexander's companions were very impressed indeed by what they saw, and in the books they wrote afterwards they settled the fame of the river. When Megasthenes some 25 years later was able to claim that the Ganges actually surpassed the Indus, it was already too late. Though his account was occasionally quoted, the earlier opinion persisted on until the end of classical antiquity.

Among the rivers of India⁸¹ the Indus (Ἰνδός) was the only one which was known to the Greeks before Alexander's campaigns, and even afterwards it remained the most familiar.⁸² Its breadth varied greatly in different accounts, but nearly always it was grossly exaggerated. The sources of the Indus were erroneously located in the Hindukush or Pamir. According to Arrianus, "all the important rivers of Asia rise from Taurus and Caucasus", and many others shared this view.⁸³ It was supposed that the sources were relatively near to the place where the Indus left the mountains; the Greek had no idea of its long upper course and real sources beyond the Himalayas. Diodorus (1, 37, perhaps from Megasthenes) refers to Indian philosophers stating that all countries surrounding India are situated higher up, so that all waters flow to India.

For a while Alexander seems to have been entirely confused in his geography, when he supposed that the Indus was actually the upper course of the Nile. A comparison and even confusion between the Indus and the Nile was not rare.⁸⁴ The theme itself was old; Herodotus (4, 44) in the fifth century had known that these two rivers have crocodiles. This same observation fascinated Alexander and his men. Other similar phenomena were observed both in Egypt and in India: the same kinds of animals and plants were observed in both countries. Both rivers had unknown sources, and their regular floods were of similar importance to both countries. Both had wide deltas.⁸⁵

⁸¹ For the first time discussed by Schlegel 1826, then Wecker 1916, 1369ff., and Stein 1932, 287ff., recently e.g. by Hinüber 1985, 1090ff.

⁸² Before Alexander Herodotus 4, 44, and (without a name!) 3, 98; Ctesias F 45, 1, 14, 37 & 46, and without a name F 45, 3 & 5; and Aristoteles, *Meteor.* 1, 13, 15, 350A; then *i. al.* Strabo 15, 1, 13 & 32; Curtius 8, 9, 4; Arrianus, *Anab.* 5, 4, 1f.; 5, 20, 10; 6, 14, 4; *Ind.* 2, 5f. & 4, 8ff.; Pliny, *N. H.* 6, 23, 71f. (*incolis Sindus appellatus*); Philostratus, *Vita Ap.* 2, 18f. For the name see Hinüber 1985, 1096, and Karttunen 1995a.

⁸³ Arrianus, *Anab.* 5, 5, 4; and e.g. Aristoteles, *Meteor.* 1, 13, 15, 350A; Pliny, *N. H.* 6, 23, 71.

⁸⁴ Arrianus, *Anab.* 6, 1, 1ff. and *Ind.* 6, 7ff. Cf. Hinüber 1985, 1104, Arora 1982a.

⁸⁵ On the Indus delta, see Strabo 15, 1, 34; Arrianus, *Anab.* 6, 18ff.; cf. McCrindle 1901, 19, note 5. According to Pearson 1960, 107, Onesicritus was the first to use the word *delta* in connection with a river other than the Nile.

Some scholars have wondered whether Alexander really committed such an error, and in any case he soon learned the real state of affairs. The confusion is mentioned as a curiosity by historians.⁸⁶ This has raised the question whether the Achaemenid naval venture as described by Scylax (and after him, Herodotus 4, 44) was completely forgotten. Some deny the historicity of Scylax, but as Herodotus believed in it so also would a Greek reading his account.

Bevan (1922, 353) suggested that Scylax was content with seamen's tales and did not describe the actual voyage. But again, Herodotus said enough about it. Therefore an attempt to doubt at least the latter part of it, sailing round Arabia to Egypt,⁸⁷ does not help us. Some entirely deny the historicity of Alexander's error, but this seems to me to be tampering with evidence in order to square history more neatly with our expectations. Neither can I agree with Schachermeyr,⁸⁸ who found it impossible to think that the feat of Scylax was unknown to Alexander and suggested that any mention of it was deliberately suppressed for propaganda reasons: Nobody but gods – Dionysus and Heracles – had preceded Alexander as conquerors of India. After establishing the idea that Alexander must have known Scylax, he continues to suppose that in spite of this the similarities of the country with Egypt might have led Alexander sincerely to believe that he had found the upper course of the Nile.⁸⁹ He further suggested that the Indus-Nile hypothesis might actually have originated in early Ionian geography as a parallel to the Araxes-Tanais hypothesis (see below) and in opposition to Scylax, who was not believed.

Perhaps it is, after all, not so difficult to explain. Scylax is so rarely quoted, and books, especially those written outside important cultural centres like Athens, were still quite rare. Therefore, it is quite possible that Scylax's own account was unknown to the Macedonians.⁹⁰ Herodotus certainly was not unknown, but this does not mean that anyone in Alexander's army carried a copy with him. It is a long book, and perhaps not everything was remembered, or at least not correctly. Perhaps the brief passage on Scylax was not remembered at all, or perhaps only the main point was remembered, that Scylax had sailed from the upper course of the Indus to Egypt. Omitting the sea, this would result exactly in the confusion deluding Alexander.

It is curious to see how both errors and pieces of information tend, after sinking more or less into oblivion, unexpectedly to surface again. Thus, after long centuries, after the Ptolemaic system again supposed a land connection between Africa and Asia, after

⁸⁶ Strabo 15, 1, 25 (Nearchus F 20), Arrianus, *Anab.* 6, 1, 2f. The most recent discussion in Bosworth 1995, 34ff.

⁸⁷ Salles 1988.

⁸⁸ Nevertheless the detailed discussion of the question in Schachermeyr 1973, 443ff. is very useful. Sceptical about the ignorance concerning Scylax is also Bosworth 1995, 36f.

⁸⁹ It is true that the ancients believed, and this belief continued until the 17th or 18th century, that rivers rather commonly divided and flowed in different directions, but to use here the hypothesis of the Indus dividing into two arms, one flowing to the Arabian Sea and another being the upper course of the Indus, seems to me to make the whole reasoning much too vague.

⁹⁰ On behalf of the Aristotelian *Liber de inundatione Nili*, preserved only in a late Latin version, Tam 1948, 86 argued that the belief that the Indus was the upper course of the Nile had become common among the later Achaemenids. See also Bosworth 1995, 35f.

continuous confusion between India and Ethiopia, after Jewish and Christian speculation about the rivers of the garden of Eden, we again hear that the Nile originates in India and has its sources near the Hydaspes.⁹¹

A parallel case is found in the extreme north, where the Jaxartes (Ἰαξάρτης, now Syr Darya) and the Tanais (Don) were thought to be the same river.⁹² In the Greek view, the Don was thought to be the boundary between Europe and Asia.⁹³ To us this is a blatant error, but for Macedonian imperial propaganda it was very useful, and it was definitely corrected only by Eratosthenes. With its help it became possible to claim that Alexander had thus reached the very end of Asia in this direction. Nicanor, in a curious, but somewhat doubtful fragment (F 2, from Stephanus of Byzantium), connected the Tanais both with the Jaxartes and with the Acesines in India.

The confusion of Alexander's men about the Jaxartes is understandable, at this time Greeks probably had no previous knowledge of the region and the river. Even the Oxus (Ὦξος, or oftener Ὠξος, Iranian **Vaxšu*, now Amu Darya) became known by this name only now, although in earlier sources it might lie behind the mysterious Araxes.⁹⁴ It was said to be the greatest river of Asia after those of India (Arrianus, *Anab.* 3, 29, 2). Aristobulus (in Arrianus, *Anab.* 3, 2, 2) and others were now able to relate that the Oxus has its sources in the Caucasus, in the confines of India,⁹⁵ but a confusion still remained about the mouths of the river.

The Oxus and sometimes the Jaxartes, too, supposedly flowed to the Caspian Sea (Aristobulus?, Patrocles).⁹⁶ When the Jaxartes-Tanais hypothesis was dropped, the sea was supposed to be a gulf of the Northern Ocean and thus a kind of parallel to the Persian Gulf (Eratosthenes with reference to Patrocles). Of the Aral Sea Alexander's companions seem to have had no knowledge at all.⁹⁷ For Herrmann (1942) the question seemed

⁹¹ In India, Procopius, *De aedificiis* 6, 1, 6 and Theophylactus Simocatta 7, 17, 302B. On the Hydaspes, Theop. Simoc. 7, 17, 310B.

⁹² E.g. Strabo 11, 7, 4, Plutarch, *Al.* 45f. and *De Alex. virt.* 2, 335E & 341C.

⁹³ See e.g. Curtius 6, 2, 14; 7, 7, 2; 7, 8, 30; cf. Herrmann 1916, 1184, Pearson 1960, 14f. & 75ff., Hamilton 1971, Schachermeyr 1973, 398f., and Bosworth 1995, 31f.

⁹⁴ On the Oxus in classical sources see Herrmann 1942 (on the Araxes in 2007f.) and Myśliwiec 1968. A curious reflection of the Herodotean eastern Araxes is perhaps seen in the *Tabula Peut.*, where the Armenian Araxes circles the Caspian in the south, flows eastward parallel to the Oxus south of it and after a very long course finally discharges itself into the Eastern Ocean. See Herrmann 1938, 48, in addition to Miller 1929 the map is reproduced in Herrmann 1938 as pl. IV:3 and (better) in André & Filliozat 1986, 220f. The Araxes problem has been recently discussed by Bosworth 1995, 28ff.

