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GEMSTONES IN THE FIRST MILLENNIUM AD

MINES, TRADE, WORKSHOPS AND SYMBOLISM

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PREFACE

The conference »Gemstones in the First Millennium AD« was organised in October 2015 in Mainz, Germany, within the scope of the project »International Framework – Weltweites Zellwerk – Changes in the cultural significance of early medieval gemstone jewellery considered against the background of economic history and the transfer of ideas and technologies«. The project, the conference and this volume are generously sponsored by the German Federal Ministry of Education and Research (BMBF). The project focuses on garnet jewellery, a European phenomenon of the early Middle Ages. On the one hand, the social and symbolic character of this jewellery style is scrutinised, while another part of the project focuses on eco-historical questions. While the project's results will be published in a separate volume, the present proceedings are a collection of essays, mostly by external authors. Researchers from different countries, such as Germany, England, the United States, Sweden, Norway and Italy and from various fields, such as archaeology, history, philology as well as the natural sciences, contribute to this volume: they present their results on worldwide gemstone research – including, but not focusing on garnet. These speakers, now authors, were selected to help the project members widen their views and »think out of the box« for their own research as well as to integrate their individual research results within a wider context. Trade flows and production methods, but also utilisation and perception were discussed in a cross-cultural and diachronic approach, using gemstones as an example. The conference aimed at three main questions that formed the sessions: »Mines and Trade«, »Gemstone Working« as well as »The Value and the Symbolic Meaning(s) of Gemstones«. The structure of this volume follows the structure of the conference. The chairs of the sessions and the editors of this volume present each of these three chapters with an introduction to the topic. The chairs were chosen as representatives of the three project's joint-partners: The Römisch-Germanisches Zentralmuseum (RGZM) in Mainz, The LVR-LandesMuseum in Bonn and the South Asia Institute of Heidelberg University (SAI). The RGZM has a strong background in provenancing garnets and thus presents the chapter »Mines and Trade«. The LVR-LandesMuseum is focusing on technological questions within the project and therefore describes »Gemstone Working«. The partners from the SAI are philologists and hence qualified to discuss »The Value and the Symbolic Meaning(s) of Gemstones«.

Starting with the idea of bringing together experts from different fields and continents as well as positioning ourselves within the scientific community, we received more than we had dared to wish for: with top-ranking researchers from the wider field of gemstone studies, this conference included interesting presentations in fields that, in the past, were often characterised by isolated research carried out by only few experts. The stimulating discussions during the sessions created new networks and led to the exchange of thoughts across the disciplines.

This conference was organised by colleagues from the RGZM, but our project partners from the SAI and the LVR-LandesMuseum in Bonn played an important role in searching for and selecting the speakers. We are very thankful for their support. We would also like to thank our student assistants Anna-Maria Bojzak, Michael Franz and Andrea Bersch, for helping to organise the conference days. Thanks are also due to Carola Murray-Seegert for proofreading, Dieter Imhäuser for designing the layout, Won Andres for helping with copy-editing, and to the publishing house of the RGZM. Of course, our special thanks go to the speakers and authors whose essays created this volume. We are now fortunate to be able to present these contributions to a wider public.

The Editors

Alexandra Hilgner, Susanne Greiff & Dieter Quast

GEMSTONES AND MINERAL PRODUCTS IN THE RED SEA / INDIAN OCEAN TRADE OF THE FIRST MILLENNIUM

Gemstones, other minerals, and mineral products are perhaps among the least investigated and understood, but at the same time potentially most interesting objects of early trade. This has several reasons. Gemstones and precious metals were durable and had considerable value, both in economic and symbolic terms, and were thus attractive trade goods and status markers. Other mineral products were of strategic importance, such as metals and alloys for making weapons, or held properties that made them truly unique in a world without modern chemistry, such as those used as pigments and for medicinal and magical purposes. With the exception of base metals, such products, with gemstones being the extreme example, combined low bulk with high value, and were thus less hampered by the high transport costs characterising all premodern economies, including that of the first millennium AD¹. As indicated, however, our knowledge of this trade leaves much to be desired. This also has several reasons, foremost that although durable, gemstones and jewellery have, due to their attractiveness, always been reshaped, refitted and remodelled to follow new fashions², while metals have frequently been melted down to create new tools and weapons. The archaeological evidence of gemstones stems mostly from grave goods or from the antiquities market, and thus at best documents the very end of the commodity chain.

This paper addresses the role of mineral products in general and gemstones in particular in the Red Sea and Western Indian Ocean trade in the first millennium AD. Production, distribution and exchange of these products are discussed in light of literary sources, and the gemstone trade is situated within the geopolitical development of the period.

THE WESTERN INDIAN OCEAN IN THE OLD WORLD SYSTEM OF EXCHANGE

In Janet Abu-Lughod's seminal study of the thirteenth-century world-system³, that is the world trade of the time of the famous travellers Marco Polo and Ibn Battuta, she describes the commercial economy of the day as consisting of eight overlapping circuits, together bridging the distance from the Atlantic to the East China Sea (**fig. 1**). The Indian Ocean region is divided into four circuits, the Red Sea and the Persian Gulf, and the Arabian Sea and Bay of Bengal. If we go a millennium back in time, to the early centuries of the first millennium, it arguably makes sense to merge the three western circuits into one, showing the Red Sea, Persian Gulf and Arabian Sea as a single integrated system, reflecting the existence of a Mediterranean Empire in the form of Rome, and a political division between the Persian and Roman Empires dividing the Middle East in Mesopotamia (**fig. 2**). Where to draw the lines, and which circuits and places to include are to some extent arbitrary, being the result of scholarly conjecture. Nevertheless it seems significant that although the commercial centres change over time, the same regions remain important, Venice and Genoa for instance taking over for Rome, Aleppo and Constantinople for Antioch and Palmyra, Baghdad for Ctesiphon and so on. The premodern exchange circuits described by Abu-Lughod were to a large degree the result of factors such as regional wind systems, annual cycles of flood and transhumance patterns in the desert; important commercial centres typically emerged at the junction or at the centre of such naturally influenced circuits.

