Nodes and Hubs: Berenike and Thessaloniki. A Comparative Study of Ancient Trade Networks (300 BCE - CE 700)

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UNIVERSITEIT LEIDEN – THE NETHERLANDS

NODES AND HUBS: BERENIKE AND THESSALONIKI

A COMPARATIVE STUDY OF ANCIENT TRADE NETWORKS (300 BCE – CE 700)

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Cover image. *The Arch of Galerius, colloquially known as the Καμάρα, in Thessaloniki*.
Image by Ελευθερία Παυλίδου (2023).

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Preface and acknowledgment.

This Bachelor's thesis has been in the works for a long time, longer than I care to admit, and at the same time not nearly as long as it could have been. Before I found my final subject, I had switched subjects multiple times without choosing something that interested me. I even had to switch supervisors because my first supervisor left the faculty.

When I finally decided on comparing Berenike and Thessaloniki, a choice that I have to admit was not born out of any logical decision-making, but rather out of an inability to choose one or the other, I still had a long way to go in order to figure out what exactly I wanted to do. I am not ashamed to admit that, after having figured out what to do, I at certain points could not see the woods for the trees, something people assured me is very normal and that everybody goes through no matter how difficult.

Needless to say, it has been a long road, and this thesis is the first tentative step of many on a new and, hopefully, long journey into academia.

I would like to give special thanks to my Thesis-supervisor, Dr. Marike van Aerde, without whose patience and guidance this work would have never been finished in time, and without whom my passion for Archaeology would have never returned.

Furthermore, I would like to thank my friends who had to suffer through my constant self-doubt and questions about whether or not my writing was academic enough.

I would like to thank Prof. Dr. Olaf Kaper for his help in correctly identifying the basalt sphinx statue as the Egyptian deity Tutu.

Finally, I would like to thank Dr. Tymon de Haas for trying to motivate me to write a thesis during a difficult time in my life. Even though my lack of motivation at the time, and the pandemic, stopped me from ever going further, I still appreciate the effort he put in.

Thank you for all the support and understanding I have received.

Inhoud

Chapter 1: Introduction.

In this Bachelor Thesis, a study of two sites, through excavation reports, museum exhibitions and relevant literary sources were used to contribute a step toward a better understanding of trade networks in the ancient world. To this end, a comparative analysis of two case studies, Berenike in Egypt and Thessaloniki in Greece, was performed.

Whether it be small scale or the global entity it is today, trade has always been an integral part of human society. It not only brings in profit and products but is also the highway along which ideas and peoples travel. I aim to eventually work for the European Union, and I believe that the more we understand trade in the past, and the interconnectivity of peoples and goods, the better we will be able to understand the multicultural nature of the European Union.

My admiration for both of these sites and civilizations is irrefutable, but their history is also integral to the subject matter of this thesis. Berenike was a trade node focused on the wider world outside the Mediterranean, while it is generally believed that Thessaloniki focused on the Mediterranean internal trade until, at least, the Byzantine era.

1.1 Research aim and sub-questions

The research question of this thesis is as follows:

What patterns emerge from a comparison of the archaeological evidence from two main Mediterranean ports, Berenike in Egypt and Thessaloniki in Greece?

The main research question will be answered through these 3 sub-questions.

1. How does the archaeological record compare to relevant textual sources?
2. How does the lack of focus on archaeology in previously performed research affect the methodology used?
3. Can we identify certain variables for port hubs based on a comparative study of archaeological data?

While globalization theory is usually the chosen method for this kind of questioning, I have opted to step away from it and use network theory as a tool to think with. My choice for this will be expanded upon in the second chapter of this thesis.

My hypothesis going into my research will be that Berenike focused more on the Import of goods from, for example, the Indian subcontinent. Whereas Thessaloniki would be more export-focused, getting the supplies needed for its citizens and trade from its hinterlands, at least until the Byzantine Era when Thessaloniki became a part of the larger trade system.

Furthermore, there should be enough literary sources on both sites that I suspect my hypothesis will be supported, even with the problems faced by the research.

1.2 Methodology.

Since trade is an important part of the human experience, a lot of research has already been done on the topic. For example, the silk roads, where the origins of research can be traced back to the 19th century (Seland 2014, p. 368). However, most of the research available on this subject is done from the historical perspective, largely based on literary sources, and therefore is linear in nature. By focusing solely on textual sources while ignoring archaeology, an entire research base is forgotten, and the interpretations can be skewed. As van Aerde put it in her review of *The Indian pepper trade and the Muziris Papyrus* by De Romani's "… the scene is set, so it seems, with only a partial, deliberate selection of props and backdrops" (van Aerde, 2022, p.445). With this thesis, I hope to add to the debate and show the pros of interdisciplinary research, especially when it comes to aspects of history that are integral to human societies like trade.

While the introduction to the research problem has been short, the amount and type of research done drives me to discuss it more in-depth in the second chapter of this thesis.

1.3 Limitations

Despite a feasible methodology, there are nonetheless several inherent limitations, impeding and possibly affecting the outcome of the research.

First and foremost is the lack of research on the harbors of Thessaloniki, which is made even more impactful because most of the research is in Greek, and reading Greek is sadly a skill that I am still lacking. As a suitable workaround for this problem, and therefore to limit the impact it has on the outcome, I went to Thessaloniki from March 3, 2023, until March 10, 2023. During this trip I visited the sites and museums with exhibitions relevant to my research, which helped me with identifying the information I needed in related sources.

Second, while there are numerous excavation reports on the campaigns in Berenike since 1994, the most recent fieldwork has not yet been published and no overall catalogue or database of the site is as of yet available. In order to remedy this I spent a significant amount of time in the Nederlandse Instituut voor het Nabije Oosten (NINO), the only location where said excavation reports could easily be found.

1.4 Approach.

Taking this into account, it is my goal to compare the red sea harbor of Berenike to the Mediterranean harbor of Thessaloniki based on their available excavation reports and

additional literature. Berenike would lend itself splendidly for comparison, with years of excavation done, a platitude of archaeological material, and multiple excavation reports all providing a clear picture of trade. And while archaeological data on Thessaloniki is less easily accessible, especially concerning the timeframe of this thesis, what can be used was still sufficient in a comparative case study.

After comparing the two harbors, I compared what I learned with relevant textual sources; does it support or go against the evidence put forward by textual sources?

The ultimate goal is to both gain a better understanding of the interconnectivity of trade nodes, even if they focus on different areas of the ancient world, and to answer the question how focus on two case studies can identify variables that are relevant for "trade processes" in general?

1.5 Thesis outline.

In the second chapter of this thesis, I will discuss the historical background and take a more in-depth look at the state of the research. What research has already been performed and how can it inform us? What are some of the problems faced, and how do these problems translate to interdisciplinary research? And how exactly can I apply all of this to my research and research questions? I will discuss this in my second chapter, as opposed to my introduction, because the amount of research performed is substantial and needs an entire chapter to be best understood.