⁹⁵ As the difference between the Hindukush and the Pamir was not understood, we can also accept the Paropamisus of Ptolemy 6, 18, and perhaps the same was already meant in the account of Aristoteles (*Meteor.* 1, 13) claiming that the Araxes originates in the Parnassus. The Caucasus also in Polybius 10, 8, 48. The confusion between various names of mountains probably led Dionysius Periegetes (747f.) to state that its origins are in the Hemodus Mountains. Pliny (6, 48) has its *ortus in lacu Oaxo*. Cf. Herrmann 1942, 2012f.

⁹⁶ For Aristobulus see Pearson 1960, 179 note 179; Patrocles F 6 in Strabo 11, 11, 5.

⁹⁷ Herrmann 1916 and 1942, 2009, Tarn 1951, 491ff., Pearson 1960, 14f., 75ff., 93ff. & 163f., and Hamilton 1971. The idea of the Caspian being an inlet of the Ocean also provided an erroneous argument against the wrong theory identifying the Jaxartes with the Don (Pearson 1960, 14f.).

solved. Old dry beds west of the present Amu Darya show that at one time the ancient Oxus really did flow to the Caspian, but now the geologists seem to assert that it did so only in remote prehistoric times and had long before Alexander assumed more or less its present course.⁹⁸ Sometimes an underground passage was involved in explanations. In local folklore there is a similar belief in an underground connection between the Oxus and the Gilgit river, a tributary of the Indus.⁹⁹

The Cophen (Κωφήν, Κωφής) and other western tributaries of the Indus system are described by Arrianus (*Indica* 4, 11f.), who probably obtained his account from Megasthenes (F 9a). The river has been identified by Lassen.¹⁰⁰ The name Cophen, or more commonly Cophes,¹⁰¹ is clearly of local origin. It clearly corresponds somehow to OIA Kubhā (since the Rigveda (later Kuhū). Perhaps it is a vr̥ddhi formation, OIA *kaubh-*, MIA *kobh-*.

Among its tributaries the Soastus or Suastus¹⁰² is the OIA Suvāstu (Swat), and the Guraeus or Garoeas¹⁰³ is Gaurī (Pañjkora). The latter name is also used for the united course of the two rivers. The account in the *Anabasis* described the difficulty of crossing the Guraeus because of its depth, rapid current and rounded, slippery stones, which all well suits a mountain river (Kiessling). Both names reappear in Ptolemy (7, 1, 42) as names of countries, Σουαστηνή and Γουρβαία.

The Choes (Χόης) or Choaspes (Χοάσπης) are probably to be identified with the Kunār. The name Choaspes has apparently been adapted to the more familiar Choaspes of Susiana. Another related name seems to be the Coas (Κῶας) of Ptolemy, but this has been described as the main river.¹⁰⁴ Either Ptolemy has forgotten the main river (Cophen) or rather Coas stands here for the Kabul.¹⁰⁵

⁹⁸ Spuler in *Mél. J. Dénys* 1958, 231ff. For earlier discussion see also Tam 1951, 491ff. André & Filliozat 1980, 70 seem to consider ancient literary evidence more reliable than geology.

⁹⁹ Tam 1951, 541 (note to p. 491) quoting Markwart, *Wehrot und Arang* 1938, 9 & 113.

¹⁰⁰ Lassen 1874, 673f. (1852, 668f.; cf. McCrindle 1877, 192f.).

¹⁰¹ Cophes in Strabo 15, 1, 26; Pliny, *N. H.* 6, 21, 62; 6, 23, 78; 6, 25, 94; Dionysius Perieg. 1140; Cophen in Arrianus *Anab.* 4, 22, 6 & 5, 1, 1, *Ind.* 4, 11; Philostratus, *V. Ap.* 2, 6 & 8. The river is discussed by Wecker 1922, 1361f., Tucci 1977, 42ff., and Hinüber 1985, 1099.

¹⁰² Σόαστος in Arrianus, *Ind.* 4, 11, Σουάστος in Ptolemy 7, 1, 26.

¹⁰³ Γουρβαίος in Arrianus, *Anab.* 4, 25, 7, Γαροάας in Arrianus, *Ind.* 4, 11. The Soastus is briefly discussed in Hermann 1932, 471, the Guraeus in Kiessling 1912, 1944f., both also in Wecker 1922, 1361f. Both identifications already in Lassen 1874, 140 (1852, 131f.), again Tucci 1977, 44f., and Hinüber 1985, 1099.

¹⁰⁴ Choaspes in Strabo 15, 1, 26, and Curtius 8, 10, 22, Choes in Arrianus, *Anab.* 4, 23, 2, Coas in Ptol. 6, 18, 2; 7, 1, 26, 28 & 42.

¹⁰⁵ Choes and Choaspes have been commonly identified with the Kunār, see e.g. Lassen 1874, 136f. (1852, 128f.), Tomaschek 1899, 2354f. & 2356, McCrindle 1901, 31, Wecker 1922, 931. Lassen (*ibid.*) supposed that the name Coas is identical with Choes, though the Kabul river (at least after its confluence with the Kunār) is evidently meant. This has been supported by McCrindle 1885, 86f., and Wecker 1922, 931. However, the identity of the Coas with the Choes is not so clear. Hinüber 1985, 1099 compares the name with the Kuhū of epics and Purāṇas, a name for the Kabul. Tucci 1977, 47 accepted the Kunār for Choes and Coas, but explained the Coaspes as an Iranian form **hu-aspa* corresponding to the Suvāstu (Swat).

A lesser river is the Malamantus (Μαλάμαντος or Μαλάντος) in Arrianus, *Ind.* 4, 11.¹⁰⁶

Next come the rivers of the Pañjab. The identification of their names mentioned in classical sources was begun by A. W. von Schlegel as early as 1826.¹⁰⁷ The first of them, the Hydaspes (Ἰδάσπης) is the present-day Jhelam, ancient Vitastā (since the *Rigveda* 10, 75, Pāli Vitaṃsā), a name still used in Kashmiri as Vyath.¹⁰⁸ It is the Bidaspes (Βιδάσπης) of Ptolemy (7, 1, 26), a form closer to the Indian name. It has been suggested that the first form probably came from Iranian interpreters, as *hy-* is the normal Greek equivalent for Iranian *vi-*.¹⁰⁹ For the curious change *st* > *sp* Charpentier (1927, 117ff.) suggested a local Iranian dialect with such a change and cited a few parallels from Eastern Iranian (Ormuri, a loanword in Brahui, some OIA words, which could be explained in this way as Iranian loanwords). These few examples are hardly convincing, all the less so as an Iranian population by the Jhelam is conjectural and rather unlikely east of the Indus. There is another way to explain the Iranian origin of the Greek Hydaspes. While it remains an unproven hypothesis that the Pañjab was part of the Achaemenid empire, it seems rather certain that the Indus country was. And even beyond the frontier the Jhelam was so near that there must have been an established Iranian name for it. And while this name might well have been borrowed from the local OIA Vitastā, it easily became adapted into a more Iranian-looking form, **Vidaspā*.

After the Indus and the Ganges the Hydaspes was the best known among Indian rivers.¹¹⁰ In late poetry (e.g. Latin of the Imperial period) its name appears often enough to provide readers with an idea of India.¹¹¹ On its bank was fought the famous battle with Porus, described in all histories of Alexander. When the Macedonian army arrived, the river was high and turbulent because of heavy rains and the melting snow of the mountains. The crossing on the eve of the battle is often described colourfully. After the battle Alexander founded the twin cities of Bucephala and Nicaea on the opposite banks of the river. Later he built there his river navy and sailed down the river. In this lower part of its course it often had high banks and was said to be never less than 20 stadia in

¹⁰⁶ Briefly discussed in Lassen 1874, 140, 3 & 674, Wecker 1922, 1362, Herrmann 1930a, 828, Stein 1932, 288, and Tucci 1977, 43f. Lassen's OIA *malavant-* 'black' or Stein's *mālāvati* do not help much.

¹⁰⁷ See further Lassen 1827 and 1874, McCrindle 1877, 191f. (and on the Hydaspes 1896, 93, note 1), and the *RE* articles (by Tomaschek, Kiessling, and Treidler) quoted below.

¹⁰⁸ Derived from MIA **Vihatthā* by Charpentier 1927, 115f. In Islamic sources the river is called Bihat or Wihat (Stein 1932, 288). The name was first discussed by Schlegel 1826, 303f. A good summary and discussion of classical accounts is found in Kiessling 1916.

¹⁰⁹ Hystaspes (Vištāspa), Hydarnes (Vidarna) and other cases already in Herodotus.

¹¹⁰ There is no end to a list of references to the Hydaspes. In addition to those mentioned elsewhere in this chapter see e.g. Arrianus, *Anab.* 5, 4, 2f.; Strabo 15, 1, 3; 15, 1, 17 (Aristobulus F 35) and 15, 1, 27; Diodorus 2, 37 (Megasthenes F 4); Mela 3, 69; Pliny 6, 21, 62 & 6, 23, 71; Dionys. *Perieg.* 1139.