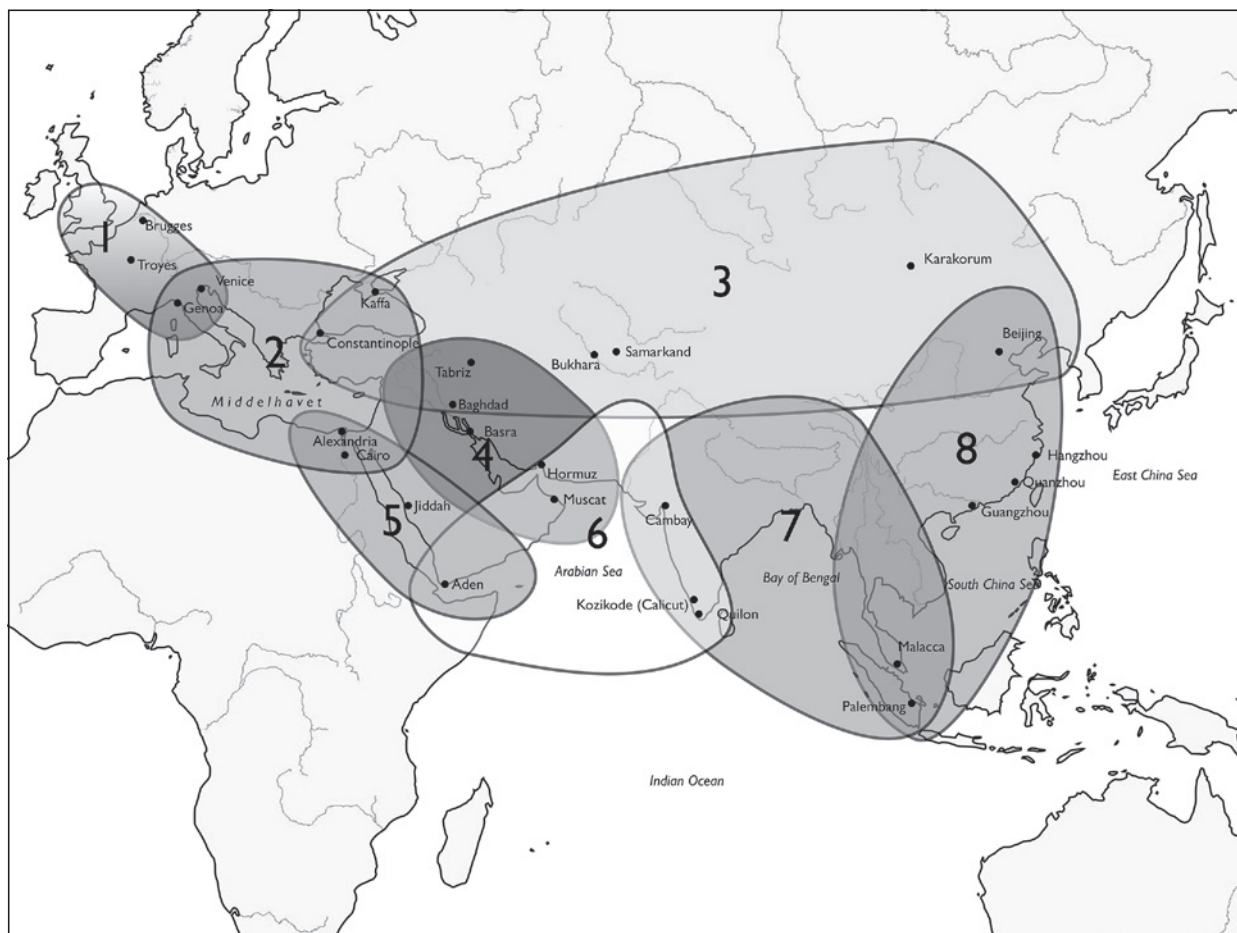


Fig. 1 The 13th century world system. – (After Abu-Lughod 1989, 14. – Basemap © Esri 2014).

The Western Indian Ocean had a central position in this early world trade, as it connected Central Asia, South Asia, the Middle East, the Mediterranean and Africa. In this way the Indian Ocean became a bridge between diverse commercial hinterlands, and the ports along its coast functioned as gateways through which commerce could flow from one part of the system to others.

Zooming in on the Western Indian Ocean region, communication and settlement were to a large extent determined by the natural environment. The northern part of the region is among the world's hottest and most arid, the landmasses north of central Somalia and Gujarat being outside the 200mm annual rainfall isohyets⁴, representing the approximate limits for rain-fed agriculture and thus large scale permanent habitation. In this arid zone, agricultural populations are limited to the great rivers of Mesopotamia and the Nile, as well as the highlands of Yemen, the latter receiving ample rainfall during the monsoons⁵. The arid lands in between and around them were and are, however, utilised by pastoralists. Rather narrow coastal plains characterize most of the Western Indian Ocean littoral, excepting East Africa south of Mogadishu, the eastern and Mesopotamian coasts of the Persian Gulf, and the Pakistani and Indian coasts from the Indus plain to Gujarat. Behind these plains rise rugged mountain ranges, in some places extending all the way to the sea, as in Southern Arabia and Somalia, in others, for instance in the Red Sea and along the Indian west coast, ending a few kilometres behind the coast. The combination of aridity, temperature and topography has rendered overland movement along the coast difficult. The convenient and attractive way of travelling between Indian Ocean littorals was always by sea⁶, while overland transport connected inland centres of

