

Winds and Coins: From the Supposed Discovery of the Monsoon to the *Denarii* of Tiberius

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Whenever there is any discussion of trade between the Greco-Roman world and India, the discovery of the monsoon is usually mentioned and generally credited to the pilot *Hippalus*, who is for many 'one of the great names in the history of navigation'.¹ The term 'discovery', however, has long been criticized. Sailors do not discover a wind and they do not invent anything when they make use of it; they merely sail with it when it takes them where they want to go. As far back as 1879, Kennedy stressed that the monsoon was common knowledge long before the disputed date when the Greeks, towards the end of the Hellenistic era or at the beginning of the Roman Empire, are supposed to have experienced it: 'The monsoons must have been known from the earliest times to all who sailed along the African and Arabian coast, and the normal trade route from the Persian Gulf to India can never have been along the inhospitable shore of Gedrosia.'²

The two texts on which the idea of a Greek or Roman discovery of the monsoon is built are the *Periplus of the Erythraean Sea* and the end of Book VI of the Elder Pliny's *Natural History*. A recent study of the latter, however, has thrown fresh light on the subject—of which the following are the key passages:³

XXVI [96] Sed priusquam generatim haec persequamur, indicari conuenit quae prodidit Onesicritus classe Alexandri circumnecus in mediterranea Persidis ex India, enarrata proxime a Iuba, deinde eam navigationem quae his annis comperta seruatur hodie. [...]

[100] [...] Postea ab Syagro Arabiae promunturio Patalen fauonio, quem hypalum ibi uocant, peti certissimum uidebatur, XIII (centena milia) XXXII (milia) p (assum) aestimatione.

[101] Secura aetas propiorem cursum tutioremque iudicauit, si ab eodem promunturio Zigerum portum Indiae peteret, diuque ita adnota est, quippe omnibus annis nauigatur. [...]

[104] Indos autem petentibus utilissimum est ab Ocelli egredi, inde uento hippalo nauigant diebus XL ad primum emporium Indiae Muzirim.

XXVI [96]. But before we go on to a detailed account of these countries, it is suitable to indicate the facts reported by Onesicritus after sailing with the fleet of Alexander round from India to the interior of Persia, and quite recently related in detail by Juba, and and is followed at the present day. [...]

[100] [...] Subsequently, it was thought that the safest line was to start from Ras Farrak in Arabia with the favonius (the native name for which in those parts is Hippalus) and make for Patale, the distance being reckoned at 1,332 miles.

[101] The following period considered it a shorter and safer route to start from the same cape and steer for the Indian harbour of Sigerus, and for a long time this was the course followed, until a merchant discovered a shorter route and the desire for gain brought India nearer; indeed the voyage is made every year. [...]

[104] The most advantageous way of sailing to India is to set out from Ocellis. From that port, it is a 40 days' voyage, with the *Hippalus* blowing, to the first trading station in India, Muziris.

In section 100, I have followed Santo Mazzarino,⁴ in adopting the reading *Hypalus*, based on the combined spelling of two manuscripts, rather than the emendation *Hippalus*, which has been wrongly accepted by all editors since Hardouin (1685), 104. Calling a wind '*hypalus*' means in Greek that it comes 'from under the sea', and the idea that a wind can begin from

the depths of the sea (as others come from the exhalations of the earth) was not strange in Antiquity. Discussing the ways to predict the weather, the Elder Pliny says that, 'Often also the sea swells in silence and, blown up in unusually high waves, confesses that the winds are now inside it' (XVIII, 359; trans. H. Rackham). Some winds originate from greater depths than others: for this reason the *auster* whips up larger waves than the *aquilo* (II, 228). In the seventeenth century, Ralph Bohun, in an interesting *Discourse Concerning the Origin and Properties of Wind* (Oxford, 1671, p.10), once again considered the generation of winds by the sea or the land to be one of their several origins. As Mazzarino has pointed out, the idea of wind generated by the sea seems to be suitable for the southwest monsoon which blows from the open sea.

On the other hand, in section 104 the reading *hippalus* is in all likelihood the correct one. This is because Pliny's text is based on two different sources which, as was his habit, he transcribed carefully without trying to reconcile them. In section 96 Pliny announces an account divided in two parts. The first derived from Juba (first century BC), who was making use of older sources—probably Nearchus, towards the end of the fourth century, describing the return voyage of Alexander's fleet; the second is a description of the voyage towards south India in the time of Pliny. Thanks to Federico de Romanis, we know that this information was furnished to Pliny by traders between AD 49-52.⁵ Between these two parts, Pliny inserts, in sections 100-1, six lines to describe two intermediate voyages which went further northwards. The first (section 100) went to the mouth of the Indus, and the other (section 101) to the western coast of the Deccan. The spelling *hyppalus*, in section 100, means that this section was coupled with the earlier section (96-9), which pushes back its origin to the Hellenistic sources of Juba. Otherwise, Pliny spells it *hippalus* when he records contemporary information.

In this way Pliny's text helps us trace the transformation of a term which, because its original components were forgotten, was thought to be derived from a proper noun with a similar spelling. So was born the myth of the pilot Hippalus about whom the author of the *Periplus of the Erythraean Sea*, a Greco-

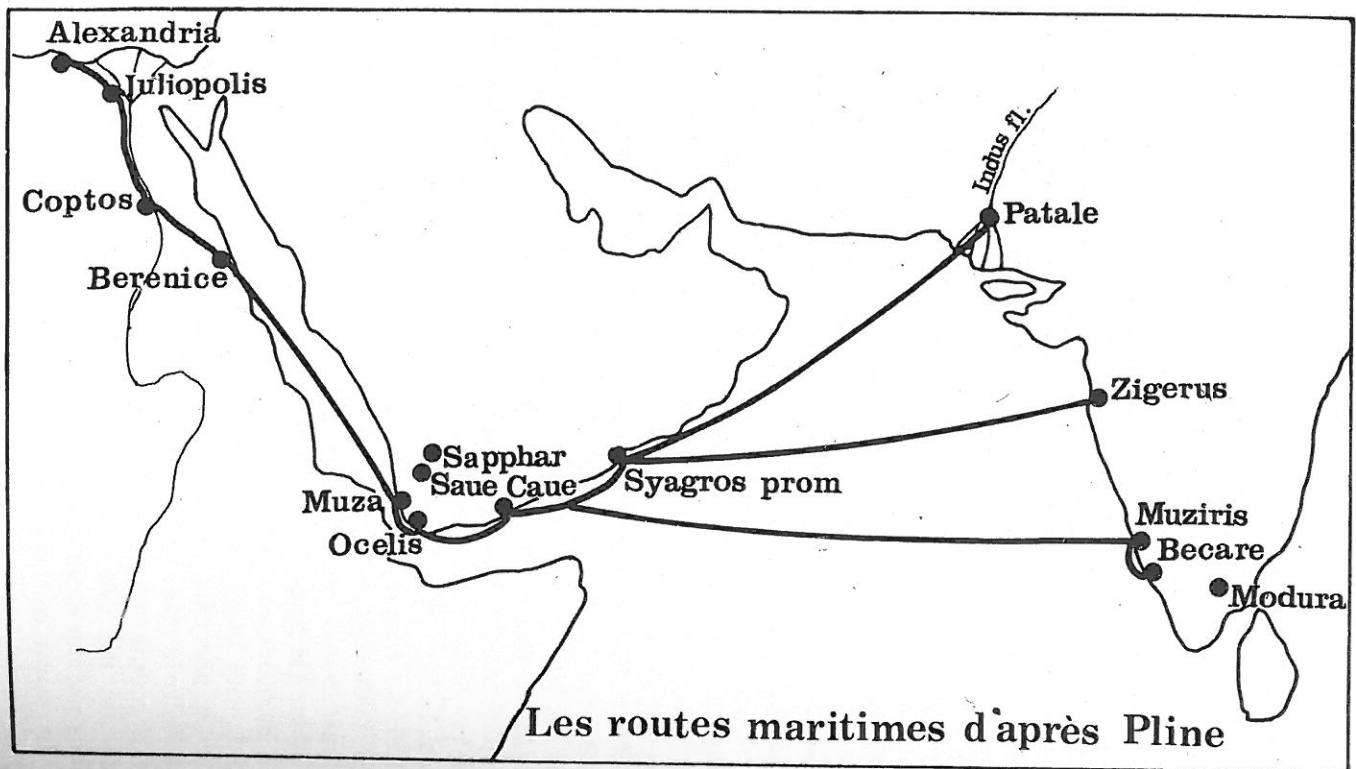
Egyptian merchant who sailed in the middle of the first century AD,⁶ provides us with the other key:

In the past, smaller vessels sailed along the coast from Kanè and Eudæmon Arabia (Aden) following the coastal route that we have just described; the pilot *Hippalus* was the first, after giving thought to the location of the ports and the shape of the sea, to find the route on the high seas. Thereafter, since in this region Etesian winds coming from the sea blow seasonally just as they do in our countries, the south-west wind seems to be called Hippalos, after the first navigator to have discovered the direct sea route.⁷

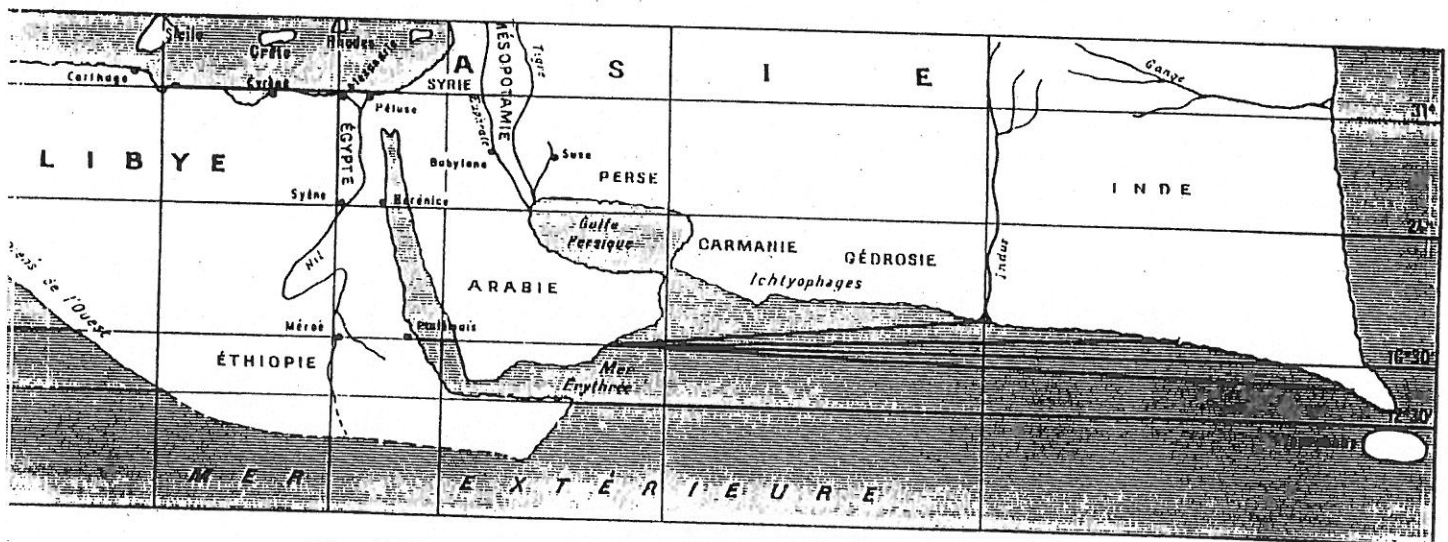
This passage is an obvious clue to understanding Pliny's text and constitutes the basis of the traditional interpretation.

However, while the text indicates that Hippalus must have given his name to the wind used for the crossing, neither the existence of this wind nor the way in which it was used were regarded by the author of the *Periplus* as the discovery of the mythical pilot: his role was that he was the first to open *ton dia pelagous ploun* (or later *ton diaploun*), that is, the crossing of the open sea, after observing neither the South-West nor the North-East monsoon seasons, but the 'location of the ports and the shape of the sea'. Those who wished to interpret this passage as the discovery of the monsoon were obliged to stretch the meaning of the text.⁸ That is true of the two pioneering books by Rawlinson and Charlesworth, whose influence was considerable, in which they claimed that Hippalus had observed the periodicity of the monsoon. A more recent example is the book by Sir Mortimer Wheeler,⁹ another authoritative work, in which he translated *schema thalassês* as 'the condition of the sea' (although twenty years earlier Warrington translated the phrase more literally as 'the shape of the sea') and wrote that, 'without [Hippalus'] discovery, or at least his popularization of the monsoon as a dependable aid to deep-sea voyaging, regular trade with India would have been impossible'. In reality, no ancient text has ever said any such thing. To repeat Curtin's particularly scathing criticism:¹⁰ 'The story is obvious Roman ethnocentric nonsense'. But I would add just one correction: it was not the Romans who indulged in such ethnocentric nonsense but modern commentators.

In point of fact, the Greeks knew of the monsoon



Map 1: Maritime routes according to Pliny, on a modern map.



Map 2: The same, on a map according to Strabo's geography.

independently of the mythical feat of Hippalus, and the oldest Greek sources which describe it are concerned not with navigation but with the climate of India. Alexander's army experienced the monsoon while coming down from the Paropamisadae and around Taxila. Aristobulos, who took part in the expedition, made a careful study of its features as early as the end of the fourth century BC. 'In the time of the Etesian winds', he says, 'the rains pour increasingly and violently from the clouds, both day and night, until the rising of Arcturus' [that is till mid September]. He also noticed the contrast between the rains of the Himalayan foothills and the drought in Sind. Arrian later showed that Nearchus, while bringing back Alexander's fleet, was held up at Patala on the Indus by the Etesian winds blowing from the south and the open sea, which prevented him from navigating along the Gedrosian coast.¹¹ Nearchus had to wait for the northeast monsoon before he could set sail.