¹¹¹ Horace, *Carm.* 1, 22, 8; Seneca, *Herc. Oet.* 628; Lucanus, *Phars.* 8, 227; Statius, *Theb.* 9, 441; for further references see André & Filliozat 1986, 440 (index s.v. Hydaspes).

breadth.¹¹² Many studies of the topography have been written, but although the river is said to have changed its course much less than the other rivers of the Pañjab (Kiessling 1916, 35), even the location of the battle-field is still controversial.

Since the days of Ctesias (F 45, 6) it was "known" that Indian rivers contained precious stones. In poetry this was often connected with the Hydaspes, occasionally also with other rivers. The river is called *gemmifer* by Seneca and Statius, but Pliny applied the same epithet to the Acesines and Ganges.¹¹³

Next comes the Acesines (Ἀκεσίνης, now Chenab or Cīnāb, the ancient Candrabhāga or Asiknī), the Sandabal (Σανδαβάλ, perhaps for *Σανδαβάγ) of Ptolemy.¹¹⁴ The *Cantabra* (this, too, apparently from Candrabhāga) and the Acesines are mentioned as separate rivers by Pliny. Pliny also gave an account of giant reeds and of the Indian fig-tree (banyan) on its bank.¹¹⁵ A nice hypothesis supported by textual evidence from Hesychius makes the Macedonians abandon the more common Indian name of Candrabhāga (Σανδαροφάγος) because it was interpreted as (Alek)sandrophagos 'Alexander-eater' and thus as a bad omen.¹¹⁶ But we do not really know whether in the Pañjab in the time of Alexander the later name Candrabhāga was more commonly used for the river than the Vedic Asiknī. We also note that originally it was probably rather *Ἀσεκίνης and not Ἀκεσίνης.

Though the Hydaspes was later considered the most important river of the Pañjab, Alexander's men were impressed with the might of the Acesines. Like the Hydaspes its water was high at the time of its crossing by Alexander, carried out with the help of boats and hides. Ptolemaeus described its roaring waters, swift current and great, sharp rocks, which made the crossing dangerous. Arrianus claims that a city was also built on its bank. On its banks Macedonians wondered at the sight of mighty banyan trees and bamboos.¹¹⁷

¹¹² The Porus battle e.g. in Arrianus, *Anab.* 5, 8ff., Diodorus 17, 88f., Curtius 8, 13f.; the cities in Arrianus, *Anab.* 5, 19, 4, Diodorus 17, 89, 6 & 95, 5, Curtius 9, 1, 6 & 9, 3, 23 (cf. II.5 above); the navy in Strabo 15, 1, 19 & 29, Diodorus 17, 89, 4f. & 95, 3ff., Curtius 9, 3, 21ff. (cf. II.4 above); the river voyage in Arrianus, *Anab.* 6, 1ff. and *Ind.* 18ff., Diodorus 17, 96ff., Curtius 9, 4ff.; high banks in Arrianus, *Anab.* 6, 3, 3; and the breadth of the river in Arrianus, *Anab.* 6, 4, 2. In their accounts of commencing the river voyage Curtius and Diodorus erroneously call the river Acesines.

¹¹³ Seneca, *Med.* 725, and Statius, *Theb.* 8, 237; but Pliny 37, 76, 200. On jewels see V.6 below.

¹¹⁴ Arrianus, *Anab.* 5, 5, 5; 5, 20, 8f. (Ptolemaeus); 5, 25, 5; 5, 29, 2; 6, 1, 2, etc.; Strabo 15, 1, 18 (Nearchus); 15, 1, 27; Curtius 8, 9, 7; 9, 3, 20; and 9, 4, 1 & 5; Theophrastus, *H. Pl.* 4, 4, 4; Mela 3, 69; Ptolemy 7, 1, 26f. See Lassen 1874, 674f., McCrindle 1877, 192, 1896, 112, note 3, and 1901, 23, note 2, Tomaschek 1894 and 1899 (Cantaba), Stein 1932, 288, and Hinüber 1985, 1096f.

¹¹⁵ Pliny, *N. H.* 6, 23, 71 (separate rivers); 16, 65, 161f. (reeds); and 12, 11, 23 (banyan).

¹¹⁶ First suggested by Schlegel 1826, 296f. See also Lévi 1934 = 1937, 413, and Goossens 1943, 54.

¹¹⁷ Crossing in Arrianus, *Anab.* 5, 20, 8ff. (Ptol. F 22); city in Arrianus, *Anab.* 5, 29, 3 (cf. *Ind.* 19, 4); banyan in Pliny, *N. H.* 7, 2, 22f.; bamboo in Pliny 16, 65, 162. On a confusion between the Hydaspes and the Acesines in Diodorus and Curtius see above. In addition, the Acesines is mentioned e.g. in Arrianus, *Anab.* 5, 4, 2; 5, 5, 5 (flows southward); 5, 25, 5; 6, 1, 2; 6, 4, 1; 7, 10, 6; and *Ind.* 4, 8ff. (Megasthenes F 9a) & 6, 5 (flooding); Strabo 15, 1, 18 (Nearchus F 18 on flooding); 15, 1, 27; Diodorus 2, 37 (Ἀκεσίνοϋς); Mela 3, 69; Pliny 6, 23, 71; and Dionysius Perieg. 1138. For further Latin references see André & Filliozat 1986, 429 (index s.v. Acesines).

The Hydraotes (Ἵδραώτης) of Arrianus is Ravi, ancient Airāvati (but Vedic Paruṣṇī) It is called the Hyarotis (Ἵραρωτις) by Strabo and *Hiarotis* by Curtius, Arouadis (Ἀρουάδις?) by Ptolemy.¹¹⁸ Hydraotes is probably corrupt, originating from the analogy to the *Hydaspes* and to Greek ὕδωρ, ὕδρ- 'water'. For the more correct Hyarotis one would suppose an OIA **Vīrāvati* rather than *Airāvati* (MIA **Erodī*?). Or perhaps we should follow Lassen and Kiessling and consider it without the vṛddhi as *Īrāvati* (MIA *Īrotī*). Hinüber, however, rejects this, quoting examples of OIA *āvata* giving MIA *āvaa* (obs. Rāvī < MIA *(i)rāvai).¹¹⁹ A parallel to this curious -ao- is found in the Greek name of the Gandhāran town Puṣkalāvati/Puṣkarāvati, *Peucelaotis*.

The Hydraotes Alexander could cross without difficulties and therefore not much is said about this river. Diodorus and Pliny pass over it without mention. On the lower course, near its confluence with the Acesines, Alexander fought the Mallians.¹²⁰

The Hypasis is the modern Satlej/Beas (Biās), the ancient Vipāśā (Vedic Ārjīkīya). A Greek name **Hypasis* is only a reconstruction, the equivalent (with the usual Iranian touch *Hy-*) of the OIA name and the intermediate form of the Hyphasis (Ἵφασις) of Arrianus and the Hypanis (Ἵπανις) of Strabo, Diodorus and Dionysius Periegetes, the Bibasis (Βιβάσις) of Ptolemy (7, 1, 26). In Latin the correct form is found as the *Hypasis* of Curtius and Pliny.¹²¹ It might be significant that in different places Diodorus, merely following his sources as always without bothering too much to think about them, gives both variants: Hypanis in the description of India (2, 37) and Hyphasis in the history of Alexander (17, 93). In his chapter about India he leaned heavily (though not solely) on Megasthenes, while book 17 was a version of the Vulgate, perhaps using Cleitarchus.

This was the place of Alexander's disillusionment,¹²² and the eastern boundary of what was in the Hellenistic period considered to be the reliable geographical knowledge of India. After all, Megasthenes was not entirely believed. It was not fully understood that there was one more river of the Pañjab before the Ganges system. Generally the Yamunā, too, was ignored, and the Ganges was represented as the next river after the Hyphasis.

¹¹⁸ So Renou in Ptolemy 7, 1, 26 & 27. In both passages the name is corrupt, the MSS. readings include ἄ(ν)δριος, (τ)ουά(ν)δριος, ῥουάδιος. Hinüber 1985, 1098 prefers Ῥούαδις. For references to other authors see below.

¹¹⁹ The river is discussed e.g. by Schlegel 1826, 305, McCrindle 1877, 191 note, 1896, 114, note 1, and 1901, 27, note 1, Kiessling 1916, 23f. (as Hyarotis), Hinüber 1985, 1097f.

¹²⁰ Crossing in Arrianus, *Anab.* 5, 21, 6 (briefly Curtius 9, 1, 13), lower course in Arrianus, *Anab.* 6, 7ff. Further references to the river e.g. in Arrianus, *Anab.* 5, 4, 2; 5, 5, 5; 5, 25, 5; 5, 29, 2; 7, 10, 6; *Ind.* 3, 10 & 4, 8; Strabo 15, 1, 21 & 27. Diodorus 2, 37 do not mention it.

¹²¹ Hyphasis also in Diodorus 17, 93, 1, and Philostratus, *V. Ap.* 3, 1. Hypanis in Diodorus 2, 37. It has been suggested that Hyphasis was used by Ptolemaeus, Hypanis by Aristobulus (e.g. Pédech 1984, 395). In Latin the form *Hypanis* is found in several late sources, see André & Filliozat 1986, index s.v. For other references see the following note. On the river see Schlegel 1826, 305f., McCrindle 1877, 191 note, 1896, 120, note 1, & 281, note 2, and 1901, 32, note 1 & 44, note 2, Kiessling 1916, André & Filliozat 1980, 90f., Brunt 1984, 460, and Hinüber 1985, 1097.