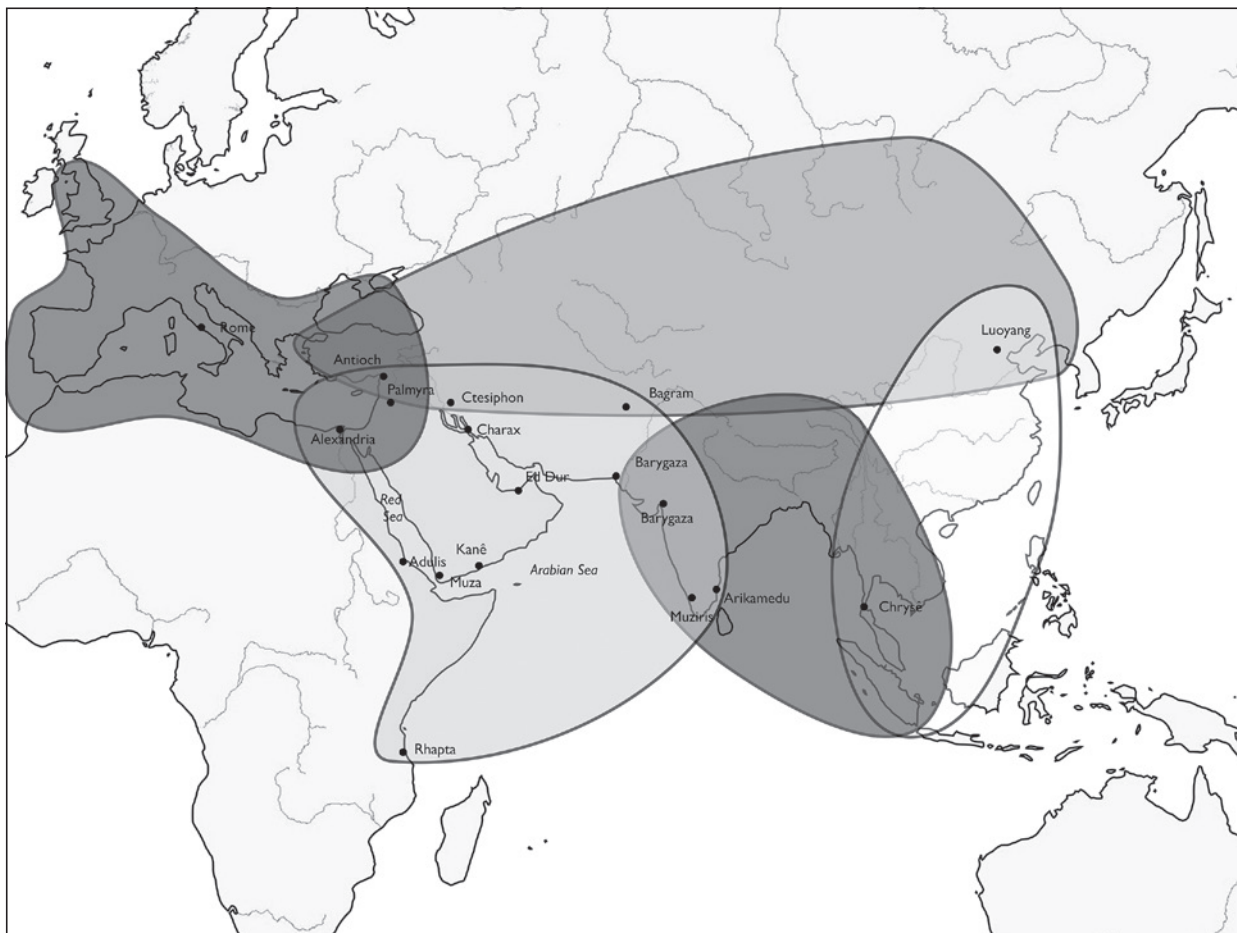


Fig. 2 Trading circuits in the 1st century AD. – (Basemap © Esri 2014).

power and production with the coast⁷. From an early stage this fostered the rise of maritime communities along the littoral⁸, engaging not only in regional and transoceanic exchange, but also in the extraction of marine resources, including pearl diving. Over time these communities, together with commercial and political agents in the hinterlands, developed technology in the form of boats and ships, infrastructure in the form of harbours along exposed coastlines, and knowhow of seamanship and navigation.

THE MONSOON TRADE

Movement by sail in the Western Indian Ocean is greatly facilitated by and depends on the monsoon system, which provides stable, although periodically dangerously strong winds, blowing from south-west to east in May to October and from north-east to west in November to April, with changing winds in the transitional periods. Communication, however, also relies on the wind systems in the Persian Gulf and the Red Sea, the latter being a particular challenge with northerlies prevailing throughout the year, except in the southern Red Sea, where winds blow from the south in the February-March period⁹. The advantage of the monsoon from a commercial point of view is that you could travel to anywhere in the Western Indian Ocean region and back again in the course of a year. The problem was that it was difficult or impossible to make a return journey in a shorter time. The monsoon varies in strength from year to year and over geological time, but

Leaving from:	Going to:	Malabar	Gulf of Aden	Southern Red Sea	Northern Red Sea	Persian Gulf
Indus, Gujarat, Konkan	Indus, Gujarat, Konkan		Mid-October to March (Tibbets 1961, 361-362)	Mid-October to March (Tibbets 1961, 361-362)	December to January (Pliny, NH 6.106)	Mid-October to March (Tibbets 1961, 230-231) November to February (recommended, Horsburgh 1841, 483)
Malabar			March (Tibbets 1961, 230-231)	March (Tibbets 1961, 230-231)	December to January (Pliny, NH 6.106)	
Gulf of Aden		Before May 11 (Tibbets 1961, 225) August to September (Tibbets 1961, 226; Niebuhr 1774, 447-452)		October to April (NIMA)	January to March (NIMA; Facey 2004, 11)	Before June 10 (Tibbets 1961, 225)
Southern Red Sea		Before May 11 (Tibbets 1961, 225) August to September (Tibbets 1961, 226; Niebuhr 1774, 447-452)	April to June (Tibbets 1961, 225) August to September (Tibbets 1961, 226; Niebuhr 1774, 447-452)		All year, but adverse winds (NIMA)	Before June 10 (Tibbets 1961, 225)
Northern Red Sea		July (PME 39, 49)	July (PME 14)	January to September (PME 7)		By way of India or Arabia (Salles 1988)
Persian Gulf		Avoid November, March to May (Dickson 1949, 249-250) Indian ports closed June to August (Tibbets 1961, 227-278; Casson 1989, 290; Thornton 1970, 30)	Avoid November, March to May (Dickson 1949, 249-250) Indian ports closed June to August (Tibbets 1961, 227-278; Casson 1989, 290; Thornton 1970, 30)	After October 28 (Tibbets 1961, 228)	By way of India or Arabia (Salles 1988)	