Though the Greeks had experienced right from the start of the Hellenistic era what the *Periplus* considered an example of the Etesian winds specific to the Indian Ocean, Pliny's text, as well as the description in the *Periplus* of the transition from coastal navigation to ocean navigation and the vague portrayal of the pilot Hippalus, illustrates clearly an important event for Greco-Egyptian traders and sailors: the opening up of a sea route which no longer went all round the southern coast of Arabia. Instead of just cutting across the Gulf of Oman, it went much more directly towards the Indian coast—either to the Gulf of Cambay or to the Deccan, which meant a long crossing of the open sea—and made possible direct trading between Egypt and India without having to use Arabian ports as transit points.¹²

We need to examine the circumstances that lead to the opening of this route.

The winds do not seem to be an essential element. Sailors used them according to the techniques at their disposal. What really makes a navigator venture on the high seas along an uncharted route is the conviction that he will finally reach his destination. This was the real strength of Christopher Columbus, whom no one credits with having discovered the trade winds. Columbus never doubted for a minute that his caravels would

land at Cipango or India. As Bartolomeo de Las Casas wrote, 'when he made up his mind, he was as sure of discovering what he discovered and of finding what he found as if he had kept it locked in his room'.¹³ But the author of *Historia de las Indias* hints at several explanations for such a deeply rooted conviction, which have ever since been the subject of endless speculation. Was it his faith in the geographical and cartographic work that was the legacy of Marinus Tyrius, that is, the theories of Pierre d'Ailly, Martin Behaim and especially Toscanelli, which shortened the distance of the western route towards India? Or was it the secret he learnt from an 'unknown pilot'? Columbus' biographers can only speculate between these two possibilities.¹⁴ The ancient sources present the historian of Antiquity with exactly the same kind of choice, only this time he has to choose between two figures: the mythical *Hippalus* or the adventurous explorer Eudoxus of Cyzicus.

When the author of the *Periplus of the Erythraean Sea* specifies that the direct route across the Indian Ocean came to be known after observation of the 'location of the ports and the shape of the sea', he saw a geographical reason for this new sea route. Eratosthenes towards the end of the third century BC, and even Strabo, who relied upon him, thought that the coast from the mouth of the Indus to Cape Comorin faced squarely south. Modern historians and editors have delighted in tracing on the current map of the Indian Ocean the various sea routes indicated by Pliny and the *Periplus*: the differences and advantages of each are quite obvious (Map 1). The results of such an exercise would be far less clear on the map of the world as seen by Strabo (Map 2) or even Ptolemy, who, though he was better acquainted with the location of the Gulfs of Kutub and Cambay, considered them to be the southernmost extension of India. It is important for our purpose to note that a passage of the *Periplus of the Erythraean Sea* (section 51) locates the cities more accurately than Ptolemy. Pauthan is twenty days' journey south from Barygaza, the port on the Gulf of Cambay (the actual distance is about 400 km, which accords with the estimate in the *Periplus*), whereas Ptolemy thought it was a little to the north of Barygaza. Greco-Egyptian sailors and traders, therefore, had an empirical knowledge of the orientation of the Indian peninsula, something most geographers failed to

record. Poseidonios was the only one to have correctly oriented the Indian coast along a north-south axis.¹⁵ It is the acquisition of this knowledge that the *Periplus* credits the pilot Hippalus with.

Dihle¹⁶ brought out forcefully what for him was the almost automatic effect on navigation of the knowledge of this north-south orientation of the Indian coast. The advantages of the ocean route became apparent and sailors no longer feared missing India and getting lost in the vast ocean that covered the end of the earth. He believed that with the Bactrian Greeks settling in India, such a realisation was bound to occur. Right from the early decades of the second century BC, the decline of the Mauryan Empire had made northwest India an easy prey for the Bactrian Greeks. In the middle of the second century BC and the ensuing years, Eukratides, though soon assassinated, and Menander occupied a large part of North India, initiating the creation of a number of Indo-Bactrian kingdoms which flourished for a long time after the fall of Ai-Khanoum in 145 BC.¹⁷ Menander's kingdom spread over Sind, including the Indus port of Patala, Gujarat and perhaps Barygaza.¹⁸ Patala and Barygaza were the Indian ports most directly in contact with the Arabian Gulf. Dihle continued with his demonstration by examining the texts for traces or proof of information gathered by the Greeks about the coast further south. Though such evidence is rather flimsy,¹⁹ the probabilities are in favour of his hypothesis. Trade had already linked north- and south-western India.²⁰ Masters of the main Indus port and of a part—a sizeable part, perhaps—of the coast, the Bactrian Greeks settled in India inevitably came to know of the shores further south and they perhaps even explored them.

It remains to be ascertained how the geographical information so gathered was transmitted to the Ptolemaic kingdom. Dihle does not address the issue. On the other hand, since he considers this information to be the reason for Eudoxus of Cyzicus's expedition (to which I shall come back shortly), Dihle mixes the 'Hippalian' version of direct navigation (and its geographical origins) with that of Poseidonios, for whom the Eudoxus expedition was guided by a shipwrecked Indian. If we believe the evidence of the *Periplus* to be proof enough of the fact that the new geographical knowledge was

spread chiefly among traders and navigators, we will have to look at the contacts between people of north Indian and Egyptian harbours.

The *Periplus* (section 26) describes the prosperity of Eudaemon Arabia (Aden) before the time of the direct crossings, when the port acted as a meeting point and warehouse for ships that had set sail from Egypt but were not going to India, and for ships that had left from India but were going no further than the southern coast of Arabia. Once Patala fell into the hands of the Greeks, the Indo-Bactrians must have come into contact with the Greco-Egyptians. The transmission of information, therefore, would have been only natural, as well as the desire by the Greeks to avoid Arabian ports and sailors. Exchanges in Greek between Indian and Egyptian traders and navigators lead to direct crossings which were attributed later on to the mythical Hippalus.

In contrast with the version that I have reconstructed, Poseidonios, with his strange adventures of Eudoxus of Cyzicus, puts forward the hypothesis of an 'unknown pilot'. Towards the end of the rule of Ptolemy VIII Euergetes (182-116 BC), he recounts, the coast guards of the Red Sea found a shipwrecked Indian at death's door and took him to the king. After learning Greek, he told them that, while sailing from India, his ship went off course. All his companions had died of hunger and he was the only survivor who ended up somehow at the place where they found him. Grateful to them for having saved his life, he offered to act as 'the guide of the navigators chosen by the king for the crossing to India'. Among those selected was Eudoxus of Cyzicus, who had for some time been part of the king's entourage, and had developed a keen interest, as geographer and ethnographer, in the regions of the Upper Nile. Hence the expedition has come to be named after him.²¹

Many ingredients are common to Eudoxus' adventure and to that of the 'unknown pilot', a story which was current in Hispaniola, and then in Spain, after Columbus' voyages. During Columbus' stay at Madeira, he is said to have met the captain of a ship who, having been swept along by the storm during his voyage from Portugal to England or Flanders, reached a distant western island from where he managed somehow to come back,

although very ill. Despite Columbus' ministrations, the unknown pilot died, but, while breathing his last, revealed to Columbus the exact information about his route and the island he had discovered.