¹²² Arrianus, *Anab.* 5, 24ff.; Curtius 9, 1ff. Further references, in addition to the preceding note, in Arrianus, *Anab.* 5, 4, 2; 5, 5, 5; 5, 29, 2; 6, 14, 5; 7, 10, 6; *Ind.* 2, 8 & 4, 1; Strabo 11, 11, 1; 15, 1, 3; 15, 1, 17; 15, 1, 27; 15, 1, 32; 15, 1, 37; Pliny, *N. H.* 6, 21, 62 and 6, 23, 71.

Thus the Satlej (Vedic Śutudrī, epic Śatadru) came to be known only later. We must suppose that Megasthenes knew of it (he had to cross it), but its identification in the long lists of Indian rivers is not easy.¹²³ At least it was known to Pliny (*N. H.* 6, 21, 63) as Sydrus (not Hesidrus), and in Ptolemy (7, 1, 27) we find the name Graecized as Zadadrus (Ζαδάδρος, variant Ζαράδρος). But before we consider further the position of the Satlej, we must discuss the confluences of the Pañjab rivers.

The confluences of the Pañjab rivers were described by Alexander's historians, when they were come across during the river voyage of Alexander. Ptolemy in his *Geography* (7, 1, 27) briefly gave their supposed co-ordinates. These cannot, however, be compared to the present situation as the rivers have often changed their courses. The first meeting was the confluence of the Hydaspes and the Acesines. Its dangerous rapids have been described in most histories of Alexander.¹²⁴

Next came the confluence of the Acesines and the Hydraotes,¹²⁵ then the final confluence of the Acesines and the Indus.¹²⁶ Arrianus (*Ind.* 4, 10) asserted that at their confluence the Acesines is thirty stadia in breadth and thus greater than the Nile or the Ister (Danube).

An interesting question arises with the name of the combined river of the Pañjab. In the sources connected with Alexander's campaign the Acesines is generally considered the main stream, which absorbed the other rivers and kept its original name until the confluence with the Indus. This is unanimously asserted by Arrianus, Diodorus, Curtius and Justinus.¹²⁷ In time the might of the Acesines, however, was forgotten, and the importance of the Hydaspes as the place of Alexander's greatest battle in India (as it was considered) grew, so that in the Roman period we often find the Hydaspes as the main stream keeping its name until the confluence with the Indus.¹²⁸ Much later the Jhelam is also called the main river by al-Bīrūnī (Kiessling 1916, 36). A third, entirely different theory is given by Ptolemy. In his system the Zadadrus was the main river, the Bidaspes (which had incorporated the Sandabal and the Aruadis) and the Bipasis its tributaries. This new system as well as the new names he has for all these rivers – they are closer to the Indian names and lack the Iranian element seen in the names established during the campaign of Alexander – show clearly that he had new, independent information about the Pañjab.¹²⁹

¹²³ See Brunt's note on Arrianus, *Ind.* 4, 12; Treidler 1967 (Zaradrus).

¹²⁴ Arrianus, *Anab.* 6, 4, 4 – 6, 5, 4 and *Ind.* 4, 9; Curtius 9, 4, 8ff.; cf. Diodorus 17, 97, 1; briefly mentioned also in Arrianus *Ind.* 18, 11; cf. McCrindle 1896, 137, note 1, and Bunbury 1879, 508f.

¹²⁵ Strabo 15, 1, 21 (Aristobulus), Arrianus, *Anab.* 6, 5, 7 and 6, 14, 4f. and *Ind.* 4, 8; McCrindle 1896, 139, note 3 and 155, note 1.

¹²⁶ Arrianus, *Anab.* 6, 14, 4 – 6, 15, 1.

¹²⁷ Arrianus *Anab.* 6, 14, 5 (quoted below) and *Ind.* 3, 10 and 4, 8f. (Megasthenes F 9a), confirmed by Curtius 8, 9, 7 (*Indus... Acesines eum auget*). Diodorus and Justinus are not so "unzweideutig" as thought by Kiessling 1916, 36. Arrianus, *Anab.* 6, 3, 1, too, is somewhat unclear.

¹²⁸ Pliny, *N. H.* 6, 23, 71 *Indus... undeviginti recipit amnes, sed clarissimos Hydaspem quattuor alios adferentem*; further Lucanus, *Phars.* 3, 236 and Dionysius Perieg. 1138f.

¹²⁹ Cf. Kiessling 1916, 36f.

Problems have been caused by the fact that the ancient hydrography of the Pañjab did not always conform to the present situation. As is well known, the Beas is now a western tributary of the Satlej, which then joins the Chenab well below the confluence of the Ravi. The most clear account of the hydrography of Alexander's historians is given by Arrianus: "The Hydaspes runs into the Acesines, and pouring in its whole stream takes the name Acesines; then again the Acesines meets the Hydraotes and, taking in this tributary, retains its own name; next it takes in the Hyphasis, keeping its own name till it runs into the Indus."¹³⁰ This can be well combined with the present situation, if we take the Beas and the lower course of the Satlej as one river, but in the Megasthenian account (F 9a in Arrianus, *Ind.* 4, 8f.) the Hyphasis is a tributary of the Hydraotes.

In the same passage Megasthenes gives the Hyphasis or the Hydraotes two tributaries, the Saranges (Σαράγγης) and the Neudrus (Νεῦδρος). The confluence of the Hydraotes and the Hyphasis is situated in the region of the Astrybae, that of the Saranges coming from the Cecians and of the Neudrus coming from the Attacenians in the region of the Cambistholoi, as is also the confluence of the Hydraotes and the Acesines. According to an emendation by Roos, this Neudrus should be changed to Sydrus, mentioned by Pliny as the first river beyond the Hypasis, which seems to refer to the Satlej.¹³¹

Other lesser tributaries of the Indus and of the Pañjab rivers are mentioned by Arrianus, who derived his information from Megasthenes.¹³² Despite the topographical studies of the 19th century and efforts by several scholars, their reliable identification is mostly very difficult and we shall not here go into the matter.¹³³

¹³⁰ *Anab.* 6, 14, 5 ἀλλὰ ὁ Ὑδάσπης μὲν ἐς τὸν Ἀκεσίην ἐμβάλλει, ἐμβαλὼν δὲ τὸ πᾶν ὕδωρ Ἀκεσίην παρέχεται καλούμενον· αὐτὸς δὲ ὁ Ἀκεσίης οὗτος ζυμβάλλει τῷ Ὑδραώτῃ, καὶ παραλαβὼν τοῦτον ἔτι Ἀκεσίης ἐστί· καὶ τὸν Ὑφασιν ἐπὶ τούτῳ ὁ Ἀκεσίης παραλαβὼν τῷ αὐτοῦ δὴ ὀνόματι ἐς τὸν Ἴνδον ἐμβάλλει. Kiessling 1916, 232 claims that this is the common opinion of Alexander's historians, but his other references – Arrianus, *Ind.* 3, 10, Strabo 15, 1, 32, Diodorus 2, 37, and Pliny 6, 23, 71 – do not clearly say whether the Hypasis joins the Hydraotes first or the Acesines directly.

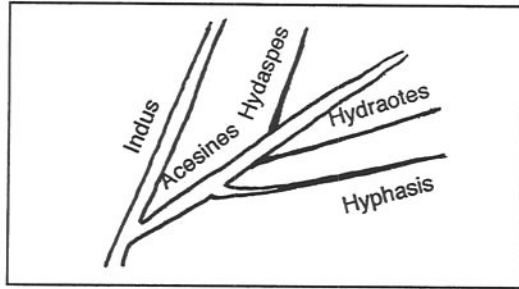
¹³¹ These have been variously explained by scholars. As was stated above, Kiessling 1916, 232 (s.v. *Hypasis*) ignores the passage, while in Kiessling 1916, 23 (s.v. *Hyarotis*) he judged it corrupt. Tomaschek 1896, 1862 (s.v. *Astrybai*), too, wanted to correct Arrian (who had probably misunderstood Megasthenes) according to the present system. In a way Wecker 1922, 117 (s.v. *Kekeis*), too, seems to have done this, when he without further comment made the Saranges a tributary of the Zadadrus/Satlej and identified it with the Soan/Sudāman. Roos in his edition emended the Neudrus to Sydrus (Pliny), Hinüber (1985, 1099) accepted this, Brunt (1983, ad l.) did not. Stein 1937a, 147 (s.v. *Neudros*) accepted Roos and identified the Neudrus with the Satlej, while Herrmann 1920, 2392 (s.v. *Saranges*) explained the Saranges as a tributary of Sydrus/Satlej with the Soan. The names of peoples in our passage are hard to explain, with the exception of the Cecians, who are probably the Kekaya of the *Mbh.* (so Lassen, 1874, 170f., Wecker 1922, 117). Entirely unacceptable is the method used by many Indologists during the 19th century to explain names used in classical literature with Sanskrit etymologies never actually found as place-names. Thus we can dismiss Lassen's (1847, 58 & 1874, 675) *navodra* 'nine waters' and Tomaschek's *anudra* 'wasserarm' for the Neudrus.

¹³² Megasthenes F 9a in Arrianus, *Ind.* 4, briefly Pliny, *N. H.* 6, 23, 71.