Tab. 1 Times of departure for different destinations in the western Indian Ocean.

the fluctuations over the last six millennia have been limited¹⁰. This enables us to utilise modern climatic data to reconstruct the more fragmentary schedules of communication preserved in historical records (**tab. 1**).

To provide but one example, an Egyptian merchant who wanted to go to northern India to acquire gemstones, such as lapis lazuli from Afghanistan or garnet from Rajasthan, would need to leave Egyptian ports in July in order to catch the southwest monsoon in August in the Gulf of Aden. He would then arrive in India in September, at the end of the monsoon, when the winds had subsided sufficiently for the approach to the coast to be safe. The winds would turn in October, but our merchant would wait at least until December before heading back, because his ship needed to catch the southerly winds in the southern Red Sea in January to March. The ship would then arrive back in Egypt in February or March. Goods could be transported across the desert there at any time, but he would need to wait until August and the rise of the Nile in order to transport his goods safely to Cairo or Alexandria¹¹.

Such schedules are provisional. It would be possible to move through Egypt by caravan when the river was too low to allow safe navigation, and we know that people in the Mediterranean sailed out of season when they felt that they needed to¹². Doing so in the Indian Ocean would be more difficult, due to the strong monsoons and the limitations set by technology and knowledge¹³. Even if not all people followed this pattern at all times, most people at most times would do so. This led to large numbers of people spending prolonged periods of time far away from home, many staying not only in order to wait for the wind to turn, but also taking up business and establishing families in their ports of call¹⁴. Following the seminal work on cross-cultural trade by Curtin, these communities are called »trading diaspora«¹⁵. The most famous is perhaps the medieval Jewish merchant community of Old Cairo: because it was forbidden to destroy records containing the name of God, they were preserved and could be recovered in modern times from the *geniza* or storeroom of their synagogue. The records reveal how the Egyptian community maintained close contact with groups in Aden and in Southern India¹⁶. The Arabian merchant communities that have existed from East Africa to East Asia up until recent times have roots or forerunners going back to the early first millennium. The first millennium also saw examples of Persian, Tamil, Roman and northwest-Indian merchant networks based on geographical origin, as well as ethnicity and faith¹⁷. Such communities served to lower transaction costs by acting as »cross-cultural brokers«¹⁸, thus establishing trust in a world where information never travelled faster than people, and where there was little or no legal infrastructure that could safeguard the life and property of traders operating over distances as large as those we are dealing with here¹⁹.

ORIGINS AND SIGNIFICANCE

Bronze Age records and archaeological and archaeobotanical evidence document contacts between Egypt and the Southern Red Sea²⁰, from the Indus to Mesopotamia by way of Oman²¹, and possibly from the Indus to the Gulf of Aden and East Africa²². For a long period the archaeological evidence is nearly absent, and only scattered literary evidence exists, such as that preserved by Herodotus of a supposed Phoenician circumnavigation of Africa²³. By the 3rd century BC maritime trade and the exploitation of coastal resources were, however, clearly established within all the circuits described by Abu-Lughod: the Red Sea, the Arabian Sea, and the Persian Gulf²⁴. Activities in the Red Sea seem to start with Ptolemaic construction of infrastructure in the Eastern Desert and along the African Red Sea coast, combined with hunting expeditions and trade in aromatics, along with peridot mining in the island of Zebirget²⁵. Hellenistic pottery and coins in the Persian Gulf document trade out of Mesopotamia²⁶, Indian ceramics indicate that the subcontinent developed maritime links along both coasts of the subcontinent and also to the Arabian Peninsula²⁷, while

literary sources reveal that Aden became a meeting point for the Red Sea and Arabian Sea circuits of exchange in the course of this period²⁸.

The supposed discovery of the monsoon by a Greek navigator named Hippalos, as reported in the *Periplus*²⁹, has been argued to be a literary construct³⁰. Nevertheless it is clear that, from a Mediterranean point of view, the commencement of direct navigation to India that took place in the 1st century BC represented a real discovery or innovation; there is no reason to doubt the report by the Roman Geographer Strabo that this led to an increase in trade³¹, or that of the *Periplus Maris Erythraei*, that South Arabia had previously been the meeting point between Red Sea and Arabian Sea circuits of trade, but that by the mid-1st century AD most trade between Egypt and India was direct³². Roman trade with India was mirrored by Indian merchants travelling to the Red Sea³³, and the other circuits described above continued to coexist with direct trade between India and Egypt.

We have no clear indication of the volume and historical significance of this trade beyond the general observation that both were substantial³⁴. There are two references in Pliny to trade with India and Arabia, as well as India and China, costing the empire the annual sums of fifty and one hundred million sesterces respectively³⁵. The latter figure would amount to the combined property requirement of 100 senators during the reign of Augustus, or the approximate annual wages, excluding other expenses, of two imperial legions. The number of ships departing each year from Egypt for India is reported by Strabo in to be 120³⁶. We do not know what kinds of ships those were, and the number would not include Indian and Arabian ships calling at Roman Red Sea ports or the traffic in the Persian Gulf, which must have mirrored that of the Red Sea. Finally, there is the so-called Muziris-papyrus containing a tax calculation for a single ship's cargo³⁷, unfortunately without the inclusion of any minerals or gemstones, as far as we know. It had a total value of almost seven million sesterces alone, the same as the price of a sizeable estate in Italy³⁸, and equalled the minimum property requirements of 14 members of the Roman Senate. That the eastern trade was extremely important to the imperial economy is indicated not only by this high figure, but also by the fact, documented in the above-mentioned papyrus, that eastern imports were taxed at the unparalleled rate of 25%. Less evidence exists of the importance of the trade to participating African, Arabian and Indian communities, but I have argued elsewhere that income from long-distance trade became an important asset for regional elites vying for political power, and thus contributed towards the formation and consolidation of early states on the Indian Ocean rim³⁹.