The third chapter will be an analysis of excavation reports from Berenike. I will be looking at the artefacts found and buildings uncovered in order to gain a better understanding of Berenike's role in the ancient maritime trade routes. For example, what type of trade could mainly be found here? Was it a harbor that focused on export or on import?

The fourth chapter will be a continuation of the second chapter where I will look at Thessaloniki, my second case study. I will study this site through relevant literary sources and a visit to the museums in Thessaloniki itself.

Chapter five will focus on the discussion, where we will discuss the findings of the research, and whether the archaeological record supports or discounts the relevant textual sources.

The sixth and final chapter is the conclusion. Here I will give a summary of the thesis and give an answer to the research questions.

Chapter 2: Historical Background and the State of the Research.

Before going into a detailed analysis of the sites, how their data compares to each other, as well as the relevant textual sources, and what it can tell us about ancient trade systems, we must take an in-depth look at the historical background and take a deep-dive into previously performed research. This chapter will be divided into four sub-chapters, the first three will focus on the history of Berenike, Thessaloniki, and my choice of theoretical framework, while the last one will discuss the state of the research.

2.1: Sites

2.1.1: Berenike, a gateway to the east.

2.1.1.1 Historical background.

In 275 BCE, south of Ras Benas, where the Eastern Desert meets the Red Sea, Berenike was founded by Ptolemy II Philadelphos, who named it after his mother, Queen Berenike I (Peppard 2009, p. 196). Initially, it was established as a harbor with the primary function of importing war elephants from Africa proper, however, it quickly became something more. It was in use for almost 825 years, and for the longest period, it was the gateway that

Figure 2.1: Location of Berenike; South of Ras Banas at the easternmost edge of the Eastern Desert. Source: Google Earth (2023).

connected the Mediterranean to the Indian subcontinent and beyond. Trade products would arrive in Berenike, and also in the more northern Red Sea harbor of Myos Hormos, travel through the eastern desert to the Nile, and up to Alexandria from where the products were spread throughout the larger Mediterranean world.

Berenike was at its peak during the Ptolemaic dynasty, more specifically between the mid-third to the mid-second century BCE, after which it seems to have died down, at least until the arrival of the Romans in the area. When the Romans conquered Egypt in 30 BCE, life seems to have been breathed back into the port. Both archaeological and literary evidence seems to point towards extensive commercial and cultural contacts (Sidebotham *et al*, 2019, p. 8). This is also supported by the botanical evidence of subsistence and trade studied by Cappers.

The reasoning as to why this southernmost red sea port was highly important is simple, it all comes down to the wind. The red sea is characterized by persistent and powerful winds from the north, making it very difficult for (bigger) transport ships to sail to the more northern red sea ports, like Myos Hormos.

While using the more southern harbor of Berenike would have been preferable for incoming trade, due to the aforementioned winds. It stands to reason that more northern harbors (like Myos Hormos) would have been preferred for export, due to the fact that the shorter distance needed to travel over land would have made this outgoing route more cost-effective.

After the Romans left the port in C.E. 550, it faded into oblivion and was mostly forgotten. And for the longest time, the site of Berenike was only visited by the Nomads of the Eastern desert which, in combination with the local environment, caused the site to be preserved extremely well. It wasn't until 1818, with Giovanni Belzoni's "rediscovery" of the site, Berenike opened up to western visitors. Even if it was only sporadically with very little geographical and archaeological research performed, and they all focused on the temple at the most elevated part of the settlement (Sidebotham et al 2019, p. 8), the port started to be remembered. However, only from 1994 onward would proper long-term excavations and surveys be performed at the site (Sidebotham 2011, p. 18). Between 1994 and 2001 a collaborative research team from the University of Delaware and the University of Leiden performed extensive excavations at the site of Berenike and its immediate surroundings, with the finds expanding on the debate on red sea trade systems. Additionally, this was followed by a Polish-US collaborative project from 2008 onwards. Furthermore, on the bicentennial anniversary of the rediscovery and after a three-year hiatus, an international team returned to Berenike (Sidebotham *et al*, 2019, p. 7).

2.1.1.2 Topography.

As stated before, Berenike is situated where the Eastern desert meets the Red Sea, this location "provided avenues of trade, communication, and conveyance of basic resources to and from the port, but also posed barriers to reaching it." (Sidebotham, 2011, p.8). According to Sidebotham, the location of the port south of Ras Benas was carefully chosen for the protection it offered from the strong, southerly ashore current that caused boats that were anchored offshore to drift, but it also served as a landmark sailors could use. Its location between two wadis (Wadi Mandit and Wadi Umm Salim al-Mandit, respectively) was both a blessing and a curse. On the one hand, the heavy flow of sediment-rich water, which was caused by the occasional heavy rainfall between October and December, created the perfect conditions that facilitated the development of a natural harbor (Sidebotham, 2011, p. 9). The downside was that this sediment-rich water also caused the harbor to silt up, and while the Ptolemaic and Roman rulers had the means to dredge the harbors, as was the case with *Lepcis Magna*, they decided not to do that here instead opting to move the port city eastward and closer to the sea (Sidebotham, 2011, p. 11).

2.1.1.3 Population.

As stated by Sidebotham "Estimating population sizes of ancient settlements, especially larger urban centers, is fraught with pitfalls" (Sidebotham, 2011, p. 68). However, an estimation can help us better understand the function of a port. Sidebotham doesn't give any estimations on the Ptolemaic and early roman periods of the port, due to the lack of information on it as of yet. However, he does give an estimate for the mid-late fourth to fifth century C.E. based on documentation. "during this late Roman renaissance a population of approximately five hundred to one thousand is likely" (Sidebotham, 2011, p. 68). He also mentions that the number of inhabitants would have fluctuated throughout the year, depending on the arrival and departure of the ships.

2.1.2: Thessaloniki; the Metropolis of Macedonia

2.1.2.1 Historical background.

Before and during the monumental rise of Macedon under King Philips II, Macedonia was solely a rural society, with no real political center. The closest thing Philip, and his son Alexander the Great, had to a political center in Macedon was whichever rural palace they fancied in Aigai and Pella (McEvedy, 2011, p. 369). It wasn't until Alexander died, and his empire was split up into smaller kingdoms, that a true political center would be formed by King Cassander of Macedon. In 316 BCE, roughly 41 years before the founding of Berenike, he merged the population of 26 villages around the Thermaic Gulf into one city. He named this newly created city after his wife, Thessalonike, who was the half-sister of Alexander the Great by his father Philip II.

In 168 BCE the Kingdom of Macedon fell and came under Roman Republic control. The Romans changed the name of the city to the Latinized “Thessalonica”. During this Roman era, Thessalonica rose to importance as a military and commercial station situated on the Via Egnatia. While already important, it wouldn’t be until the end of the first century BCE that the geographer Strabo would call Thessaloniki the Metropolis of Macedonia.

Roughly 300 years later, Thessalonica, reached the peak of its importance when it became the capital of the Diocese of the Moesias, and in 305 it became the official residence of Emperor Galerius, however short-lived (McEvedy, 2011, p. 370).