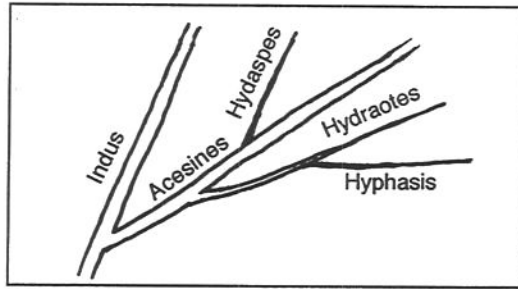
¹³³ See e.g. McCrindle 1877, 191ff. notes; Stein 1932, 288f.; Hinüber 1985, 1099f.; and the *RE* articles under the individual names (like Stein 1948, 1496 on the Tutapus).

The Rivers of the Pañjab according to Greek Authors

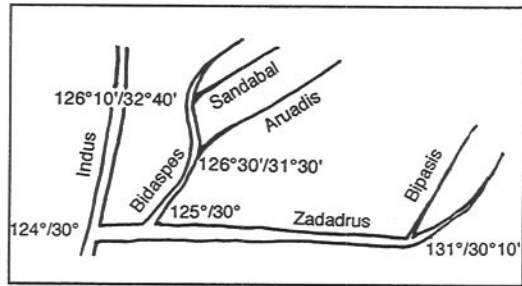
1. Arrianus, *Anabasis* 6, 14, 5
(Alexander's historians).



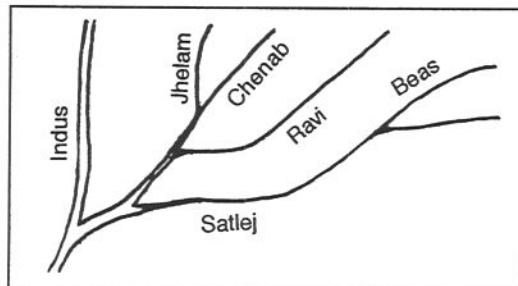
2. Arrianus, *Indica* 4, 8f.
(Megasthenes F 9a).



3. Ptolemy, *Geography* 7, 1, 27
(with coordinates of the confluences)



4. Modern situation.



To the Southeast of the Pañjab flows the unseen greatness of the Greek tradition: the Ganges (Γάγγης < OIA Gaṅgā).¹³⁴ Despite Tarn, Alexander most probably knew of its existence, although only Megasthenes produced an exact description of the great river of India.¹³⁵ Beginning with Megasthenes, who had himself seen the mighty river, it was pronounced to be the greatest river in the world, but the older tradition giving the same honour to the Indus is also frequently mentioned. The contamination of sources went so far that in many cases the same authors give both opinions.¹³⁶ However, according to Arrianus, Megasthenes and all authors who mention the Ganges deem it greater than the Indus.¹³⁷ While others claimed a north-south direction for the Ganges (like the Indus), Megasthenes knew better.¹³⁸

The sources of the Ganges were located in the Caucasus or the Emodoi Mountains, though even Megasthenes probably had little reliable information about them, and others were simply guessing.¹³⁹ Pliny described the rapid upper course of the river and its violent descent to the plains.¹⁴⁰

The measurements of the Ganges were often grossly exaggerated. While Megasthenes gave 100 stadia (approx. 18.5 km) as its average breadth, Arrianus stated this as the minimum. According to Strabo, other authors (ἄλλοι λέγουσιν) gave the minimum as 30 stadia (approx. 5.5 km) or even 3 stadia. Diodorus does not mention whether his 30 stadia are a minimum or an average. An average of 100 stadia is also given by Pliny and a minimum of 8 Roman miles (approx. 12 km). Mela gives a minimum of 10 Roman miles.

¹³⁴ *Pulcher Ganges* in Vergil, *Georg.* 2, 138; for other references see notes below, for a modern discussion of the Ganges and of the Gangetic system see e.g. Lassen 1874, 675f. (1852, 670f.), McCrindle 1901, 19, note 4, and 77 notes, Kiessling 1912, 703ff., Stein 1932, 289ff., Brown 1957, 20ff. & 1973, 143f., and Hinüber 1985, 1090ff.

¹³⁵ Tarn 1923 & 1948, 85 & 1950, Appendix 14, opposed by Meyer 1927 and Schachermeyr 1955. Kienast 1965 leaves the question open, but see again Bosworth 1995, 42f.

¹³⁶ Strabo 15, 1, 13 (the Indus and the Ganges are the greatest rivers of India, the Ganges the greatest); and 15, 1, 35 (Megasthenes; the Ganges is the greatest of all rivers, and the Indus comes next to it); Diodorus 2, 11, 1 (the Ganges is the greatest river in Asia), 2, 35 (the Indus is the largest of all rivers after the Nile), and 2, 38 (the Indus is nearly equal to the Ganges); Arrianus, *Ind.* 3, 9 (the Ganges and the Indus are the greatest in Asia), and *Anab.* 5, 6, 7 (the Ganges is the largest river in Asia); Curtius 8, 9, 5 (*Ganges omnium ab Oriente fluvius maximus*), and 9, 2, 2 (*maximum totius Indiae fluminum*); Mela 3, 68 (*Ganges omnium maximus*), and 69 (*Indus... paene Ganges magnitudine exaequat*); Pliny 6, 21, 60 (the Ganges is greater than the Indus). By greatness was always meant the breadth; André & Filliozat 1980, 86 err in supposing that *minorem esse Gange* in Pliny 6, 21, 60, refers to the length.

¹³⁷ Megasthenes F 9a in Arrianus, *Ind.* 4, 2 τοῦ Ἰνδοῦ τὸν Γάγγεα μέγθει πολὺ τι ὑπερφέρειν Μεγασθένης ἀνέγραψε, καὶ ὅσοι ἄλλοι μνήμην τοῦ Γάγγεω ἔχουσιν.

¹³⁸ To the south e.g. Diodorus 2, 37; Curtius 8, 9, 5. To the east Strabo 15, 1, 13.

¹³⁹ The Caucasus Strabo 15, 1, 13; the Emodoi Artemidorus in Strabo 15, 1, 72; Haemodus Mela 3, 68. Pliny, *N. H.* 6, 22, 65, referred to two opinions: some say that its sources are as little known as those of the Nile, others locate them in the Scythian mountains.

¹⁴⁰ Pliny, *N. H.* 6, 22, 65: *cum magno frangore ipsius statim fontes erumpere, deiectumque per scopulosa et abrupta, ubi primum molles planities contingat, in quodam lacu hospitari, inde lenem fluere*. Then follows the account of its measurements (see below). For the reading *fontes* see André & Filliozat 1980, 94. Of the mountainous upper course briefly Strabo 15, 1, 13.

The depth is variously given as 20 orgyia (approx. 35.5 m) by Strabo and as 20 paces (approx. 29.5 m) by Pliny. Interesting, though this, too, is grossly exaggerated, is the account of Aelianus, who at least can distinguish between the upper and lower courses of the river. The former should thus have a breadth of 80 stadia and a depth of 20 orgyia, but for the lower course the grossly exaggerated numbers of 400 stadia and 60 orgyia are given.¹⁴¹

In the Hellenistic period, even for Megasthenes, the mouths of the Ganges were known only by hearsay. In different sources it was supposed to have one, five or seven branches.¹⁴²

Of the other rivers of India we do not hear much. Many tributaries of the Ganges are listed by Arrianus in the *Ind.* 4, 3ff. and Pliny, *N. H.* 6, 21, 64f. The Iomanes (Ἰωμάνης restored according to Pliny against the MSS. form Ἰῶβαρης, < Yamunā) is mentioned e.g. by Arrianus (*Ind.* 8, 5, but not in *Ind.* 4) among the tributaries of the Ganges. According to Pliny, it joins the Ganges between the towns of Methora (Μέθορα < OIA Mathurā) and Chrisobora.¹⁴³ In Ptolemy (7, 1, 29) Διαμούνας seems to be derived from the MIA Jamunā.

Further the ErannoBoas (Ἐραννοβόας) and the Sonus (Σῶνος) of Arrianus and Pliny seem to have acceptable Indian models.¹⁴⁴ Thus the Ἐραννοβόας seems to be derived from MIA Hirañāvāha (OIA Hiraṇyavāha) and modified according to a supposed Greek etymology;¹⁴⁵ the Σῶνος corresponds to the Indian Śoṇa. According to the *Amarakośa* (1, 13, 534), the Hiraṇyavāha is simply another name for the Śoṇa, the modern Son. At the confluence of the Son and the Ganges, or of the ErannoBoas and the Ganges was situated Pāṭaliputra. Thus it seems that somehow our sources have made two of the one river.¹⁴⁶ Most of our information on these rivers comes originally from Megasthenes (F 9ab), who undoubtedly was well informed.

¹⁴¹ Strabo 15, 1, 35, including Megasthenes F 9b; Diodorus 2, 37; Arrianus, *Ind.* 4, 7; Pliny, *N. H.* 6, 22, 65; Mela 3, 68; Aelianus, *N. An.* 12, 41. Cf. André & Filliozat 1980, 94f. (who also give the modern equivalents of these measurements). According to Hinüber 1985, 1091, the Ganges is at Varanasi at low water approx. 430 m, at high water 1000 m, with the depth of 10–12 and 16 m.