OBJECTS OF TRADE

The commodities involved can be broadly divided into plant products, animal products and mineral products. Among plant-products, spices and aromatics from India, Arabia and East Africa were important, along with textiles of linen from Egypt and cotton from India. Bulk commodities like wine, oil, wheat and rice were also traded. Animal products, in addition to ivory, included tortoise shell, pearls, corals, wool, fur, leather and silk.

Turning to mineral products and gemstones, although the archaeological record of ancient Indian Ocean trade has grown tremendously over the last decades, with a number of ports being excavated and published, little new evidence has come to light on the trade in gemstones and other minerals. Our main source of information remains classical literature, primarily the previously mentioned *Periplus Maris Erythraei*. The title means »the circumnavigation of the Red Sea«, by which the Greeks and Romans referred to the entire Indian Ocean region. The *Periplus* is a text of about 6,300 words that explains what to buy, what to sell and how to sail to different ports in the Western Indian Ocean, written by an unnamed and otherwise unknown

author of the 1st century AD⁴⁰. Arguably it is also useful with regard to trade in the later parts of the first millennium, not so much as to which ports were important, as this would certainly change over the course of generations and centuries, but with regard to which products were available in which regions, as this to some degree depended on stable factors of climate and geology.

Among other works, Theophrastus' *De Lapidibus* («On Stones») from the 4th century BC is too early to contain any knowledge of gemstones from the Indian Ocean, but there are other relevant references in a number of literary sources⁴¹. Among the most important is a list of eastern imports subject to taxation in Justinian's 6th century *Digesta*⁴². The list probably originally dates to the 2nd century and the rule of Hadrian, but was apparently still considered valid and useful in the 6th century. The most comprehensive text is Pliny's encyclopaedic «Natural History», which however, is problematic, because Pliny was sometimes clearly mistaken with regard to the place of origin of the stones he described. This was probably because gemstones were frequently traded through intermediaries in regions other than that of their origin. Information on gemstones is also contained in a number of works dealing with their supposed magical and medicinal purposes⁴³. The advantage of the *Periplus* is that the text is more explicit and exact with regard to place of origin compared with other classical sources which, for instance, when using the term »India«, might equally well refer to what we are accustomed to call Arabia or Africa⁴⁴. Finally there is also the great problem of terminology, which also applies to the *Periplus*. As Lisbeth Thoresen discusses in her contribution to this volume, there are many cases in which it is difficult or impossible to give secure modern identifications of the stones mentioned by ancient authors. In the discussion below, no attempt is made at improving the identifications and translations given in the editions cited. This means that the stone called *chrysolithon* («goldenstone») in the *Periplus* is identified with the *topasos* of Agatharchides and the peridot of Jeziret Zabargad/St. John's Island in the Red Sea. This builds on a tradition of scholarly conjecture rather than gemmological science. The consequence of this is that what follows is a discussion of patterns or trends rather than of specific facts.

Table 2 lists 39 mineral products or product-groups traded in the western Indian Ocean in the 1st century AD according to the *Periplus*. A certain overlap is likely, as some terms, such as »transparent gems« (*lithia diaphanês*)⁴⁵, are generic. Pearls, corals and nautilus shell have been included although they are animal products, as they could also be characterised as suitable gemstones.

Looking first at the types of products traded, 20 of them were gemstones in the wider sense of the word including glass-stones, shells etc. Sorting them according to their regional origin, most of them came from India, while precious metals came from the Mediterranean and from Mesopotamia, base metals from the Mediterranean, Arabia and India. If we narrow the definition of gemstones to actual precious and semi-precious stones, all but two, emeralds from the Eastern Desert of Egypt⁴⁶, and peridot from the Red Sea, were of South Asian origin. This tells us nothing about the value or volume of gemstone trade compared to other commodities, but shows that a wide range of gemstones were traded in the Western Indian Ocean, and that most of them were of Indian origin.

The *Periplus*, however, goes into more detail by specifying the ports that supplied and demanded different commodities. Graph visualisation software allows us to study flows and potential flows of products between different ports. **Figure 3** depicts the trade in mineral products reported in the *Periplus* as a network of supply and demand. Grey nodes show products while ports are yellow. Arrows show the direction of trade – supply or demand. Single products can be taken out, and thus we can follow for instance how lapis lazuli from Central Asia entered the Indian Ocean at the port of Barbarikon (at the mouth of the Indus) and was in demand in the Egyptian ports of Myos Hormos and Berenike.