For years, between the fall of the western Roman empire and the general recovery experienced by the Byzantine empire, Thessalonica declined in its significance. However, with the recovery of the Byzantine empire, things started to look up for the town. It would enjoy prosperity until the early fourteenth century when it lost its hinterland to the Bulgars. In 1430 the town was incorporated into the Ottoman Empire, of which it would remain a part until its fall in 1912.

2.1.2.2 Topography.

As can be seen in figure 2.2, the settlement existed out of three main areas. A harbor, which was located on the southwestern shore. The city proper made up the bulk of the settlement and was laid out in a grid pattern with two main roads connecting the four gates. It is clear

Figure 2.2: The layout of Ancient Thessaloniki over the contemporary city. Figure by Noud Visser, tafter Google Earth (2023).

from the aerial photographs that this grid pattern can still be seen in contemporary Thessaloniki. The final part of the city was the Acropolis, which was situated in the northernmost part of the settlement.

There are some signs that the outline of the ancient city changed slightly, for example, the earliest, Roman version of the golden gate ended up within the later walls and was left as a free-standing arch, which is no longer visible (McEvedy, 2011, p. 371). Furthermore, there are some hypothetical boundaries on the map on which figure 2.2 is based since the sea wall line is unknown and based on a reconstruction by Constantine the Great. That being said, there are two main roman buildings still visible and can be used as a reference point. These are the Forum, of which a portion is still visible in the center of town, and the palace of Galerius, which can be found in the southeast corner of the ancient city.

2.1.2.3 Population.

The ancient city's population is rather difficult to discern, however, based on the Ottoman census of 1478 and 1519 McEvedy suggests that the city had a population of about 10000 to 15000 during the most prosperous phases of the city. Specifically between C.E. 305 – C.E. 600 and the period between C.E. 1000 – C.E. 1400. This number is comparable to the numbers given on one of the maps in *"the geography of Strabo. VII"* which puts the population between 10000 and 20000. I like to add that Antonaras, in his book *"Arts, Crafts and Trade in Ancient and Byzantine Thessaloniki"* mentions a number of 100000 inhabitants during the early Byzantine period, which is almost ten times as many as suggested by McEvedy and Strabo.

2.2 Theoretical Framework and Methodology

As discussed in the introduction for this thesis, historically the theoretical framework used for a comparative research such as this is Globalization theory. While writing the proposal for this thesis I fully intended to follow this tradition, however during the reading and writing I opted out of this in favor of Network theory.

2.2.1 why not globalization

Globalization can be a relevant theoretical framework when studying complex systems in history. However, it is far from one whose definition is agreed upon even by the scholars using it in their research (Hodos *et al*, 2017, p.4). The definition of globalization has multiple interpretations, all related to one another but at the same time intrinsically different. To some, it is equal in its meaning to Westernization (Hodos *et al*, 2017, p.3), and to others, it is a process that takes away from the heterogeneity of different societies (Hodos *et al*, 2017, p.3). In my opinion this "debate" is more akin to discourse for discourse's sake, leading to a focus on the terminology and semantics rather than the data

which can be counterproductive in the understanding of networks when there is limited information available.

Furthermore, globalization theory has a very top-down approach, where the basis of the research is not in the sites and the datasets, but rather in the theoretical framework itself. Preferably, for complex systems, I aim to base my research on the datasets and sites themselves and let the data inform my research. In my opinion, this bottom-up approach leads to research that does not distance itself from the data and the sites as much as is often the case with the top-down approach that is associated with Globalization Theory where the interpretation of data is adjusted to suit its narrative.

2.2.2 Critical approach and Network Theory

While network theory is not necessarily new, with many of its analytical techniques being introduced in the 1970s, they would only become more widely applied in the last 10 or so years in the archaeological field, likely caused by the advancement in computers. However, even now, the "network methods have been insufficiently explored and have been dominated by a few popular perspectives that were sometimes uncritically adopted from other disciplines" (Brughmans, 2013, p. 623 - p. 624).

Network theory is a way to understand data, focusing on nodes and connections, rather than on linear lists and catalogs, and can be applied to archaeology in two main ways. The first way is that it can be applied to archaeological maps. The second application is as a visualization in, for example, a graph. Organizing this data in a graph can also be a framework for interpretation and as such can be a very valuable tool to think with for trade connections in the past.

Network theory is inherent in the natural sciences, and came to prominence in computer sciences, where it uses nodes and ties in order to understand more complex systems (i.e. the world wide web (Figure 2.3), or even the human brain). These nodes and ties are based on datasets and often visualized by using graphs.

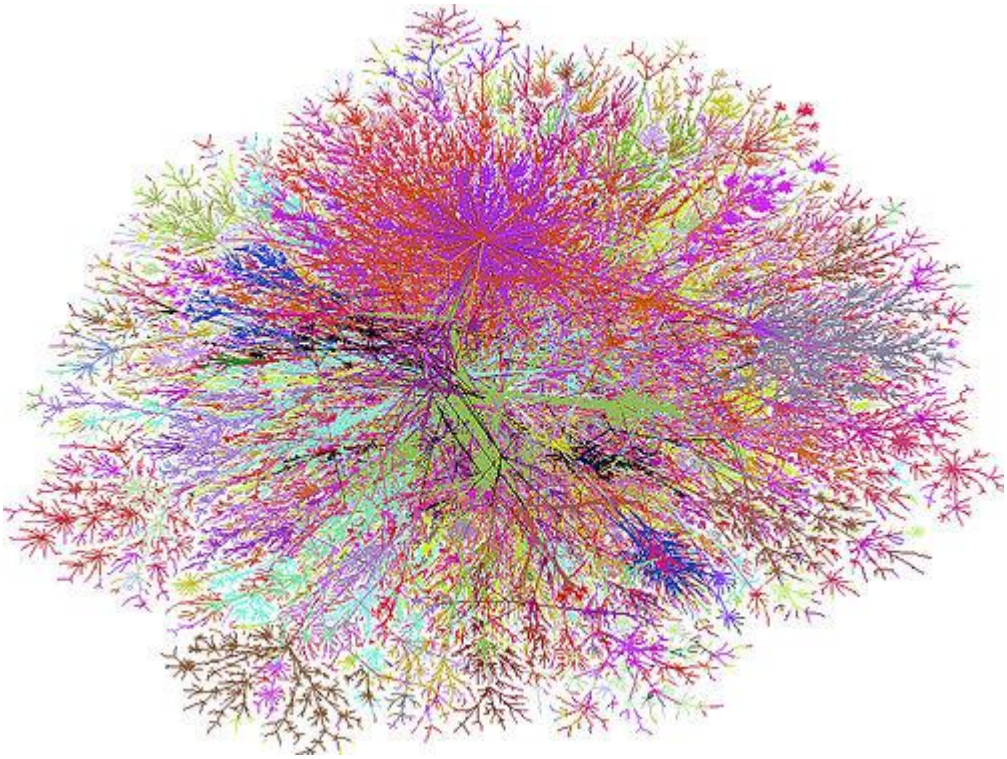

Figure 2.3: Graph of the world wide web circa 2004. Internet map 2004. From Math Insight. http://mathinsight.org/image/internet_map_jurvetson_2004

Even without these computers, graphs, and all the complicated mathematics involved, network theory is still a very useful tool to think with. Especially for this thesis, where both data, time and word count are in limited supply, this approach allows me to look at the data from the sites and place them within a larger frame, a bottom-up approach.