All in all, there are two parallel sets of explanations for the Egypt-India crossing (which, we must not forget, did not lead to a new land) and for the discovery of America. We cannot hope to reconcile them. In fact, if you take an unknown route, there are only two ways of getting to where you want to reach: either you find a guide, or, basing yourself on the information available, you try and work out the direction and the distance. Ancient history sometimes prefers the easy way out and hence there was an attempt²²—often well received—to combine the two versions by making Hippalus the pilot of Eudoxus' expedition. 'A simple solution, too simple perhaps', as Raschke wrote, 'and one which can never be verified'.²³ The result of this was muddling up the geographical hypothesis and that of the unknown pilot, both of which had in any case been blurred by the idea of the 'discovery of the monsoon'. By making Hippalus vanish from the history of navigation, Mazzarino excludes this theory, at least in the way it is presented.

The point we need to retain is that there was established, probably during the second half of the second century BC, a sea route across the Indian Ocean. This happened when navigators realized that, by following the same parallel (even Mediterranean sailors knew how to do this by using the stars to navigate²⁴), from the Masirah island (referred to as Sarapis in the *Periplus*, north of which the description of the Arabian coast becomes extremely vague), one could enter the Gulf of Cambay, or they could go from Cape Guardafui to Lymirike.²⁵ This crossing had been prepared as early as the second century BC or perhaps even the third century BC by Indian and Arab navigators who had increased the number of sea routes in the northern Indian Ocean. Good evidence for this can be found in Agatharchides' passage about the Fortunate Islands (in all probability Socotra, which is derived from the Sanskrit *Sukhatara dvipa*, 'the most pleasant island'): he regards them as a place where merchant ships met from Persia, Carmania and neighbouring countries, but mostly from Patala on the Indus. The various routes did not all come into use at the same time:

there was a gradually increasing flow of traffic towards south India, where pepper, pearls and beryls were loaded. But one always sailed with the same wind,²⁶ and the monsoon only regulated the seasonal character of the crossings.

Several accounts attest to the fact that from the end of the second or the beginning of the first century BC relations between India and Egypt were easier and more frequent. It is not true to say that there is a complete absence of Ptolemaic coins in India. Berghaus noticed a few dozen of them, along with coins from Asia Minor, and we must not forget that most were bronze coins which caused less attention and were not as well preserved as gold or silver coins.²⁷ Two amphoras from Arkamédu bearing Cnidian stamps were published recently,²⁸ which probably date from the beginning of the first century BC. Isotopic analysis makes us think that western Mediterranean lead was used in the coins found in Central Deccan before the Satavahanas.²⁹ Finally, it has long been observed that the existence in the Egyptian Thebaid of an 'epistategos of the Erythraean Sea and the Indian Sea', at the latest in 62 BC, (or maybe at the latest in 74/73),³⁰ furnishes a good *terminus ante quem* for Lagid interests in the Indian Ocean.

Strabo, who went to Egypt at the time when Aelius Gallus was the prefect between 27-24 BC, spoke eloquently of the second stage in the development of this trade and of the quantitative leap it took after the Roman conquest of Egypt: 'Up to a hundred and twenty ships make their way under sail from Myos Hormos for India, whereas previously, under the reign of the Ptolemies, very few people dared to launch their ships and trade in Indian goods.'³¹ This is a well known text and though one might have some reservations about the figure of a hundred and twenty ships, the general tone is quite plausible in the light of the unbridled taste for luxury in Rome and the success that exotic goods—pepper, silk and pearls in particular—enjoyed there. But I believe we can identify, some thirty years after the stage so well described by Strabo, a third phase of trade, that of Italian traders and silver *denarii*, which may be none other than the last of the phases described by Pliny.

In 1979 Paul Veyne,³² by way of introduction to his brilliant critique of the theory of an automatic return to equilibrium in international trade, examined the two well known passages of Pliny the Elder's *Natural History* concerning the haemorrhage of gold: 'In no year does India absorb less than fifty million sesterces of our empire's wealth, sending back merchandise to be sold with us at a hundred times its prime cost' (VI, 26, 101, trans. H. Rackham). 'By the lowest reckoning India, China and the Arabian Peninsula take from our Empire 100 million sesterces every year—that is the sum which our luxuries and our women cost us' (XII, 41, 84). Pliny, Veyne explains, was certainly well informed, and his figures, based on the Roman customs revenues, cannot be seriously called into question. But while keeping in mind the price of eastern merchandise entering the Roman empire, Pliny did not take into account the price of goods exported to India, since he was not concerned with the problem of balance of trade. He was thinking as a member of a society in which autarky was highly valued. That is why one cannot rely on these passages to argue that the Roman Empire was suffering from a massive haemorrhage of precious metal.

It is difficult to challenge the basic ideas of this argument. However, they can be, and have been, qualified to some extent. As Veyne has shown, Pliny's information could only have been based on what he gathered from the customs services. Ever since the publication of the Vienna papyrus *P. Vindob. G. 40822*³³, dating from the middle of the second century AD, which has preserved a part of the inventory of an Indian cargo and a part of a loan agreement in connection with its transport, we have evidence that a 25 per cent duty was levied on goods coming from India into Egypt. But we also know that this tax was applied to a conventional price fixed for each product. This was certainly not the price Western traders paid to the Indians, which probably no one on the other side of the Ocean knew exactly. The conventional price must have been closer to the price of the goods at the time they were loaded in Alexandria on Mediterranean ships heading for Rome and the Western Mediterranean, in other words, a price much higher than that paid by traders in India. However, custom taxes in the Roman Empire were levied both on imported and exported

goods and there is reason to believe that Pliny's figure was based on the sum of taxes paid on Roman exports, which provided him the information he needed for his purpose. Rather than from the *portorium* accounting offices, he probably retrieved it from the amount paid out for the farming of these taxes: this, as he himself says (VI, 84), was the practice for the *portorium* of the Erythraean Sea.

Bartered goods certainly existed and the *Periplus* draws up a list of such goods. But as André and De Romanis have already stressed, the sources leave us in no doubt about the importance of coins in that period. Regarding trade with Arabia, Pliny (VI, 162) makes it clear that the Arabians sold to the Romans and the Parthians without buying anything from them in exchange and in India there is a Tamil text which speaks of Romans coming with gold and going back with pepper.³⁴ The *Periplus of the Erythraean Sea* mentions gold and silver coins as one of the recommended goods for trade in all the major Indian ports, especially in the southern ones: 'mainly, a great amount of money' (sections 39, 49, 56). I would add that one cannot help comparing Pliny's second text with the letter attributed by Tacitus to the emperor Tiberius, replying to the Senate in AD 22 asking him to decide on the wisdom of promulgating a new sumptuary law (*Ann.* III, 53): 'For on what am I to make my first effort at prohibition and reversion to our ancient standard? [...] The promiscuous dress of male and female—and the specially female extravagance by which, for the sake of jewels, our wealth is transported to alien or hostile countries?' Like Tiberius, Pliny too associated the luxury of jewels with the idea of a massive outflow of money, and while deploring this fact, launched a scathing attack against women. Either Pliny was directly influenced by an idea actually expressed in Tiberius' discourse or it was a *topos* widely used in the middle decades of the first century, or more precisely, an adaptation of an old *topos* on luxury and autarky to a particular set of circumstances. But in one sense Tiberius was more specific than Pliny: while the latter gives a figure in sesterces alone, which makes it possible to think that he only took into account the value of imports, Tiberius said *pecuniae nostrae transfervuntur*—in other words it really was a question of money and the transfer of coins. Clearly both Tiberius and Pliny felt, rightly or wrongly,

that there was a haemorrhage to the east of silver *denarii* and *aurei* from the Roman Empire.