¹⁴² One Strabo 15, 1, 13. Five Ptolemy 7, 1, 18. Seven Mela 3, 68 (*in septem ora dispergitur*) and Vergil, *Aen.* 9, 30f.

¹⁴³ Pliny, *N. H.* 6, 22, 69 *amnis Iomanes in Gangen per Palibothros decurrit inter oppida Methora et Chrisobora*. Chrisobora is the same as Arrianus' Cleisobora, but all attempts at identification have been entirely unconvincing. On the Iomanes see also Lassen 1784, 676 briefly, Wecker 1916, Hinüber 1985, 1110. In Curtius 8, 9, 8 *Iomanes* is only a modern emendation, the manuscripts have *in mare*.

¹⁴⁴ Arrianus, *Ind.* 4, 3; Pliny, *N. H.* 6, 22, 65. On the ErannoBoas see Schlegel 1826 & Kiessling 1909; on the Sonos Wecker 1929. See further Lassen 1874, 676 (1852, 671), McCrindle 1877, 63f. notes; Stein 1932, 289; and Hinüber 1985, 1092.

¹⁴⁵ Greek ἔρανος 'lovely' and βοή 'sound, roar'. Therefore we need no sound law (as required by Hinüber 1985, 1093) for βοας < vāhā.

¹⁴⁶ Thus it has been explained by the majority of scholars. However, André & Filliozat 1980, 94, compare the ErannoBoas to the Hiraṇyavatī, a northern tributary of the Ganges.

Oxymatis, as the name is commonly read according to Schwanbeck's emendation (the MSS. have Ὀξύμαγίς), seems to correspond to OIA Ikṣumatī, the modern Kalinadi, perhaps through MIA *Ucchumatī.¹⁴⁷

For the Diardanes mentioned by Curtius (8, 9, 9) in the remotest part of India even the Brahmaputra has been suggested, but also the Yamunā. It seems to be the same as the Oidanes, a tributary of the Ganges, of Strabo (15, 1, 72 from Artemidorus; also in Pliny). Both rivers were said to have dolphins and crocodiles.¹⁴⁸

The Comminases (Arrianus, *Ind.* 3, 9) can probably be derived from MIA Kamma-nāsā, OIA Karmanāsā, modern Karamnāsa.¹⁴⁹ Lassen further identified Kainas as the Kena, Kondochates as *Ghaṇḍakavatī, and Cacuthis and Erennesis as the Kākuttha and Vārāṇasī. Further, the Solomatis is perhaps Śarāvātī, modern Rapti.¹⁵⁰ *Ghaṇḍakavatī, however, is a reconstruction; only Ghaṇḍakī is attested in OIA for the modern Gandak, while Cacuthis is perhaps really derived from MIA (Pāli) Kakuṭṭhā, Kakutthā, Buddhist Sanskrit Kukusthā.¹⁵¹

Megasthenes (F 9a in Arrianus, *Ind.* 5, 2) stated that the total number of Indian rivers was 58. In the early Imperial period Seneca (F 2 in Pliny 6, 21, 60) knew of 60. Arrianus (*Ind.* 5, 2) felt a healthy suspicion with regard to such exact figures. We know 36 of these names.

5. *Airs, Waters, Places*¹⁵²

Much was written by Alexander's companions and other authors about the Indian climate, and special interest was shown in the question. Background is given in the Hippocratic *Airs, Waters, Places* and other Greek water theories (in Herodotus, and the Peripatetics). A related theme was the supposed similarity between India on the one hand and Egypt and Ethiopia on the other, and its reasons.¹⁵³

¹⁴⁷ Arrianus, *Ind.* 4, 5. Schwanbeck 1846, 34f., Lassen 1874, 656 (1852, 671), Stein 1942, 2040f., and (with MIA reconstruction) Hinüber 1985, 1092. With Greek ὀξύς 'sharp' and the common equivalence Iranian vaxšu > ὀξυ- we perhaps need no Indian explanation. Hinüber rightly rejects Tarn's Issumai (1951, 144 referring to K. H. Dhruva) for Ἴσσομαί (i.e. *icchumai < Ikṣumatī).

¹⁴⁸ The Brahmaputra Lassen 1874, 677 & McCrindle 1896, 184, note 2; the Yamunā Stein 1937, 2102f.

¹⁴⁹ Lassen 1874, 676, Wecker 1922, 1194, and (with the MIA form) Hinüber 1985, 1093.

¹⁵⁰ All in Lassen 1874, 656 (1852, 671), see also McCrindle 1877, 188ff. (note), Garbe 1883, 456f. (about the Erennesis) Wecker 1922, 1194 & 1310 (ss.vv. *Kommenases & Kondochates*).

¹⁵¹ Hinüber 1985, 1093f. The case of the Erennesis he rightly dismissed, and hesitatingly accepted the Solomatis.

¹⁵² This chapter bears the English name of the Hippocratic treatise Περὶ ἀέρων ὑδάτων τόπων, a pioneer and classic of Greek climatic theories.

¹⁵³ See e.g. Brown 1949, 95ff., Arora 1982a, also Bolchert 1911.

Most of India was supposed to be alluvial plain.¹⁵⁴ Here a scientific argument was (quite correctly) attempted by Nearchus, who compared the Indus valley with Egypt and with some alluvial plains of the Near East created by much smaller rivers than the Indus and the Nile. Megasthenes and others apparently explained the waste plains around the Ganges in the same way.

Special attention was paid to floods in India. Alexander and his army traversed the Pañjab during the monsoon and had to cope with them. While the Hydaspes was successfully crossed during the battle, Alexander had first to withdraw before the flooding Acesines. Aristobulus, too, wrote about floods and rivers changing their course.¹⁵⁵ Megasthenes saw the flooding Ganges and said that cities were built of wood because of floods.¹⁵⁶

Opinions surprisingly differed as to whether there were rains in India or not.¹⁵⁷ That there should be no rains was part of pre-Alexander legendary knowledge, mentioned by Ctesias (F 45, 5 & 18),¹⁵⁸ but it should not have survived Alexander's campaigns. One factor that indicated the existence of rains was that even during the arid season snow was seen in the mountains. And, of course, Alexander's men had experienced heavy rains in the Pañjab, and the whole question thus seems absurd. It has been suggested that Aristobulus was just senile when he much later wrote his book and claimed that rains occur only in the mountains, but not on the plains of India. But in this very fragment we read of rains in Taxila and of heavy rain in the Pañjab. These were apparently included among the mountains and their foothills, and the rainless areas were situated in the arid lower course of the Indus, where in modern times the annual rainfall is only 5–20 inches and occasionally even less, while the upper part of the Pañjab receives 40–100 inches.¹⁵⁹ Perhaps the parallel of Egypt had some influence, too, as Aristobulus said that both countries were watered by the rivers. Other authors (such as Nearchus) often spoke of summer rains, and even of two rainy seasons, in the winter and in the summer.

A related argument arose on the question as to whether fertility was dependent on rains or on rivers, and more particularly on general moisture or on some special quality of water. All the time we get the impression that the time of the year when Alexander was in

¹⁵⁴ Nearchus F 17 in Strabo 15, 1, 16; Arrianus, *Anab.* 5, 6, 3f. Nearchus also referred to Herodotus' account (2, 5) about the importance of the Nile for Egypt. See also Bosworth 1995, 34ff.

¹⁵⁵ Arrianus, *Ind.* 6, 6, and Nearchus F 18 in Strabo 15, 1, 18 on the Acesines; Aristobulus F 35 in Strabo 15, 1, 19

¹⁵⁶ Flooding is the only way to explain his exaggerated account of the breadth of this river. Cities built of wood in F 17 in Arrianus, *Ind.* 10.

¹⁵⁷ Strabo 15, 1, 13 (Eratosthenes) & 17 (Aristobulus F 35) & 18 (Nearchus F 18 and Aristobulus F 35 again) & 24 (Onesicritus et al.); Diodorus 1, 41, 7 (Agatharchides *FGrH* 86, F 19), 2, 36, 4 (rainy season twice a year) and 17, 94, 3; Curtius 8, 9, 13 (snow in summer) and 8, 13, 46 (rains); Arrianus, *Anab.* 5, 9, 4, and *Ind.* 6, 4ff.; cf. Lassen 1874, 678f., McCrindle 1896, 184, note 1; Brown 1949, 102f.

¹⁵⁸ Dihle 1962, 102 suggested that Ctesias simply projected the Egyptian situation onto India, but for the lower Indus country the claim is perhaps not too far from the truth (cf. Lambrick 1975, 102).

¹⁵⁹ Annual rainfall map in Davies 1959, 81; see also Lambrick 1975, 4.

India (the rainy season in summer) had a great influence on the opinion of the climate.¹⁶⁰ Two rainy seasons, one in the winter and one at the summer solstice, were suggested by Diodorus (2, 36), who had apparently taken for granted winter rains “just as in other nations” in the case of India, too, while summer rains were observed during Alexander’s campaigns.¹⁶¹ A little later Diodorus praises the regularity of the rainy season in India. This must be due to Megasthenes – Alexander had experienced the full monsoon in the Pañjab, but the next summer in Sind there was hardly any rain at all.