2.2.3 Identifying variables

My methodological aim will therefore be to identify and codify variables, based on archaeological material and written sources. These variables should in theory function as a basis for the identification of nodes and hubs in a trade system, based on limited information. The variables that I have identified and used are the diversity of religion, the presence of local and non-local materials, and production centers and warehouses.

2.3 State of the research.

As stated in the previous chapter the amount of research done on the case studies, while not significant, will be sufficient to support my research and form the basis for this thesis. However, the challenge will be in collecting the research, since relatively little has been published on Berenike and what has been published isn't easily accessible, and the largest portion of the research done on Thessaloniki, specifically the harbor, is in Greek.

The easily accessible research on Berenike is mostly historical in nature, based on translations of ancient texts, with only one excavation report and smaller parts of others being accessible online, the other excavation reports can only be found in the “Nederlands Instituut voor het Nabije Oosten” (NINO).

The state of the research on Thessaloniki is even more difficult to discern, especially when it comes to the harbor and trade. Most papers or articles I could find do not concern the harbor, but rather the acropolis or the city proper, with the time frame, almost solely focusing on the Byzantine and Islamic eras of the town. All other periods are mostly written about in Greek. I did however manage to find some obscure references about trade in ancient Macedonia. Timber and natron are their main trade products, and the presence of amphoras points towards both the import and export of luxury goods.

That being said, the research available on trade in the ancient Mediterranean is plentiful, with a whole host of historical texts and archaeological research giving rise to multiple hypotheses and theoretical frameworks helping us gain a more clear image of ancient, far-reaching trade systems, and the roles certain archaeological elements played in this.

Chapter 3: Berenike; transit port or final destination.

As I discussed in the previous chapter, specifically Berenike's historical background and topography, the site was an important port for the Ptolemaic war industry and the Roman commercial trade. It had ample infrastructure pointing to it being an important node in the Indian-Ocean trade. Yet neither the Ptolemaic dynasty nor the Romans ever bothered dredging the harbor, as we would have expected for an important port, causing it to silt up leading to the constant moving of the port city. What then, was the function and role of Berenike within the larger trade systems of the ancient world? Was it a mere transit port, where products and people passed through as they went between the Mediterranean and the Indian Ocean, or could it be considered the final destination of many of the trade goods? To answer this question I studied the reports by Sidebotham, which I used to identify the religious sects not native to the area, and the products and production centers/warehouses which may give me some insight into the role of Berenike. Furthermore, it should be noted that the most comprehensive material and findings on Berenike can be dated to the Roman Era.

3.1 Religions and Merchants.

As stated by Sidebotham, the same deities that dominated the entire Mediterranean were also dominant at Berenike, namely the Egyptian, classical Graeco-Roman, and Hellenistic hybrid deities. However, there is also evidence for the presence of Christian, Palmyrene, South Arabian, and Zoroastrian religious activities (Sidebotham, 2014, p. 599).

The main evidence for these religious activities comes from the presence, and subsequent excavations, of five, possibly six, religious sanctuaries at the site. Starting in the most western part of the site, these sites are: "the Late Roman Harbor Temple, the Shrine of the Palmyrenes, the so-called Serapis Temple, the Northern Shrine, and a Christian ecclesiastical facility" (Sidebotham, 2014, p. 602).

Despite ample evidence in the archaeological record for “their presence, and residence, in Berenike, no positively identifiable objects or structures of a religious or funerary nature associated with South Asians have thus far been documented from our excavations" (Sidebotham, 2011, p. 75, 227-229). This was true until the more recent find of a small stone statue of a standing Buddha, and a Buddha bust made from local gypsum (Sidebotham *et al*, 2019, p. 18).

While there was a clear presence of Serapis, Isis, and possibly Harpokrates, worship, alongside that of pharaonic deities and the Roman imperial cult, this part will focus mainly on the non-local cults as described by Rądkowska and Zych. It should be noted,

however, that "It may well be that what appears to be ‘exotic’ from this perspective was hardly that for the core residents of the town, the people who called it home" (Rądkowska & Zych, 2018, p. 225).

3.1.1 The Palmyrenes

One of the places of worship present in Berenike is known as the Palmyrene shrine, and while it was a place of worship for a multitude of cults, it gets its name from the worship of Palmyrene deities. Specifically the worship of Hierobol, also known by the name Yarhibol, who was one of the most important gods in the religious triad of the Syrian desert (Sidebotham *et al*, 2011, p. 64). It is known that Hierobol/Yarhibol worship was practiced in Berenike, due to a surviving Greek-Palmyrene inscription dedicated by two officers of a Roman mounted unit, mentioning an artisan by the name of Berechei, who made a statue of “the greatest god Hierobol/Yarhibol” (Sidebotham, 2014, p. 612). Based on the names on the inscription, the concerning statue was carved somewhere between C.E. 180/185 and C.E. 212.

3.1.2 Zoroastrians

Another non-local cult with possible connections to Berenike, is Zoroastrianism. This religion originated in modern-day Iran in the 6th century BCE and greatly influenced the Greek dualistic view of the world (Duchesne-Guillemin, 2022). The presence of this religion in Berenike can be seen in the presence of a broken glass cameo depicting a symbol associated with a Zoroastrian fire altar (Francis, 2000, p. 223), it remains to be seen, however, if this religion was also actively practiced.

3.1.3 South Arabian Religion

The evidence of religions from South Arabia is at the same time more present and more flimsy than the aforementioned cults. The northern shrine, in some literature referenced to as "the square feature", contained a multitude of artefacts reminiscent of South Arabian religions. In the north-western part of the structure, a pair of stone altars were found with its closest parallels being from South Arabia and Aksum (Rądkowska & Zych, 2019, p. 239). This pair was cut out of gypsum anhydrite, a local stone, so it may have been an imitation. Furthermore, a small statuette (10 cm) was found behind these altars, and while the representation does not fit any known traditions, the hand gestures resemble either South Arabian figurines or Roman representations of Horus (Rądkowska & Zych, 2019, p. 241). The final, and most certain, object of South Arabian origin concerns a bronze bull's head welded to a bronze plaque (Figure 3.1). Not only does the style and execution have strong parallels to similar items found in South Arabia, but the bull is also considered a sacred animal of the sun (or moon) deity Almaqah (Rądkowska & Zych, 2019, p. 242 - 243). This deity was worshipped both in the kingdom of Saba, in modern-

day Yemen, and the kingdom of D'mt which would later become Aksum, in Modern day Ethiopia and Eritrea. The last piece of evidence that points to the South Arabian nature of this structure, and therefore the presence of cults from this region, is how identical it is to the Extra Muros temple excavated at Sumhuram in modern-day Oman. Not only is its layout almost identical, but the objects found in the Omani temple are very reminiscent of the furniture found in the temple in Berenike (Rądkowska & Zych, 2019, p. 244). The only problem with this being indicative of religious practices associated with South Arabian pagan cults is that the temple was furnished in the late 4th and early 5th centuries C.E., when the peninsula had already abandoned its "pagan" past, Rądkowska and Zych give multiple explanations for this however (Rądkowska & Zych, 2019, p. 243).