In India about 6,000 Roman *denarii* and over 1,000 *aurei* have been found. This is not an extraordinary figure, since, for instance, about 25,000 republican *denarii* were found in Dacia. But the Roman coins which have come to the knowledge of scholars in India are a mere fraction of the actual number of coins discovered, most of which were melted down. The distribution of the dates of issue, especially for the *denarii*, is very specific and has given rise to an interesting debate.

Out of the 6,000 coins, only one is later than the debasement of weight and fineness by Nero in AD 64. In all hoards, coins of the last issue of Augustus, bearing the effigy of *C. Caesar* and *L. Caesar*, which were minted in Lyon from AD 2 onwards, and the single issue of Tiberius, constitute the overwhelming majority. Bolin added that the coins found in India were in such good condition that they could not have circulated in the Empire: according to him, the coins must have been sent when they had just been struck. Going one step further, Crawford has suggested more recently that only members of the imperial family, or at least high ranking figures, who were in direct contact with workshops where the coins were struck, could have organized this transfer of coins.³⁵ Recent numismatic research,³⁶ however, does not corroborate this provocative and stimulating hypothesis. It is not true that the Roman *denarii* and *aurei* found in India were all unworn coins; most are worn although some are in very good condition. And in the rare cases where a study has been made, there are no die links which ought to exist if Bolin's and Crawford's theories were true. We will thus have to find another explanation for the abnormal composition of the hoards found in India, of which McDowall has made a careful study. The paucity of coins of Caligula, Claudius or Nero's first issue is no more marked in India than in other hoards of the Roman West; on the other hand, the small number of coins of the end of the Republic and the absence of those of Mark Antony, which continued to circulate in large numbers in the Empire are quite surprising. By establishing a relation between the purity of the silver in the coins and their presence in India, McDowall has gone to the root of the problem. The finer coins—those dating from the

end of the reign of Augustus and the Julio-Claudian dynasty until Nero's reform—are the most numerous. Coins from the end of the Republic, which are less fine, are not as frequent, and there are no others, neither those of Mark Antony which have only 90 per cent silver nor those after Nero's reform which have only 93.5 per cent silver.

This relationship between the purity of the coins and their presence in India is clarified by De Romanis' observations on the numismatic culture of the Sinhalese and Indian elite and professional money-changers, who were experts in *nīpasutha*, the science of coinage, which was a part of daily life in India.³⁷ Moneychangers only accepted *denarii* of the best quality. Sture Bolin had already compared the absence of *denarii* of the Flavian era in Germany and India, and assumed that the debasement had lead foreigners to refuse the new coins. The difference is that in Germany the *denarii* came back into circulation after Trajan because, Bolin says, the Germans had no choice. In India, on the contrary, silver *denarii* were completely discredited, and only *aurei* continued to come. Although their weight, like that of the *denarii*, had been reduced, they retained the same purity. Their circulation did fall off for a while, but they were reintroduced in large numbers under Antoninus Pius, as Berghaus has shown.

McDowall also put forward the paradoxical theory (inspired by Bolin's theory on Germany), that nearly all of the Roman *denarii* must have come in India after Nero's reform, where it was particularly in the interest of Roman merchants to use them as articles of trade. This theory has been partly confirmed by the most recent information Berghaus has provided us with. In the Budinatham hoard (Tamilnadu, a district of Coimbatore), one of the worn *denarii* of Augustus bore a countermark of Vespasian. This could only have come in India after the beginning of the Flavian period. But there have been also discovered very recently two hoards which consist entirely of Republican *denarii* and *denari* of the *C.* and *L. Caesar* type, all extremely well preserved: they arrived in the time of Augustus. This leads us to the plausible conclusion that Roman coins began to be used in India in large numbers in the last decade of the Augustus' rule, first the *denarii*, then, particularly from Caligula's reign, the *aurei*. The date of the *Periplus of the*

Erythraean Sea, which was certainly written before AD 70 and more likely at around the middle of the century, and Tiberius' speech in Tacitus *Annales*, prevent us in any case from dating all Indian hoards late. The pre-Neronian *denarii*, selected by merchants after Nero's reform, continued to arrive for a time—perhaps very short—when they could be found, but certainly not after Trajan who withdrew them from circulation. After which the *aurei* were the only coins to be traded, even if in fluctuating quantities.

Lo Cascio,³⁸ who has made a more general study of the effect of Gresham's Law after Nero's devaluation, noticed the paucity within the empire of *denarii* of Augustus, Tiberius, Caligula and Claudius in the hoards during the Flavian era, whereas there was a large number of Republican *denarii*. The best coins, he wrote, must have disappeared, either melted or sent abroad; the hoards contained the next best available, which were preferable, despite being worn, to coins issued after the reform. The composition of the Indian hoards is practically the reverse of what Lo Cascio has described, and one cannot help thinking that the skill of the Indian moneychangers had something to do with it and that a substantial part of the missing *denarii* of Augustus and Tiberius found their way to the East.

For my purpose, I accept that in the decade before the rule of Tiberius a substantial transfer of Roman *denarii* to the other side of the Ocean took place. It seems plausible that about fifteen years later Tiberius became worried and referred the matter to the Senate. In addition, the great majority of the *denarii* have been found mainly in and around the district of Coimbatore. By means of the Ponnani and Cauvery river basins, the district links the Malabar to the Coromandel Coast, the Cera to the Cola kingdom—a geographic advantage that may well explain this concentration. But there is another explanation, which has long been known: the largest Indian beryl mine is located in this area, at Padiyar near Dharapuram. Another *denarii* hoard, found a little further to the N.E., at Koneripaty, is close to another beryl mine, the Vanayibadi mine.³⁹ The *Periplus* mentions beryl among articles exported from Muziris, the major port on the Malabar coast. Here we have a concrete example, perhaps, of Tiberius' remarks linking the export of coins to the luxury of jewels.