It seems that the Macedonians were really impressed by the similarity of the Nile valley and the Indus valley. Probably the similarity was striking indeed, for people accustomed to the circumstances in Greece. A great agricultural land with a subtropical climate entirely dependent on one great river – for Greeks and Macedonians this was something new and remarkable. No wonder that the case was somewhat exaggerated. The parallel of Egypt was taken seriously enough and occasionally purely Egyptian features were ascribed to India (e.g. hippopotami by Onesicritus and Philostratus). Egypt’s southern neighbour Ethiopia was often included in the comparison. Thus it was stated that the Indians of the South were dark and resembled Ethiopians (cf. the Eastern Ethiopians in Herodotus), while those of the North were more similar to the Egyptians.¹⁶²

All agreed on the exceptional fertility of India. At an early period it had already become a τόπος. Herodotus knew of it as well as Ctesias.¹⁶³ The opinions of Alexander’s historians and of Megasthenes were summarized by Eratosthenes and preserved for us by Strabo.¹⁶⁴ According to Brown (1957, 22f.) Megasthenes is here at his worst, copying the exaggerations of Alexander’s historians against his own experience, but actually he seems to give at least one piece of genuine Indian information when he refers to ripening as coction (ἔψησις instead of πέψις), apparently translating *pāka*, an Indian term for ripening. The favourable climate of India was supposedly the reason not only for two annual crops, for a great number of sweet fruits and large animals, but also for a taller stature, the exceptionally good health and long life of the Indians, often mentioned in our sources since the early period.¹⁶⁵

An extreme case of the enormous fertility ascribed to India was the more or less fabulous country of Pandaea (Πανδαίη, perhaps corresponding to the Pāṇḍya in the very

¹⁶⁰ See Brown 1949, 100ff. on fertility and water theories in Onesicritus. Also Pearson 1960, 104, 120ff. on Nearchus (note 122 note 35) & 174, Hinüber 1985, 1103f. Pédech 1984, 170f. emphasizes the correctness of Nearchus’ account. See also Pliny, *N. H.* 17, 30, 133 on climate and horticulture.

¹⁶¹ See the note ad l. in Murphy 1989, 48.

¹⁶² Arrianus, *Anab.* 6, 9, Strabo 15, 1, 13 and 15, 1, 24, et al., cf. Brown 1949, 95ff., and Arora 1982b, 472.

¹⁶³ Herodotus 3, 106, Ctesias e.g. F 45, 28. See Karttunen 1989a, 122ff. on τόποι.

¹⁶⁴ Strabo 15, 1, 13 & 20 (with Megasthenes F 8 at the beginning). Cf. Diodorus 2, 36.

¹⁶⁵ On height and health, see Diodorus 2, 36, Arrianus, *Ind.* 17, and Pliny, *N. H.* 7, 2, 22; on health, also Ctesias F 45, 32, Nearchus F 10a in Arrianus, *Ind.* 15, 12, and Megasthenes; on age Ctesias F 45, 32 (120 or even 200 years) and F 52 (in Pliny 7, 2, 28f. on the Pandarae, cf. Karttunen 1989a), Onesicritus F 11 in Pliny 7, 2, 28 (130 years in shadowless i.e. southernmost India) and F 24 in Strabo 15, 1, 34 (in the country of Musicanus). In the land of long life and extremely good health illnesses were rare and the physicians had little else to do than cure snake bites (V.5 below).

south of India), where everything, fruits as well as humans, mature earlier, but also decay earlier than elsewhere. Megasthenes¹⁶⁶ further claims that the Pandaeon women married at the age of seven, which has been connected with the early history of child marriages in India. A late passage in the *Mahābhārata* mentions ten or seven as the recommended age of marriage for girls (and 13 or 21 for men).¹⁶⁷ But here the girls are still girls (*nagnikā*), of their early maturity we hear nothing.

Among the pre-Alexander sources Ctesias seems to have been fond of wells, and his *Indica* contains several miraculous wells of India. Among them the Silas (F 47 ab) is also found in later literature (including Megasthenes F 10ab). It is variously described as a well or a river, but the miraculous property of its water was always the same.¹⁶⁸

The violent tides of the sea and the lower course of the Indus were often noted in our sources.¹⁶⁹ To Alexander's men, who were accustomed to the smooth waters of the Mediterranean, they were a cause of great wonder and danger. Of the monsoon winds, which were noted by Nearchus and his crew, we shall have more to say in chapter VII.2 below.

The idealized notion of Indian nature and the Indian climate led Diodorus to make the erroneous claim that India was never visited by famine. To quote a modern commentator, "then as now, the occasional failure of the monsoon rains had dire consequences for the food supply."¹⁷⁰

Extreme heat and the intensity of the sun in India was an old *τόπος*, mentioned by Herodotus (3, 104) and Ctesias (F 45, 12). After Alexander's campaign it became an issue of scientific argument. A problem of academic interest in connection with India and Ethiopia was the cause of a dark complexion. While the Eastern Ethiopians of Homer cannot be Indians, Herodotus (7, 70) located them somewhere in the neighbourhood of India and claimed that they do not differ much from other Indians. In another place (3, 101) he said that Indians are of the same colour as Ethiopians. Both were also supposed to have black semen. Ctesias rightly assured his readers that there are both dark and blond Indians

¹⁶⁶ Megasthenes (F 13a) is found in Arrianus (*Ind.* 9, 8, see also F 13bcd). When Pliny (7, 10, 28f. = Cleitarchus F 23) says the same (mature at seven, die at 40) of the Mandi, we are entitled to suspect a corruption of the name (which is not unusual in Pliny).

¹⁶⁷ Hinüber 1985, 1111f. The *Mahābhārata* 13, 44, 13:
triṃśadvarṣo daśavarṣām bhāryām vindeta nagnikām |
ekaviṃśativarṣo vā saptavarṣām avāpnuyāt ||

¹⁶⁸ See Karttunen 1985 and 1989a. In this connection we may also note the late tractate on miraculous wells (*De fontibus mirabilibus*), although it contains curiously little on India (a fragment of Ctesias [F 45sβ] on the spring Ballade).

¹⁶⁹ Arrianus, *Anab.* 6, 18ff., and *Ind.* 6, 7 & 21, 3; Curtius 9, 9, 9ff.; Diodorus 17, 106, 6; Strabo 7, 2, 1f. (Cleitarchus F 26) & 16, 3, 5f. (Nearchus F 27 and Orthogoras F 5). See also McCrindle 1896, 367f., and Schulze-Gävernitz 1931, 33f.

¹⁷⁰ Diodorus 2, 36, commented on by Murphy 1989, 48. As the whole account has been commonly derived from Megasthenes' *Indica*, this has caused some uneasiness for scholars who suppose that Megasthenes should have known better. We have already pointed out that not everything in Diodorus 2, 35ff. hails from Megasthenes. Murphy (*ibid.*) ascribes the present passage to Eratosthenes.

and concluded from this eye-witness account that the heat of the sun could not be the cause of dark skin.¹⁷¹

The sun theory, however, was not abandoned, though some peculiarity of Indian and Ethiopian water was also suggested as a possible cause.¹⁷² At the same time it was commonly known that despite their dark colour the Indians differ from Ethiopians in not having curly hair. Eratosthenes (in Strabo 15, 1, 13) explained this by the moistness of Indian air. This difference of hair led Strabo himself in 15, 1, 24 to reject the water hypothesis and accept the old sun theory. It was rightly noted that whatever the cause was, it appeared already in the embryonic stage so that children were born similar to their parents.

While the main arguments and facts hail from the early Hellenistic period, the discussion continued. To take just two examples, Dio Chrysostomus, a rhetorician living about 100 A.D. used old bricks to build a new utopia in India, where rivers flow with wine, honey and oil.¹⁷³ A much less favourable idea of the hot Indian climate was expressed by Galenus, the famous physician of the second century A.D., in his treatise *De temperamentis* 2 (Kühn 2, 618). Black-skinned Indians became a τόπος which is often found in later literature.¹⁷⁴ Especially in Roman poetry there is no difference between Indians and Ethiopians. The two ethnic names can often easily be interchanged, and if a geographical context is given, it may be the wrong one. A late maxim spoke of an Indian or Ethiopian who cannot wash his skin white.¹⁷⁵

It is curious to read an account¹⁷⁶ of unseen northern stars (the Great Bear) and shadows falling southwards in India, but such is related by several historians of Alexander. At the time of Alexander's campaigns Eudoxus and Aristoteles had already established the idea of a spherical earth as a part of Greek science, and the astronomical observations of Eudoxus in Egypt and at home in Cnidus had shown the related phenomenon of stars changing with latitude.¹⁷⁷ In the same way it was already established in theory that to the south of the equator shadows fall southwards.

Following Schulze-Gävernitz (1931) we shall discuss the accounts in three groups, related to the Indus mouths, to South India and Taprobane, and to a place somewhere in the interior. The first group is represented by Nearchus and Onesicritus. The statement of

¹⁷¹ Ctesias F 45, 19, cf. Pliny, *N. H.* 6, 22, 70.

¹⁷² Onesicritus F 22 in Strabo 15, 1, 24.

¹⁷³ Dio 35, 18–24 (also in McCrindle 1901, 175ff.). A river of honey in India is mentioned as early as Ctesias (F 45, 29; cf. Karttunen 1989a, 187). As milk and honey also flowed in Indian accounts of the happy land of Uttarakuru, we might perhaps here have a reflection of Amometus' almost entirely lost book about the Attacori (Pliny, *N. H.* 6, 20, 55).