3.1.4 Buddhism

Finally, I would like to touch on the evidence of South Asian religious practices being present in the archaeological record of Berenike, specifically the presence of Buddha worship found during the 2019 excavation. Sidebotham mentions that two locally produced artefacts in South Asian style were found in the Isis temple. These artefacts concern a triad of Indian figures, possibly deities, which are currently being studied by a specialist and on which no further information is given. The second artefact is a small stone head of a Buddha (9.3 cm), with iconography comparable to Gandharan, Kushan, or Guptan traditions (Sidebotham *et al*, 2020, p. 18; Figure 3.1). Additionally, in Trench BE18/19-116, a stone statue possibly depicting a standing Buddha has been excavated. The reason for this being a possible Buddha statue is how closely it parallels an image of a standing Buddha on gold coins from Kushan that were found (Sidebotham *et al*, 2020, p. 14).

3.2 Material

Berenike was an important node in the Indian Ocean trade, and as Sidebotham states: "The commodities, material possessions, records, and structures that people left behind are concrete testimony to this trade" (Sidebotham, 2011, p. 3). These commodities and material possession are what I will be looking at in this part of the thesis, and while no clear catalogue has been published, sufficient material has been published for me to make an assessment. It is important to identify the parameters for what we see as local and non-local when it comes to Berenike, and in this, I will follow Sidebotham in defining local as the port city and its direct area. For this reason, the likes of Aswan and the Nile Delta valley do not count as local.

3.2.1 Non-local materials.

3.2.1.1 organic material

First I would like to discuss the organic material, which was both well preserved, in part due to the arid climate of the Eastern Desert, and very diverse. A detailed list of these plant remains, as given by Cappers, could provide us with "... a solid basis for a reconstruction of the international trade of plant products and the food economy" (Cappers, 2006, p. 3). As we would see in the section discussing local materials, the low-quality fruit-producing plants of the Eastern Desert meant that most, if not all, of the more high-end and luxury fruits like stone pine, apricots, and a variety of cereals found were imported from the larger Mediterranean area and the Nile valley (Cappers, 2006, p. 162).

The presence of rice kernels and rice chaff in the archaeological record, dating to the early and late habitation layers, might be an indication of the presence of an Indian community. However, Cappers goes on to state that the presence of rice in Fayum may indicate that the rice was largely meant to be transported further north towards Rome (Cappers, 2006, p. 156). Furthermore, a group of pulses has been found, with four being indicated by Cappers as pointing towards import, of these four, the mung bean (*Vigna radiata*) originating from the Indian sub-continent, and the Abyssinian pea *(Pisum abyssinicum*) originating from Aksum, are the most indicative of long-distance trade. The presence of a coconut and the emblic, better known as the Indian gooseberry, is a clear indicator of Indian Import. However, the "most exotic spice is also the best represented one" (Cappers, 2006, p. 159). About 7.5 kilograms of pepper (*Piper Nigrum*) was discovered in a large dolium. We know these peppercorns originated on the Indian sub-continent, in part, thanks to the Periplus Maris Erythraei, where pepper is mentioned as a spice that was shipped from overseas ports to Roman Egypt (Casson, 2012, p. 43). The final plant species that can be connected with the Indian sub-continent is *the Coix lacryma-jobi*, colloquially known as Job's tears, the piercing present on them points towards their use as beads. Capper goes on to mention that the contexts, from which the South-Asian plant remains were unearthed, indicate that the Indian trade was maintained during both the early and late periods, yet was more diverse during the first habitation period (Cappers, 2006, p. 162).

I would like to leave the plant remains behind, and shortly discuss three types of wood not native to the area. The first type is also the most abundant of the two, and concerns teak. Teakwood originates from the Indian sub-continent and is mentioned in the Periplus Maris Erythraei as being traded to the Persian coast, more specifically Omana (Casson, 2012, p. 18). The wood is very much present in Berenike, both in the support of some

buildings, and in the creation of certain statues, and at least a part of one coffin was made out of teakwood (Sidebotham *et al*, 2020, p. 19). While Cappers argues that indirect trade of teakwood may not be excluded, the fact that teakwood was one of the favorite timbers in shipbuilding in the Indian Ocean, makes it likely that the wood found at Berenike was recycled wood. The second species of wood concerns Bamboo, and was identified by Caroline Vermeeren (Cappers, 2006, p. 164). Sidebotham states that some of the woven mats found at Berenike were made out of bamboo and that they may have been used as shelter from the sun and wind for those sailing between Berenike and the sub-continent (Sidebotham, 2011, p. 240). The final species I would like to touch on is a piece of *Boswellia Serrata* that was found during the 2009 expedition. The sap of this wood was coveted and used in the creation of Frankincense. This piece of Boswellia may very well be related to the presence of the Aromatics warehouse in Berenike, and the wealthy Roman perfumer/merchant by the name of *Marcus Laelius Cosmus* (Ast, 2021, p. 145).

3.2.1.2 ceramics and glass

Now I would like to discuss ceramic evidence uncovered during the expeditions in Berenike. The "prosaic" finds Sidebotham lists include Indian pottery, fine dinnerware, coarse wares, and larger transport vessels. Some of the Indian fine ware is rouletted ware which appears to have been manufactured in the Ganges River delta. There seems to be a distinct lack of references to Indian-made pottery by ancient authors, which Sidebotham ascribes to them not being commercially important items (Sidebotham, 2011, p. 230). Furthermore, pottery originating from Aksum and some handmade jars deriving from southern Arabian factories have been found. The fine ware originating from the Mediterranean, specifically Italy, Gaul, and the eastern Mediterranean, concerns mostly fine tableware in the form of Terra Sigilata. However, more indicative of trade is the presence of the vessels used for transport, for example, amphoras, which were far more prevalent in the archaeological record of Berenike than the fine ware. The bulk of these types of vessels originated from either Egypt, like Aswan, or the larger Mediterranean, like Campania on the Italian peninsula, with some possibly even coming from Cyprus, Gaza, and Aila (Sidebotham, 2011, p. 230 - p. 231).

In addition to the ceramic vessels, many hundreds, if not thousands, of glass sherds have been recovered from Berenike. This glass includes items of lesser quality, but also some high-quality items like millefiori, painted glass, and cameo glass (Sidebotham, 2011, p. 235).