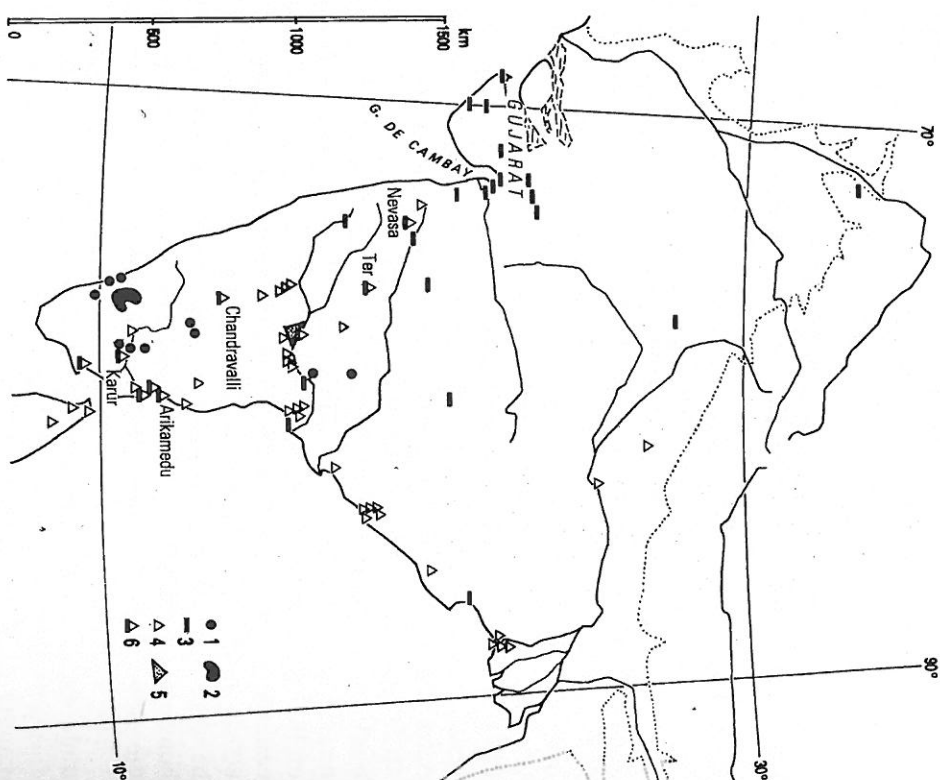
A third kind of evidence also points to the end of Augustus or Tiberius' rule. On the caravan route from the Nile to Berenice, a Red Sea port at the southern extremity of Egypt, the walls of Wadi Menih's rock shelter bear numerous inscriptions, among which are two Latin inscriptions. The first reads 'C. Numidius Eros, on returning from India, stopped there in the month of Pamenoth [between 25 February and 26 March] in the twenty-eighth year of the rule of Augustus [2 BC]; the second, 'I, Lysas, slave of P. Annus Plocamus, came here on the third day before the nones of July in the thirty-fifth year of the rule of Augustus (AD 6 July 5).'⁴⁰ On another rock wall covered with Greek inscriptions and hieroglyphics, in the valley of Wadi Hammamat, between the Nile and the port of Myos Hormos, there are only four Latin inscriptions: three of soldiers and one of a certain C. *Peticus*, who belonged to a merchant family of the Marsi region in Central Italy, and who was probably accompanying a caravan bound for the East or on its way back.⁴¹ This inscription is not dated but all the dated inscriptions in the rock shelter are after AD 9, and the majority belong to the rule of Tiberius. In a book just published, De Romanis provides us with a few more new inscriptions along the same lines,⁴² namely the presence of Italian citizens, slaves or freedmen on the routes of the eastern Egyptian desert in the very last years of the first century BC or in the first years of the next century. Though only a handful of such inscriptions have been found so far, one is bound to note that they date from only a few years earlier than the oldest *denarii* hoards discovered in India.

The active role played by these Italian merchants in eastern trade clears up the paradox of the massive influx to India of *denarii* which were out of circulation in Egypt, compared to the paucity of coins minted in Roman Egypt. We must also remember that, in the thirty years that followed the sudden acceleration of trade noticed by Strabo between 27-24 BC, very few coins arrived in India. It is likely, therefore, that other articles were traded. Strabo, on the other hand, attributes the increase in trade to Alexandrian merchants. A new transformation of a very special type must have taken place in the period from the last few years of the first century BC and in the following fifteen years. Three clues, in less than thirty

years, point to this conclusion. They are, in chronological order, (1) the names left behind in the Egyptian desert by Italian traders, (2) the *denarii* of Augustus, followed by those of Tiberius in South India, and (3) the Emperor's fears about the drain of coins to the east.

In a distant 'crosscultural trade' (to use the title of Curtin's book), both sides play on their differences to obtain what each think are the most favourable terms of trade. A good example of this was the coral plundered by Roman merchants to be shipped off to India; soon there no was no more coral left on the Mediterranean market, for the Indians were willing to pay for it a much higher price than the inhabitants of the Empire.⁴³ De Romanis, confirming Pliny, showed that this article was considered a sacred gift, and even in the first half of the 16th century, coral remained the most profitable item of trade for Westerners.⁴⁴ When Italian merchants took over trade with south India, they were quick to realize that *denarii* too could secure for them good terms of trade.

This process was confined for the most part to a specific group of actors, regions and periods. There is only one Indian hoard in which we find both gold and silver coins—proof that each one had a different role to play. Though the maps showing the distribution of archaeological material in India have to be viewed with a great deal of caution, since the excavations for the period of interest to us are still very few in number, the inferences we can draw are suggestive. Vimala Begley⁴⁵ recently made a study of 'rouletted ware', a ceramic made in all likelihood in south-east India between the second century BC and the second century AD, the bottom of which is ornamented with guilloche. This pottery is spread over the Coromandel Coast as far as Orissa, and travelled up the rivers to Nashik and Nevasa among the Andhras. 'Rouletted ware' is found, on several sites on the Coromandel Coast, but also at Chandravalli, Ter and Nevasa among the Andhras, side by side with Roman amphora fragments (and even more so at Arikamedu, the only place where excavations have been carried out on a large scale). On the other hand, wherever *denarii* hoards are most frequently found, in Kerala and the Coimbatore district, 'rouletted ware' and Roman amphoras are for the moment absent.⁴⁶ Everything seems to suggest that the same articles of trade were not selected



Map 3: 1 Denarii hoards, single site. 2 Denarii hoards, eight sites. 3 Greek or Roman amphora sherds. 4 Rouletted ware, single site. 5 Rouletted ware, eight sites. 6 Amphora sherds and rouletted ware on the same site.

in the regions west and east of the southern part of the Deccan. Karur is the only site where *denarii* hoards, 'rouletted ware' and several (or a single) Roman amphora fragments have been discovered at the same time. The Cera capital appears to have acted as bridge between two different trading systems (Map 3). This does not mean that Italian merchants only used *denarii*, or later *aurei*, as means of exchange nor that they specially sought beryl. The use of coral, as we have seen, proves the opposite—so too, does the presence of Italian wine amphorae at Arikamedu and Nevasa, which can be compared to the bas-relief of a dromedary carrying amphorae found at L'Aquila in central Italy, which I believe can be attributed to the tomb of the Peticii, the Italian trading family who left an inscription in Egypt (see pp. 238-49). But it appears to me that in India the various goods moved along different routes and different networks.