While there is no information in the visualisation that could not be gathered from a close reading of the text, the graph arguably enables us to more easily identify patterns. Concentrating on the gemstones, three

Product (as identified in Casson 1989)	Greek	PME
brass	ὠρόχαλκος	6
copper honey pans(?)	χαλκᾶ	6, 8
iron	σίδηρος	6, 8
spears	λόγχας	6
axes	πελύκια	6, 10
adzes	σκέπαρνα	6
knives	μάχαιραι	6, 17
large, round copper drinking vessel	ποτήρια χαλκᾶ στρογγύλα μεγάλα	6
steel	στόμωμα	6
tin	κασσίτερος	7, 28, 49, 56
ironware	σιδηρᾶ	10
awls	ὀπήτια	17
copperware	χαλκουργήματα	24
copper	χαλκός	28, 36, 49, 56
lead	μόλυβος	49, 56
white marble	λύγδος	28
glass stones	λιθίας ὑ<α>λῆς	6, 7
millefiori glass	μορρίνης	6
precious stones	λιθία	10
nautilus shell	ναύπλιος	17
coral	κοράλλιον	28, 39, 49, 56
pearls	πινικόν	35, 36, 56, 59, 63
peridot	χρυσόλιθον	39, 49, 56
turquoise	καλλεανός λίθος	39
lapis lazuli	σάπφειρος	39
onyx	ὄνυχῆν	48, 49, 51
agate	μουρρίνη	48, 49
diamonds	ἀδάμας	56
sapphires	ὑάκινθος	56
transparent gems	λιθία διαφανῆς	56
glassware	ὑαλᾶ σκεύη	6, 7, 17, 39
raw glass	ὑελος ἀργή	49, 56
realgar	σανδαράκη	49, 56
sulphide of antimony	στίμι	49, 56
orpiment	ἀρσενικόν	56
[Roman] money	δηνάριον / χρῆμα	6, 8, 24, 28, 39, 49, 56
silverware	ἀργυρώματα	6, 10, 24, 28, 39, 49
goldware	χρυσώματα	6, 24
gold	χρυσός	36

Tab. 2 Mineralic products in the *Periplus*. – (Text and translation Casson 1989. Text references from Casson 1989, 39-43).

clusters stand out on the supply side: the port of Barbarikon, serving as an outlet for gemstones from Central Asia and northern India, Barygaza at the Narmada for stones from northern India and the Deccan, and a cluster of ports in South India supplying gems from that region as well as probably also from Sri Lanka, although the island hardly figures in the *Periplus*. At first the gemstone trade appears to be a trade between the Mediterranean and India, but if we also bring in generic terms, like simply precious stones, and metals besides gemstones, then Arabia, Africa and Mesopotamia also become involved, as we would expect them to be; this is one of the possible advantages of doing a network analysis, as it enables us to look for potential connections based on supply and demand in addition to those explicitly mentioned in the text.

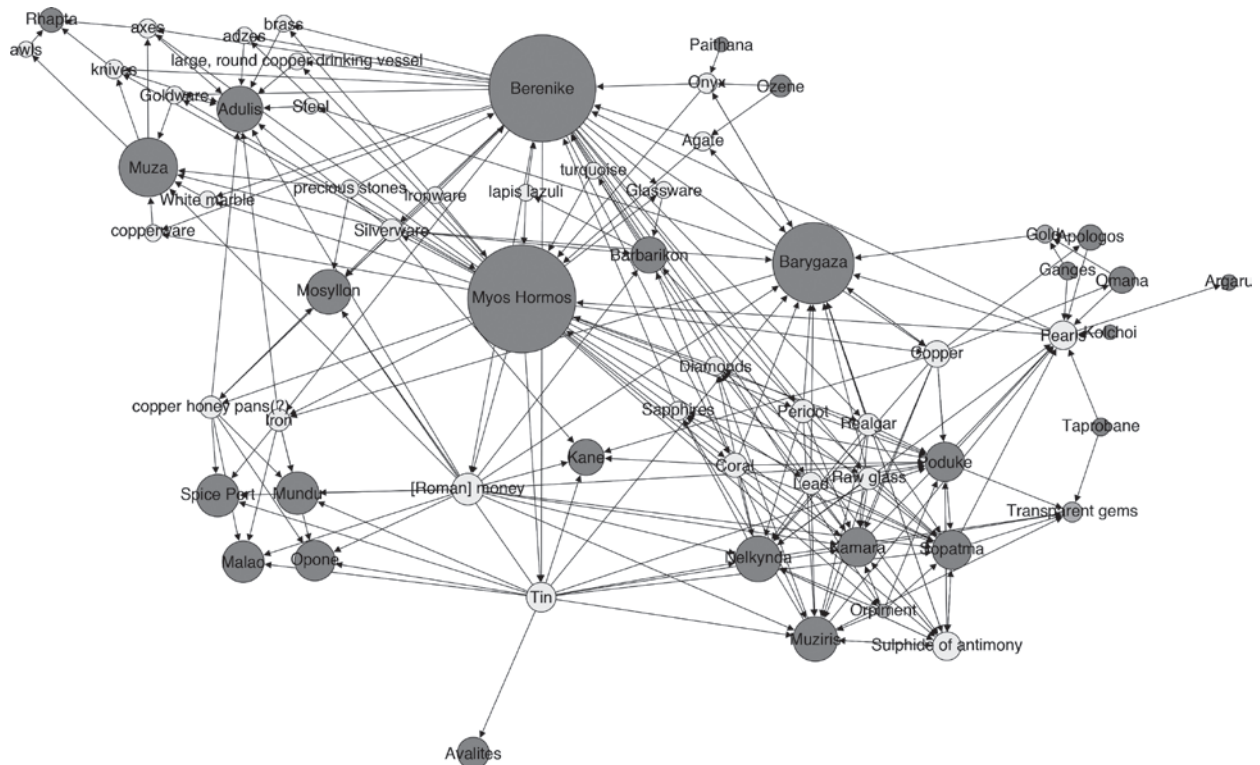


Fig. 3 A graph visualisation of the trade in gemstones and mineral products as described in the *Periplus*.