3.2.1.3 Contents of the Vessels

Since it cannot be known with certainty that these vessels were single-use or had multiple uses over a longer period of time, it is perhaps more interesting and useful to ponder what these vessels carried. Based on the types of amphoras and the custom passes written on Ostraca excavated from the 1st century C.E. trash dump, it can be ascertained that in all periods of Roman occupation, these vessels carried wine intended to be loaded onto the ships in the harbor (Sidebotham, 2011, p. 231). Both these ostraca and the *Periplus* make mention of Italian and Aegean wine being important export products leaving Egyptian harbors (Sidebotham, 2011, p. 232 – p. 233). In addition to the wine, the ostraca also mention olive oil, transported in "recycled" wine amphora, as an export product. Furthermore, the popular fish sauce, known as Garum, has been found at Berenike in small quantities, it is not clear, however, if this was intended for consumption, shipping, or both (Sidebotham, 2011, p. 234).

3.2.2 Local materials

3.2.2.1 organic materials

A significant amount of the plant species found, roughly one-third, consists of desert plants and potential garden plants, which would have been used for personal consumption and not for trade. As stated before, most of the desert plants, especially the fruit-producing plants, were of inferior quality and therefore not really fit for export, the date palm (*Phoenix dactylifera*) may have been the exception. Its highly prized fruit was exported to provinces of the Roman Empire where they did not thrive, and although most would have been obtained from the extensive plantations in the Nile valley, the residents of Berenike may have exploited palm groves found in the Eastern Desert to obtain this highly coveted fruit (Cappers, 2006, p. 163 - p. 164).

3.2.2.2 precious and semi-precious stones

Roughly 300 square kilometers of the eastern desert was known as Mons Smaragdus, or Emerald Mountain, by the Romans. This area just northwest of Berenike was the only known source of emeralds within the Roman empire and was therefore heavily exploited (Sidebotham *et al*, 2016, p. 345). The emeralds and beryls won from these mines were present in large numbers in Berenike. Of relatively poor quality, and therefore not really suited for export to the sub-continent, these so-called "Egyptian emeralds" were exported to the Axumites during the late Roman period. Furthermore, they also appear in contemporary Roman jewelry and in the jewelry worn in the Fayum mummy portraits (Sidebotham, 2011, p. 236). Alongside the emerald mines, the Eastern Desert was also very rich in gold. This wealth in gold veins caused there to be "hundreds of gold-mining

settlements ranging from tiny prospecting sites to huge operations requiring at least hundreds of people" (Sidebotham, 2011, p. 172).

3.2.3 Production centers

Cappers shortly points towards evidence of industrial activity at Berenike, which included the production of metal, rope, and possibly also glass and beads (Cappers, 2006, p. 17; Sidebotham & Wendrich, 1995, p. 105), In fact, Sidebotham makes it a point to call the Ptolemaic era site an industrial area, and even gives evidence of metal and glass working in late Roman times (Sidebotham, 2011, p. 116).

3.2.3.1 Metalworking

"Industry should be defined in the desert as mainly metalworking and brick manufacture, both of which required water" (Sidebotham, 2011, p. 116). Sidebotham gives the discovery of iron slag scattered around Ptolemaic forts and Roman praesidia surrounding Berenike as evidence pointing towards industrial activity. However, as Sidebotham already states, the metalworking at Berenike would have required a significant amount of freshwater to wash the metal and create the finished product. The use of salt water, which Berenike would have had plenty of access to, would have led to leftover salt residue in the metals, leading to an inferior quality product (Sidebotham, 2011, p. 117). Sidebotham compares this to the excavation of a Roman era metalworking area at the port site of Myos Hormos, where the researchers did not record any evidence of water use, leading to the speculation that water was held in moveable containers or tanks that have long-since disappeared (Sidebotham, 2011, p. 117). However, the finds in the trenches mostly show signs of cold-working, which coincides with the distinct lack of fresh water in Berenike.

3.2.3.2 Rope and cordage

Around 50 percent of the cordage excavated at Berenike is made of grass, with the second half being made out of palm, soft fiber, goat hair, and "other material" (Veldmeijer, 2008, p. 40). It is not known, and quite difficult to discern from the badly degraded samples, whether the ropes were imported as a final product or as a material that was finalized in Berenike itself. That being said, it is known that unprocessed grasses were used as a stowage material, this combined with evidence for textile production, like spindle whorls and coarse goat hair textiles, makes it a reasonable assumption that rope and cordage were produced at the site itself.

3.2.3.3 Glass production

In order to shortly touch upon glass workshops in Berenike, their presence, even small scale, seems unlikely. The archaeological evidence pointing to it is very scarce, and current evidence shows us that it seems that Berenike did not have the necessary fuel, nor the technology, needed for the production of glass. The glass vessels found here were

most likely imported, which does show a connection to, for example, the renowned Alexandrian glass ateliers (Kucharczyk, 2011, p. 92).

3.3 Warehouses

Where the evidence pointing to large-scale production and an industrial zone is tentative at best, there is ample evidence for the presence of warehouses at Berenike that I would like to shortly touch upon. A building, dating to circa C.E. 400, was excavated in the southeastern portion of the site. While the exact function of the building was unknown, the presence of a room with completely intact Aila-made amphoras makes it likely that it functioned as a warehouse of some kind (Sidebotham, 2011, p. 272).

A second possible warehouse was uncovered during the 2014 and 2015 campaigns. Highly carbonized timbers were found, which led to the hypothesis of a fire that destroyed part of the harbor facilities, including the warehouse where ship timbers were stored (Sidebotham *et al*, 2016, p. 329).

The third, and final warehouse I would like to discuss is an Aromatics warehouse. A dedication of a statue was found in the Isis temple, this dedication makes mention of a prominent citizen who was in charge of an aromatics warehouse in C.E. 112 (Sidebotham *et al*, 2016, p. 339). This mention of an aromatics warehouse is interesting for at least two reasons. Firstly, among the botanical finds were remains of plants and spices associated with aromatics, which may be direct evidence of aromatics passing through Berenike (Sidebotham *et al*, 2016, p. 230). Secondly, the merchant by the name *Marcus Laelius Cosmus,* who personally financed the construction of the Isis temple during the reign of Tiberius (C.E. 14 - 37), may be connected to this aromatics warehouse. This connection can be made because a wealthy perfumer by the same name is a stock character in the epigrams of the poet Martial (~C.E. 38 - 104). And while the inscription dates to a later period, it is likely that a similar facility existed in the time of Cosmus (Ast, 2021, p. 145).

Figure 3.1: Bronze Bull's head welded to a bronze plate. Photograph by S.E. Sidebotham.