A similar demonstration is possible in other regions. In Gujarat, for instance, there appears to be a larger concentration than elsewhere of sites with Roman amphora fragments (about which we know precious little) although until now only four or five isolated coins at the most have been found dating before the second century BC. The *Periplus* does not give a different picture: trade was not carried out in the same way in Barbarikon in Sind, where all merchandise went up to the king in his metropolis, Minnagar, as in Barygaza and in the southern ports, Muziris and Bakare.

In short, commerce between Rome and India did not constitute a single system; it was compartmentalized both in space and time, for reasons that have to do primarily with the way Western merchants and the articles of trade they had to offer were received in the different regions of India, and it is these differences and developments that we should be looking at in the future.⁴⁷ When Pliny discusses Roman trade with the Orient, the things that are least understood are not his statements referring to the export of 50 million or 100 million sesterces, but the *omnibus annis* and the *nullo anno minus*: to which period of time 'every year' should apply? There is nothing which enables us to state that it holds true for the entire period of the Roman Empire. The haemorrhage of the *denarii* continued for perhaps a century, but the *aurei* did not

arrive as early as the *denarii*. In the following period, Berghaus has noted the paucity of Trajanic and Hadrianic *aurei*, in contrast with the six hoards containing the coins of Antoninus Pius, and later the complete interruption of the arrival of gold after Severus, which was not resumed before the *solidi* of Honorius (AD 395-423). We find the same acceleration and deceleration in the flight of precious metals from the West to the East during the Renaissance and Modern Times: a large amount of gold left in the sixteenth century, less towards the end of that century and the first half of the seventeenth century, and a great deal of silver in the second half of the seventeenth century.⁴⁸ On the whole, Pliny's statements cannot be used as basis for a theory of the long term economic effects of the drain of precious metals to the East for the simple reason that it was not a continuous drain, and that, apart from Pliny's account, the fluctuations can be seen only in numismatic discoveries, which do not permit us to put a figure to them.

On the other hand, we can speculate about the short term effects.

In another part of this book,⁴⁹ Federico De Romanis has brought out clearly the social consequences of the unbridled taste for ostentatious luxury: the not-so-rich senators simply could not maintain the style of living of the wealthier ones, which is why between AD 16-22, they tried in vain to reintroduce sumptuary laws. De Romanis has also analysed how eastern commerce and the considerable resources it brought into play might have caused the monetary crisis of AD 33. Apart from the haemorrhage of coin, the *portorium* revenue of the Erythraean Sea produced a sizeable income for the public treasury (an idea closely akin to the explanation given by Tacitus) and the capital invested in luxury trade became much greater. This contributed to the creation of a difficult financial situation aggravated (or caused?) by the special measures to deal with it described by Tacitus (*Ann.*, VI, 15-17), Suetonius (*Tib.*, 48), and Cassius Dio (58, 21, 1-5). Assessments can differ as to the significance of each of the various factors that lead to this crisis.⁵⁰ Here I simply wish to clarify a point, which is similar to De Romanis' last argument.

The most baffling aspect of the account of this crisis was

that it was triggered off by the reenactment of one of Caesar's laws fixing a maximum ratio between the two conventional components of large fortunes in Rome: money lent on interest and property ownership. The law had ceased to be applied. Tacitus, the only one to describe closely the unfolding of the crisis, believed that the host of informers who suddenly mounted a strong attack against those who carelessly broke the law were those behind its reactivation. Rodewald, preferring to rely on Cassius Dio, believes that Tiberius himself must have brought back this law into force, since he was keen to restore solid Republican virtues, but failed to assess correctly the consequences of his decision.

Let us take for granted two things, which in my view are supported by a large number of texts: first, that the general practice in Roman Italy was to finance any commercial enterprise, especially if it concerned sea trade, by raising a loan; secondly, that the financial strategy of senators was restricted mainly to a choice between purchase of agricultural land (possibly residential property which could be put to rent) and lending money on interest. When Italian merchants decided to launch into trading the products that came all the way from India, more and more people began asking for loans; and despite the risks involved, it appears the profits from such trade were nothing short of spectacular, which sent interest rates soaring. Accordingly, senators revised their financial strategy by favouring moneylending to the detriment of landed estate, a clear departure from traditional behaviour. These excesses certainly attracted attention and they provided ammunition either for 'professional' informers and moralists of all kinds or for Tiberius with his morose temperament. This explanation of the starting point of the crisis of AD 33 concludes my account of one episode (among others) of Indo-Roman trade, whose specific characteristics I have tried to bring out.

NOTES

1. Wheeler, 1955, p. 126.
2. J. Kennedy, *Early Commerce with Babylon*, in *JRAS*, pp. 272-3. There are several other texts along the same lines including Romila Thapar, *A History of India*, London, 1990 (2), p. 107. 'There was

little to discover, since the Arabs knew of it earlier', and Curtin, 1984, p. 97. Other authors, aware of the problem, prefer to speak, like Thiel, 1966, p. 12, of a 'secret of the monsoon', carefully guarded by the Arabs and the Indians, which is not much more satisfactory.

3. Apart from a few modifications, the text and the translation are those in H. Rackham's edition, *The Loeb Classical Library*, 1961.
4. Above, pp. 72-79.
5. Above, pp. 161-163.
6. See the introduction to Casson's edition, 1989, and, for new arguments in favour of a date closer to the middle of the first century AD, Fussman, above, pp. 66-71.
7. *Periplus*, 57. The text and translation of the second phrase present problems of detail that appear to defy all solution. I have given the most traditional translation of the text. A slightly different version can be found in Casson's edition, but the nuances make no difference to the ideas I have accepted subsequently.
8. No doubt carried away by the Latin translation of Muller, Paris, 1853, in which the Greek *schéma* has been translated literally by the Latin *habitus*, leading us to understand 'aspect' rather than 'form' of the sea; see A. Tchernia, *Ad Periplus maris Erythraei* 57, in *Homages Claude Vatin*, Publications de l'Université de Provence, 1994, pp. 131-6.
9. Rawlinson, 1916; Warmington, 1928; Wheeler, 1954.
10. Curtin, 1984, p. 97.
11. Aristobulus cited by Strabo, XV, 1, 17; Arrian, *Anab.*, VI, 21.
12. For the 'verrou arabe' and Eudaemon Arabia, see Désanges, 1978, p. 303.
13. Cited by H. Vignaud, *Histoire critique de la grande entreprise de Christophe Colomb*, 2 vol, Paris, 1911, p. 227, n. 457.
14. H. Vignaud, vol. II, pp. 211-33, was the great advocate of the unknown pilot story. Samuel E. Morison stressed the naval implausibility of the episode in his *Admiral of the Ocean Sea*, Boston, 1942, pp. 61-3.
15. Cited by the Elder Pliny, *NH*, VI, 57; Fr. 212 of the edition of the fragments of Poseidonios by L. Edelstein and I.G. Kidd, 1972; see the latter's commentary, pp. 756-7.
16. A. Dihle, *Der Seeweg nach Indien*, in *Innsbrucker Beiträge zur Kulturwissenschaft*, 1974, pp. 5-13; Id., *Die entdeckungsgeschichtlichen Voraussetzungen des Indienhandels der römischen Kaiserzeit*, in *ANRW*, II, 9, 2, 1978, pp. 546-80 (both these articles appear in the collection of articles by A. Dihle, *Antike und Orient*, Heidelberg, 1984, pp. 109-17 and 118-52).