DIACHRONIC PERSPECTIVES AND GEOPOLITICAL DEVELOPMENT

It seems that from the late 3rd or at least by the 4th century, the southern Red Sea region, by that time under the control of the competing powers of Aksum in present-day Ethiopia and Eritrea and Himyar in present-day Yemen and parts of Oman, re-emerged as a contact zone between Red Sea and Arabian Sea circuits of exchange. Literary sources suggest that at least some Mediterranean travellers went to India on Aksumite ships⁴⁷. For the Romans, northern Red Sea ports seem to have gained importance alongside the southern port of Berenike, suggesting that many Egyptian traders no longer depended on the southerly winds of the January to March period in the southern Red Sea, and thus no longer travelled all the way to India⁴⁸. We know that merchants from Aksum in present-day Eritrea and Ethiopia traded in emeralds from the Eastern Desert of Egypt when they visited India⁴⁹. In the 3rd century Aksum and Himyar also became the dominant political actors in the southern Red Sea. This is visible in the subjugation of the other South Arabian kingdom, Hadramawt, by Himyar, and by the rich epigraphic, numismatic and architectural record that developed in Aksum in this period. In the eastern part of the Arabian Sea, Mesopotamian commerce, which had been present throughout the period, became more visible in both the literary and archaeological records, and Sri Lanka seems to have become the main southern centre of trade⁵⁰. From the early 6th century the Aksumite and indirectly also the Roman and Sasanian empires involved themselves militarily and diplomatically in South Arabia. Himyar was ruled as an Aksumite client state after ca 525⁵¹, and in 570 the kingdom was conquered by the Sasanians. From around 600 the Swahili coast became increasingly integrated in Indian Ocean trade, as evidenced by the presence of Mesopotamian ceramics and beads⁵². The next major geopolitical events were the Arab conquests of the mid-7th century that placed the northern and central parts of the system discussed here under control of Muslim elites.

The rise of the southern Red Sea as a zone of interaction in the 3rd and 4th centuries could be said to be a return to patterns established before the Romans became involved in Indian Ocean trade, and it also resembles, in some respects, the situation in the Islamic period, with Aydhab, Suakin, Massawa, Dahlak, Mokha and Aden being important commercial centres at different points of time. The influence of this shift in trading patterns on the gemstone trade was not necessarily dramatic, as gemstones were luxury items with low bulk and high value that could pass through many hands before reaching the consumers or end-users. Other eastern products also continued to be available in the Mediterranean. More vexing is the question of what effect the events of the 6th and 7th centuries had on the patterns of Indian Ocean trade.

It is clear from literary accounts that political authorities in late antiquity took an active interest in trade, and that this included promoting the interest of merchants belonging to favoured national and religious groups⁵³. This is most explicitly expressed in a letter paraphrased by the 6th century historian Procopius, in which the Roman emperor Justinian wrote to the rulers of the Aksumite and Himyarite kingdoms, inducing them to go to war against the Sasanians so that the Romans could buy their silk from the Aksumites rather than the Sasanians, who bought all the silk from India because they were present in the ports frequented by Indian ships⁵⁴. Whether the letter was actually sent or not, or whether it described the situation accurately is less important than what it reveals about how political authorities thought about trade. Political control of trade was important, not in order to impose embargos or blockades on rival powers, but as a source of revenue.

Studies of Red Sea trade have revealed that commercial contacts between Aila on the northern Red Sea and present day Yemen continued throughout the tumultuous 6th and 7th centuries⁵⁵. Yemen also had products of its own, primarily myrrh, that continued to be in demand in the Mediterranean world. The question, however, is whether the increased Sasanian activity evident in Africa, India and Sri Lanka should not be seen as a sign of efforts to channel Arabian Sea trade by way of the Persian Gulf in order to favour Sasanian traders and channel revenue to the Sasanian heartland.

With the Arab expansion, the Red Sea on the one hand gained significance as the gateway to the holy cities of Mecca and Medina⁵⁶, on the other hand both Egypt and Yemen suffered oppressive rule and social unrest in the late 7th and early 8th century⁵⁷. The Persian Gulf regained political importance with the establishment of the Abbasid caliphate in Baghdad in the 8th century, and trade with East Africa, India and China by way of the Gulf has been argued to have been an important source of revenue for local elites as well as the state⁵⁸. The archaeological record seems to indicate a flourishing and developing regional Red Sea trade in this period, characterised foremost by continuity from the pre-Islamic period⁵⁹, while literary sources seem to give prominence to the Persian Gulf as the northern outlet of Indian Ocean trade⁶⁰. In the 9th and 10th century, however, the Red Sea system again seems to link up with the western Indian Ocean⁶¹. In light of the developments in the 6th and early 7th century discussed above, these apparently contradicting trends can be reconciled: similar to the situation Abu-Lughod described in the 13th century⁶², commerce in the western Indian Ocean region consisted of a number of overlapping circuits. Geopolitical factors, such as the control of Roman, Aksumite Himyar, Sasanian and Islamic empires of different parts of the Indian Ocean rim, would influence how these circuits interacted and could even merge some of them for some periods, but the underlying pattern was shaped by wind-systems, and would coexist with and re-emerge after geographically contingent changes to the pattern of trade.

CONCLUSION

In summary, the observation that the natural environment to a large extent shaped the patterns of trade, but that trade, being the result of human agency, could make use of the available scope of action, might appear banal. Nevertheless, it allows us to draw some conclusions of more general nature regarding the trade in gemstones and other minerals and mineral products in the first millennium, in spite of fragmented source material, biased towards the early part of the period and towards Roman interest in the trade.

The classical sources, with the *Periplus* as the most important, identify four major sources of gemstones. One was the mountains of present day Afghanistan, Pakistan, Northern India and Eastern Iran. These gemstones were transported by way of the Indus Valley, where they were available at successive ports at the mouth of the river⁶³. Then there was the Deccan region and central India, where gems offered at ports along the Konkan coast and in Gujarat originated. A range of gemstones were available in South India and in Sri Lanka. Finally, emeralds and peridot were extracted in Egypt and traded to India. Pearls came from the southern Red Sea, the Persian Gulf and South India. Precious metals were exported from Mesopotamia and Egypt, while a number of base metals and other mineralic substances, including glass used for beads, came from Egypt, which supplied some products itself, but also served as an outlet for Mediterranean products. Iron and steel were exported from India.