¹⁷⁴ See e.g. Aelianus, *V. hist.* 1, 15; Arrianus, *Ind.* 1, 2; Himerius 18, 15; Libanius, *Epist.* 1495, 2.

¹⁷⁵ *Anthol. Graeca* 11, 428; Aphthonius 6; Themistius, *Orat.* 32, 359; Syntipas 41.

¹⁷⁶ These accounts are fully discussed by Schulze-Gävernitz 1931.

¹⁷⁷ The idea became familiar to Indians, too, though perhaps only through the influence of Hellenistic astronomy. In the 6th century Varāhamihira pointed out in his *Pañcasiddhāntika* (13, 26) that "the people of Laṅkā see the polar star on the horizon; those on Meru at the zenith; those dwelling between see it in between" (*Laṅkāsthā bhūlagṇāṃ nabhaso madhyasthitāṃ ca merugatāḥ | dhruvatārām ikṣante tadantarāle 'ntaropagatāḥ ||*).

Nearchus¹⁷⁸ contains three points: When the ships were steering to the south, it appeared that shadows, too, fell to the south; and at noon they saw no shadows. Many familiar constellations were not seen or appeared very low near the horizon. This is mentioned in connection with the Gedrosian coast, where, in the autumn of the year, it was definitely impossible.¹⁷⁹ Now Schulze-Gävernitz suggested that it was perhaps a general note originating at an earlier stage. It is clearly stated that this was observed on the Indian coast, while the fragment is actually told in connection with a later phase in the voyage, when the navy was already leaving India. According to her, to see no shadow at noon is still possible during about one month in the summer at the Tropic of Cancer. The Tropic lies only a little south of the southeastern point of the Indus Delta, and in 325 B.C. it went 37 km further north and the Delta itself perhaps had an arm further to the southeast. From Arrianus (*Anab.* 6, 17–20) we know that several voyages of exploration were organized by Alexander in the Delta and on one occasion (6, 19, 5) the ships even entered open sea. The chronology is somewhat difficult, but Schulze-Gävernitz (29ff.) presents arguments for placing this early enough for the phenomenon of no shadows at noon to be observed.¹⁸⁰

The problem with this is that while no shadows at noon can be thus explained, she has not explained the question of shadows falling south. But it is possible that the words “they saw” (ὤφθη αὐτοῖσι), which she rightly takes as referring to autopsy, only belong to the part of the account mentioning no shadows at noon. Shadows falling south might be just hearsay. We must also bear in mind that we are not discussing Nearchus’ own full account, but an excerpt, and here it is always possible that something important has been left out.

The related fragment of Onesicritus¹⁸¹ contains several accounts, given as parallels to the phenomenon of no shadows at noon or shadows falling south as observed in Africa. One of these points (the others will be taken up soon) is concerned with Patala, the port of the Indus Delta visited by Alexander. Here again shadows fall south and, what is more, the sun rises there from the west. This is certainly untrue,¹⁸² but when Onesicritus

¹⁷⁸ Nearchus F 1 in Arrianus, *Ind.* 25, 4ff., discussed by Schulze-Gävernitz 1931, 24ff.

¹⁷⁹ Pearson 1960, 15f. & 143f. (and apparently Vincent approx. 160 years earlier, cf. Brown 1949, 99) supposed that not only Onesicritus, but Nearchus, too, had claimed to have seen these phenomena, both trying in this way to emphasize their own achievements, but though we cannot deny some amount of literary embellishment in Nearchus’ account (has there ever been a travel book without it?) this seems rather unfair to our admiral. Bunbury (1879, 548f., referring to similar views of Gossellin) Jacoby (*FGrH* commentary) suggested that Nearchus is here relating hearsay, wrongly explained by Arrianus as his own observation. After considering other explanations, Brown 1949, 100, accepts this, as does Pédech 1984, 197ff.

¹⁸⁰ The same possibility, Alexander actually reaching the Tropic, is mentioned by Brown 1949, 99f. (and before him by Tomaschek 1890).

¹⁸¹ Onesicritus F 10 in Pliny, *N. H.* 2, 75, 184f., discussed by Schulze-Gävernitz 1931, 35ff.

¹⁸² The sun rising in the west is perhaps part of traditional lore about the extreme east. Pliny (6, 24, 87) says the same of Taprobane. But it is possible that Pliny here originally goes back to Onesicritus. We have seen (III.2 above) that part of his Taprobane was closely related to Megasthenes’ India.

also claims that the Bears were only visible during the first part of the night, this seems to be at least to some extent supported by astronomy.¹⁸³

In another fragment Nearchus,¹⁸⁴ too, seems to have claimed that in India neither of the Bears are seen. The context of the fragment, the controversy between Eratosthenes and Hipparchus about the latitude of the southern end of India, makes it likely that this location was also meant by Nearchus. He never went far to the south of the mouths of the Indus, where the sun is hardly overhead, but could have known the phenomenon only from those who did. Onesicritus also knew of Ceylon (see VI.3 below), and it thus seems that the sailors of Sind were familiar both with western (like Nearchus' local pilots) and southern seas. In Pliny's account of Taprobanian navigation (6, 24, 83), which Schulze-Gävernitz (42ff.) derived from Onesicritus, we learn that the Great Bear is not visible and that pilot-birds are used instead of stars.¹⁸⁵ A little later Pliny (*N. H.* 6, 24, 87) stated that in addition to the sun rising from the west, the Great Bear and the Pleiades and even the moon were only briefly visible, but the Canopus was very bright.¹⁸⁶

Another part of Onesicritus' F 10 in Pliny (2, 75, 183) claims that in a place south of the Hypasis (Beas) the sun is vertical at noon and casts no shadow.¹⁸⁷ To accept some truth in this we must go a long way indeed south of the Hypasis.¹⁸⁸ This has been done by Schulze-Gävernitz (49ff.), who points out that Alexander collected information about the more distant parts of India when he was still planning a campaign beyond the river and advancing to the Eastern Ocean. This she connects with another passage of Pliny (*N. H.* 6, 22, 69), a fragment of Baeto (F 4), about Mount Maleus in the interior, where the shadows fall southwards six months in the summer and northwards six months in the winter and the Bears are only seen for 15 days per year. This can only be accepted at the Equator, but with Baeto the Bematist we can hardly go as far as Southeast Asia.¹⁸⁹ This Mount Maleus is said to be situated in the country of the Monaedes and Suari, while another version of the same account in Onesicritus F 10 (Pliny 2, 75, 184) locates it in the country of the Oretes. Schulze-Gävernitz (59f.) connects this not with the Oretae of

¹⁸³ Schulze-Gävernitz 1931, 39f. explains how she was able to check this in a planetarium in Berlin. The result was that at the mouth of the Indus in 325 B.C. Ursa Major was only hardly seen above the horizon and set before midnight. Ursa Minor, however, was still visible, but disappeared in South India, where Ursa Major was again visible (*ibid.* 41f.). Though both constellations are really invisible only to the south of the Equator (*ibid.* 59), this is perhaps enough to explain this and the following accounts.

¹⁸⁴ Nearchus F 16 in Strabo 2, 1, 20, discussed by Schulze-Gävernitz 1931, 40ff. As there is no reason to separate it from the passage discussed above, it can perhaps be used as an argument that Nearchus did not claim to have personally seen shadows falling southwards.

¹⁸⁵ For the pilot-birds, known in the ancient Near East as well as in India see Karttunen 1989a, 27, and Freedman 1973.

¹⁸⁶ See André & Filliozat 1980, 163f.

¹⁸⁷ To this is probably related the F 11 in Pliny, *N. H.* 7, 2, 28, where he says that in the shadowless part of India lives a race of men eight feet tall.

¹⁸⁸ The passage has been explained simply as an example of Onesicritus' imagination by McCrindle 1901, 109, Bevan 1922, 361, and Pearson 1960, 95f. See also Brown 1949, 100. But the error of making this seem to be situated in the neighbourhood of the Pañjab could also have been committed by Pliny.

¹⁸⁹ As did Filliozat 1974b. On the phenomenon, see Schulze-Gävernitz 1931, 59.

Gedrosia, but with the Oratae and Suarattaratae (Suari above) of Pliny 6, 23, 75 living somewhere on the South Indian coast, and the mountain with the Annamalai mountains (*Malaya*) of Kerala. But while a knowledge of Kerala obtained in Sind seems possible, it is much more difficult to accept at the Hypasis.

It remains for us to say a few words about later sources. After quoting Baeto, Pliny says that Megasthenes (F 7b) asserted the same with reference to several locations in India. Another version of the same is given by Strabo, who confirms that the South of India was meant and adds that Daimachus opposed this.¹⁹⁰ The invisibility of the Bears and many other familiar stars adds another touch of exoticism to the fantastic travel account of Jambulus in Diodorus 2, 58, 7. It became part of the idea of India in the West and is thus occasionally referred to in literature.¹⁹¹

¹⁹⁰ Daimachus F 3 and Megasthenes F 7a in Strabo 2, 1, 19 (through Eratosthenes), Megasthenes F 7b in Pliny, *N. H.* 6, 22, 69. The same in Diodorus 2, 35, 2, who adds that in the southernmost parts of India even Arcturus is not seen.

¹⁹¹ E.g. Dio Chrysostomus 53, 7.