17. See most recently on this point Cl. Rapin, *Fouilles d'Ai-Khanoum*, VIII: *La trésorerie du palais hellénistique d'Ai-Khanoum*, Mémoires de la DAFI, XXXIII, Paris, 1992; G. Fussman, *L'Indo-grec Ménandre ou Paul Démétride revisité*, in *JdA*, 291, 1-2, 1993, pp. 61-138.
18. Strabo, XI, 1 (516): according to Apollodorus of Artemita, the Greeks 'occupied not only the region of Patala but also, on the rest of the coast, the kingdom of Saraoste and that of Sigeridis'; *Periplus*, 47: coins of Menander were still present at Barygaza in the middle of the first century AD.
19. Aelian, NA, 15, 8, describes the pearl fishery near the city of Perimula in the time of Eukratides. The name of Perimula is mentioned by Pliny as an Indian promontory, NH, VI, 72; while its exact location is difficult to determine, it must be somewhere on the western coast of the Deccan or near Cape Comorin. Ptolemy I, 7, 6, quotes Diodoros of Samos, of whom little is known otherwise, who fixed the position of the constellations, the Taurus and the Pleiades, for ships sailing from Indiké to Lymiriké (the Malabar Coast). It is the only text which does not appear to include Lymiriké in Indiké, and Dihle sees in this the trace of one the first exploratory Greek voyages from the Indus to south of the Indian coast.
20. De Romanis, above, p. 94.
21. Strabo, II, 3, 4. See Thiel, 1966 and Désanges, 1978, ch. X.
22. W. Otto & H. Bengtson, *Zur Geschichte des Niederganges des Ptolemaerreiches*, *Abh. der Bayerischen Akad. der Wissenschaften*, Phil.-Hist. Abt., NF, 17, Munich, 1938, pp. 202-4; Thiel, 1966, p. 18.
23. Raschke, 1978, p. 661.
24. Lucan, VIII, 172-85.
25. Agatharchides 103 (GGM, I, p. 191). See S.M. Burstein's translation and commentary, London, 1989, p. 169, and for these problems De Romanis 1996, pp. 142-3.
26. See De Romanis' remarks, above, pp. 129-30, n. 5.
27. See Berghaus, 1991, p. 108. I am grateful to Peter Berghaus for all his clarifications during his visit to Marseilles.
28. K.W. Slane, *Observations on Mediterranean Amphoras and Tablewares Found in India* in Begley, De Puma, 1991, pp. 204-15.
29. Ray, 1991.
30. L. Mooren, *The Date of SB V 8036 and the Development of the Ptolemaic Maritime Trade with India*, in *Ancient Society*, 3, 1972, 127-33.
31. II, 5, 12. See also XVII, 1, 13, and De Romanis above, pp. 83-84.
32. P. Veyne, *Rome devant la prétendue fuite de l'or: mercantilisme ou*
33. H. Harrasser, P.J. Sijpenstein, *Ein neues Dokument zu Rome Indienhandel*, in *Anz. Phil. hist. Kl. Österreich. Akad. d. Wiss.*, 122, 1985, pp. 124-55; G. Thur, *Hypotheken-Urkunde eines Seedarlehens für eine Reise nach Muziris*, in *Tyche*, 2, 1987, pp. 229-45; *Id.*, *Zum Seedarlehen kata Mouzeirin*, *Tyche*, 3, 1988, pp. 229-33; L. Casson, *New Light on Maritime Loans: P. Vindob G 40822*, in *ZPE*, 84, 3, 1990, pp. 195-206.
34. J. André, J. Filliozat, edition and translation of the Elder Pliny, *Natural History*, VI, 2, Paris, 1980, p. 135; De Romanis, above, pp. 153-4, n. 168.
35. S. Bolin, *State and currency in the Roman Empire to 300 A.D.*, Stockholm, 1958, pp. 72-7; M. Crawford: *Economia imperiale e commercio estero in Tecnologia, economia e società nel mondo romano*, *Atti del convegno di Como*, 27-29 settembre, Como, 1980, pp. 207-8.
36. The following pages are based mainly on P. Berghaus, *Les phases de l'importation des monnaies romaines en Inde*, in *BSFN*, 48, 5, May 1993, pp. 547-9; *Id.*, *Zu den römischen Fundmünzen aus Indien* in *Revue Suisse de Numismatique*, 1992, 226-7 (with a more complete bibliography); *Id.*, *Roman coins from India and their imitations in Coinage, Trade and Economy*, 3rd int. colloquium, Anand Kumar Jha ed., Nashik, 1991, pp. 108-21; P.L. Gupta, *Coins in Rome's Indian Trade*, *ibid.*, pp. 122-37; D. McDowell, *Indian Imports of Roman Silver Coins*, *ibid.*, pp. 145-63; *Id.*, *The Evidence of Roman Coins Found in India*, paper presented at the international seminar *Trade on the Maritime Silk Route: India and the Roman World between the 1st and the 4th Century A.D.*, 20-1 Dec. 1990, Madras; P.J. Turner, *Roman Coins from India*, London, 1989.
37. Above, pp. 182-3.
38. Lo Cascio, 1980, pp. 445-70.
39. For the beryl mines, see De Romanis, above pp. 96-8, and Warrington, 1928, pp. 250-1; Wheeler, 1954, p. 145.
40. For these inscriptions, see De Romanis, above pp. 167-71.
41. Above, pp. 238-9.
42. De Romanis, 1996, *Cassia, cinnamomo, ossidiana*, Rome, pp. 203-59.
43. Pliny, NH, XXXII, 21-3.
44. Above, pp. 188-91 and Villar, 1974, pp. 119-23.
45. V. Begley, *Ceramic Evidence for Pre-Periplus Trade on the Indian Coast*, in Begley, De Puma, 1991, pp. 157-96.
46. No *denarii* hoards have been found on the eastern coast, only a

few isolated coins: two at Arikamedu, one at Mambalam near Madras, and a few more on the Andhra Pradesh coast.

47. For the differences in the economic and social conditions of the various regions in India affected by Roman trade, and for the impact these conditions had on trade, now see Romila Thapar's remarkable article, *Black Gold: South Asia and the Roman Maritime Trade*, in *South Asia*, 1992, XV, 2, pp. 1-27 (in particular pp. 9-19).
48. Vilar, 1974, pp. 120-2. These variations are due to the wild fluctuations of precious metals prices in the West during that period.
49. Above, pp. 119-28.
50. See most recently C. Rodewald, *Money in the Age of the Tiberius*, Manchester, 1976; E. Lo Cascio's review of it in *JRS*, 1978, pp. 201-2 as well as his *Moneta e politica monetaria nel principato*, in *AIN*, 1978, pp. 241-61; M. Crawford, *La moneta in Grecia e a Roma*, Bari, 1986, pp. 122-3 and appendix 6.

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