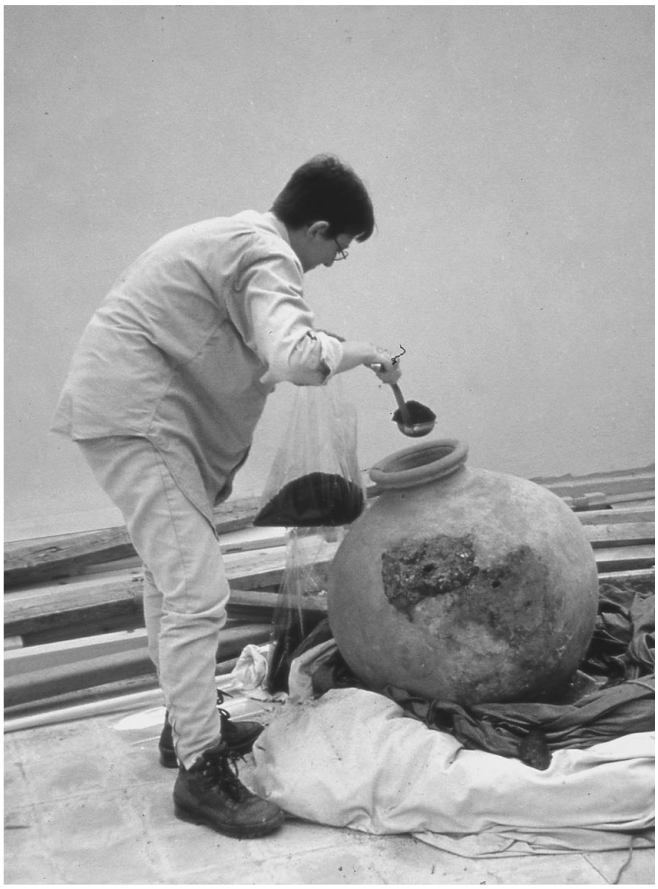

Figure 3.3: Emptying of the Dolia containing 7.55 kg of Piper Nigrum. Photograph taken from Cappers, 2006.

Figure 3.2: front view and top view of the stone Buddha head found in Trench BE19-126 (scale = 5cm). Photographs taken by S.E. Sidebotham

Figure 3.4: Glass uncovered during the excavations at Berenike. Photographs taken by S.E. Sidebotham (2011)

Chapter 4: Thessaloniki;

As stated before, there is limited information in English on Thessaloniki, especially its harbor and trade activities. I went to Thessaloniki to visit three museums that might give me more insight, these were *the Museum of Byzantine Culture*, *the Archaeological Museum of Thessaloniki*, and *the White Tower of Thessaloniki*. Of these three, only the Archaeological Museum proved to be useful. That being said, a lot of information could be garnered, and most of the things I will refer to in this section of my thesis are concerning the Museums and their artefacts.

4.1 Diversity in religion.

As stated before in the section on Berenike, one of the indicators that can be used to showcase a specific site's participation in a "global" network like trade, and its location in such a network, is the presence of diversity in religion. In Thessaloniki, the presence of religion is very clear from the things we expect, like the presence of the Olympian pantheon, Pan-Hellenic heroes, local hero worship, and the importance of Christianity in the Byzantine period, to more non-local sects. The "foreign" deities provably present in the archaeological record of Thessaloniki, mostly through votive statues, the presence of places of worship, and some funerary inscriptions, are from the Egyptian and Graeco-Egyptian pantheons, and at least one statue of the goddess Roma has been found. I will shortly discuss each god that has been found and is present at the museum here.

4.1.1 Serapis.

Worship of this Graeco-Egyptian deity, who is often considered a Hellenized form of the Egyptian god of the dead (figure 4.1), Osiris, and often also connected to Zeus, was present from at least the 1st century BCE judging by the statues and votive slabs found. This deity originated in Egypt and was given Hellenic qualities by Ptolemy I Soter (385 – 284 BCE) and its worship was centered in Alexandria. Since the religion followed trade routes and was most prominent in the larger commercial centers (Encyclopædia Britannica, 2016) it is logical to assume that the worship of this Deity found its way to Thessaloniki through merchants and sailors who either came from Alexandria or at least had some connections to Ptolemaic Egypt. Fraser concluded that the worship of Serapis in Thessaloniki was well-established, well-funded, and originated in the third century BCE, based on a letter, dated to 187 BCE, written by Philip V (Vickers, 1972, p. 165).

4.1.2 Harpokrates/Horus.

Originally known as Horus, Harpokrates is the Greek name of the same deity, the Son of Serapis and Isis (or Osiris and Aset when talking about Horus), who was the representation of the Sun at Dawn. The presence of his worship is connected to major trade routes, and

votive statues have been found as far away from Egypt as modern-day Afghanistan. The presence of votive statues in Thessaloniki (figure 4.2) is no different, and just like the presence of Serapis, his worship would have been brought to this major commercial center by merchants and sailors with connections to Ptolemaic Egypt.

4.1.3 Isis.

The Egyptian goddess Aset, more widely known by the Hellenized name Isis, was the goddess of healing and magic. Together with her husband Osiris/Serapis she was very popular amongst sailors and merchants and was one of the most important deities worshipped in the sanctuary of Thessaloniki. While the cult of Isis undoubtedly spread throughout the Mediterranean by proxy of merchants and sailors from Egypt, votive offerings by the Salarii family and a bust of a priest by the name of *L. Titonius Primus* point to Italian immigrants playing a role in its adoption in Thessaloniki.

4.1.4 Tutu.

Tutu (in Greek: Tithoe), was a leonine god protecting individuals from diseases. He is often depicted as a winged lion with a human head or a sphinx, sometimes with added characteristics to give shape to the complexity of his divinity. (Hart, 2005, p. 159) This deity was popular in the Graeco-Roman world and was also worshipped in Thessaloniki. A basalt figure, depicting a sphinx (figure 4.3) was found at the sanctuary/Serapeum during an excavation in 1939 (Vickers, 1972, p. 164). This figure originated from a workshop in Egypt, showing the sanctuary had close relations with the Nile Delta. A more detailed description of the statue itself, following the Panofsky method, and its interpretation as a Tutu statue is performed by Prof. Dr. Olaf Kaper (Kaper, 2012, p. 78 – p. 79).

4.1.5 Dea Roma.

This goddess was the personification of the city of Rome and was originally worshipped by those faced with Rome's ever-growing dominion. "What began as a religious response to Rome's military, political, and economic interventions would later grow to include monuments and rituals that demonstrated local loyalty to Rome's sovereignty." (Mueller, 2012). One of these monuments, a large statue, 220 cm tall probably depicting Dea Roma was found in Thessaloniki (figure 4.4). Furthermore, inscriptions refer to Roma worship already in the first century C.E.