The main destinations for the gemstone trade were in the Mediterranean and in Mesopotamia, and goods were conveyed by way of both the Red Sea and the Persian Gulf. Additionally, Egyptian gems were in demand in India, and African and Arabian ports would also import and probably re-export gemstones and other mineral products; this might account for some classical sources placing the origin of certain gemstones in Arabia and Africa, when India is the only relevant provenance attested in later periods. The dependence of trade on the monsoon system enabled predictable and regular communications between India and all the other destinations within the course of a year, and that also facilitated the emergence of a series of diaspora communities based on nationality, ethnicity and religion. Finally, even if the volume, the actors and the itineraries changed as result of geopolitical conditions over the very long period in question, the objects and the main trajectories of trade remained remarkably stable over the course of centuries.

Notes

- 1) See Adams 2007, 4-8 for a review. That transport costs were comparably high does not imply that goods were not carried over large distances.
- 2) Ogden 1982, 90.
- 3) After Abu-Lughod 1989, 14.
- 4) Central Intelligence Agency 1976, 13.
- 5) Wilkinson 2002.
- 6) An exception from this might be the so-called incense road described by Pliny from Southern Arabia to the Mediterranean by way of the Hejaz (HN 12.63-5), which, however seems to have been eclipsed by the Red Sea trade by the time of the *Periplus Maris Erythraei* (mid 1st-century).
- 7) Seland 2007.
- 8) Hourani 1995. – Ray 2003.
- 9) Casson 1989, 283-291. – Facey 2004. – NIMA 2001.
- 10) Gupta/Anderson/Overpeck 2003.
- 11) Seland 2011.
- 12) Beresford 2013, 265-275. – Casson 1995, 271 n. 273.
- 13) It is telling that as late as 1836, Wellsted discusses the impossibility of navigation in the opposite direction of the south-west monsoon even with steamships (Wellsted 1838, 302). Although this was in the early stage of steam navigation his premise was that steam offered no improvement over sail, both technologies being dependent on the long »southern passage« below the equator and up the African coast (Also Horsburgh 1841, 484).
- 14) Seland in print.
- 15) Curtin 1984.
- 16) Goitein 1974; 1983. – Goitein/Friedman 2008. – Margariti, 2007.
- 17) Seland 2013; 2016. – Strauch 2012.

- 18) A term also introduced by Curtin 1984, 2.
 19) Bang 2008, 131-201. – Curtin 1984.
 20) Bard/Fattovich 2007. – Fattovich 2005. – Kitchen 2004.
 21) Kenoyer/Price/Burton 2013. – Kenoyer 2007.
 22) Fuller et al. 2011. – Kennedy/Possehl 2012.
 23) Hdt. 4.42.
 24) Cf. Seland 2014.
 25) Casson 1993. – Seland 2009. – Sidebotham 2012, 21-67.
 26) Hannestad 1983. – Potts 1991. – Salles 1996.
 27) Ford et al. 2005. – Magee 2010. – Pavan/Schenk 2012. – Salles 2002. – Schenk 2006.
 28) PME 26 (Aden).
 29) PME 57.
 30) Tchernia 1997.
 31) Strb. 2.5.12.
 32) PME 26.
 33) Begley/Tomber 1999. – Tomber 2000; 2011.
 34) See, however, McLaughlin 2014, 1-27, 88-95 for a review of relevant figures.
 35) Pliny HN 6.101; 12.84.
 36) Str. 2.5.12.
 37) SB 18.13167.
 38) Rathbone 2000.
 39) Seland 2007; 2010.
 40) Casson 1989, 6-10.
 41) See also Thoresen's article in this volume.
 42) Dig. 39.4.16.7
 43) See Thoresen in this volume.
 44) Mayerson 1993.
 45) PME 56.
 46) Not attested in the Periplus, but in the contemporary texts of Strabo (Str. 17.1.44. – Pliny HN 37.65, 69).
 47) Palladius. – Cosmas, 3.17.
 48) Facey 2004. – Sidebotham 2009.
 49) Cosmas 11.21.
 50) Boppearachchi 1998. – Daryaee 2009. – Glover 2002. – Kennet 2004. – Tomber 2007. – Whitehouse/Williamson 1973.
 51) Chronology following Robin 2010, 78-79.
 52) LaViolette 2008, 30-31. 34.
 53) Seland 2012.
 54) Procopius, Bell., 1.20.9-13.
 55) Damgaard 2011.
 56) Mayerson 1996.
 57) Power 2012, 208-209.
 58) Whitcomb 2009.
 59) Damgaard 2011, 238-240.
 60) Power 2012, 221.
 61) *Ibidem* 212-216.
 62) Abu-Lughod 1989, also **fig. 1**, above.
 63) Kervan 1999 on ports at the mouth of the Indus.

Abbreviations

Apart from the exceptions below, classical authors and their works have been abbreviated in accordance with H. G. Liddell / R. Scott / H. S. Jones, *A Greek-English Lexicon* (with a revised supplement of 1996) (Oxford 1940).

Cosmas = Cosmas, *Christian Topography, text and translation*. In: W. Wolska-Conus, *Cosmas Indicopleustes: Topographie Chrétienne* (Paris 1968).

Palladius = Palladius, *De gentibus Indiae et bragmanibus, text and translation*. In: D. P. M. Weerakkody, *Taprobanê – Ancient Sri Lanka as known to Greeks and Romans* (Turnhout 1997).

PME = *Periplus Maris Erythraei, text and translation*. In: L. Casson, *The Periplus Maris Erythraei* (Princeton 1989).

SB = *Sammelbuch griechischer Urkunden aus Ägypten* (Wiesbaden).

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Summary

This article addresses the role of minerals and mineral products in general and gemstones in particular in Red Sea and Western Indian Ocean trade in the first millennium. It is argued that texts from the early part of the period provide a plausible, albeit approximate overview of the origin and distribution of most kinds of precious stones, and that stable climatic and topographic factors influencing commercial patterns enable us also to discuss the more fragmentary evidence of the later part of the period in light of geopolitical developments.