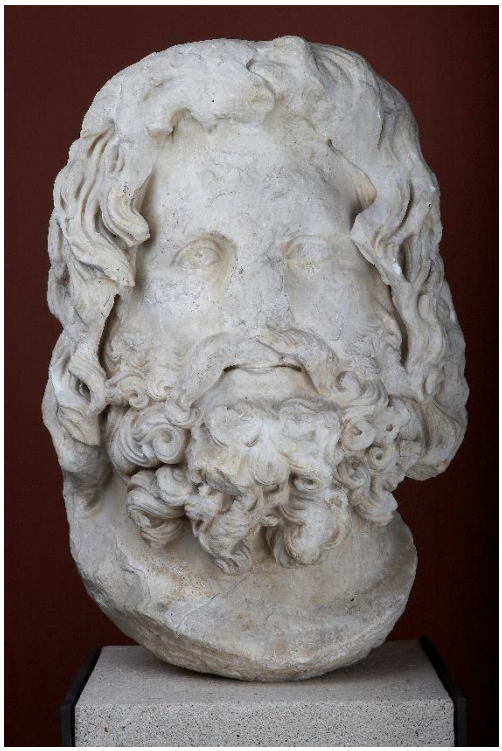

Figure 4.1: Bust of Serapis, 150 - 200 C.E. Photograph supplied by the Archaeological Museum of Thessaloniki

Figure 4.2: Harpokrates, 2nd century C.E. Photograph supplied by the Archaeological Museum of Thessaloniki

Figure 4.3: Basalt statue of a sphinx, associated with the deity Tutu. Photograph supplied by the Archaeological Museum of Thessaloniki

Figure 4.4: the statue likely depicts Dea Roma. Photograph supplied by the Archaeological Museum of Thessaloniki.

4.2 Materials, products, and production.

Other indicators for trade is the presence of materials that do not naturally occur in the area, a production that is fit for export, and products that were imported to the area. I already speculated that Macedonia, and therefore its largest port, exported timber and glass (based on the presence of glass production centers and its proximity to one of the only natural Natron sources of the ancient world, Pikrolimni lake). However, the archaeological museum of Thessaloniki also mentions tar, metals, and wine as exported goods. Furthermore, Thessaloniki was also known to mint its own coins, which was considered one of the most productive and reliable mints during the Imperial era.

4.2.1 Non-local materials.

At the Archaeological Museum of Thessaloniki, I found examples of a multitude of materials not naturally occurring in the city, nor in its immediate surroundings. Some of these materials would have found their way to the area from quite far away, like silk originating in (most likely) modern-day China, while others came from places like Egypt, only a "short" boat ride across the Mediterranean. Most, if not all, of the "foreign" material present in the Museum, were found in funerary contexts like tombs, cremation, and cist graves. Furthermore, there are some base materials that are found in the direct vicinity of Thessaloniki, of which it makes sense that they would be transported through the harbor.

4.2.1.1 Silk

Among the imported materials present at the museum was silk, the material won by harvesting the cocoons of the domesticated silkworm (the larvae stage of *Bombyx mori*). Originally a product of China, with later production centers also present in India, and giving its name to the well-known silk route. The most notable silk artefact at the museum concerns a gold-embroidered silk cloth (figure 4.5), found during the 1962 excavation of a burial site. The burial site contained a woman, aged 50 to 60, who was well off judging by her grave goods, including said silk piece.

4.2.1.2 Ivory and Schidai

Products made out of ivory and Schidai have also been found in the archaeological record of Thessaloniki, and are present both in the Archaeological Museum of Thessaloniki and the Museum of Byzantine culture. As stated in the previous chapter on Berenike, ivory and Schidai are materials that find their origin in either the east, specifically on the Indian sub-continent, and Sub-Saharan Africa, and would have found their way to the Mediterranean through either the land or maritime routes of the Indian Ocean trade. At the museums, the material takes its shape as luxury products, like ivory combs (*Archaeological museum of*

Thessaloniki), ornate jewelry boxes (*Museum of Byzantine culture, exhibition room 2*), or religious objects portraying the wealth of the Byzantine church.

4.2.1.3 Papyrus

Cyperus Papyrus, more commonly known as the paper plant, was a plant cultivated in the Nile Delta region of Egypt (Encyclopedia Britannica, 2019). The fibers of this plant were used to create papyrus, the "paper" that was used by the ancient Egyptians, and adopted by the Greek and Roman civilizations. This medium for writing was widely used in the ancient world and found its way to a multitude of commercial centers either as correspondence or as a form of paper. Thessaloniki is no exception and proof of the use of papyrus is amble. The most notable example of the use of Papyrus at the Museum is that of the Derveni Papyrus (figure 4.6). Often called "the oldest European book", this Orphic text was found amongst the remains of a pyre heaped on the tomb of a distinguished Macedonian warrior (Santamaría, 2019, p. 1) during the 1962 excavations. the tomb was located roughly 10 km northeast of Thessaloniki and could be dated to the last third of the 4th century BCE, thus around the time of the founding of the port city by Cassander, therefore fitting in the time frame of this thesis.

4.2.2 Local Materials.

Coming to the part of this thesis where we will touch on base materials that would have been harvested, won, or otherwise procured from the direct vicinity of the city, we will start with Timber.

4.2.2.1 Timber

In his article *Timber and politics in the Ancient World: Macedon and the Greeks*, E.N. Borza goes in-depth about the importance of Macedonia, and as an extension (and in later periods) Thessaloniki, to other Greek poleis and the Roman state when it comes to the trade in timber. He mentions, “The quality and abundance of Macedonian timber cannot have escaped the notice of the Athenian tyrant Peisistratus during his mid-sixth century exile in that region..” (Borza, 1987, p. 32). The quality of timber was such that the 4th to early 3rd century BCE Philosopher Theophrastus praised the Macedonian pines and firs for their superiority over all others when it came to the construction of ships and buildings (Borza, 1987, p. 36). These mentions of Macedonian timber, and its trade, are either long before the founding of Thessaloniki or very close to its founding in 317/316 BCE. However, in 227 BCE, almost a full century after its founding, we find mention of Antigonos Doson sending 15000 timbers to the earthquake-stricken Rhodos for the repairs of their roofs and beams. (Borza, 1987, p. 40). What is more, Livy mentions that after the defeat of Perseus, the last king of Macedonia, by the Romans, they forbade the harvest of Macedonian ship

timbers by Macedonians or others (Livy 45.29.13) probably as a way to keep the timber trade, and the resource itself, firmly in the control of the Roman republic. When considering the transport of the timber to the sea, two options spring to mind, the use of timber wagons which could be pulled by mules, asses, and for the heavier loads, oxen. We have evidence of these timber wagons mainly from Roman times (Meiggs, 1982, p. 342). The second transport option is one that to both contemporary lumbermen and those in ancient times would have been the most logical, which is transport via river systems. The lumber would be dropped in a river, which would then float them to the river mouth, from where they could be transported further by merchant ships. The mouth of the Strymon river, one of the rivers mentioned by Borza as one of the Macedonian rivers suitable for this type of transport (Borza, 1987, p. 37) is located a mere 9 kilometers, as the crow flies, from the center of Thessaloniki.

4.2.2.2 Natron

Leaving the discussion on the timber trade behind, we have to touch upon natron (NA2CO3). This material was used in glass production, the mummification process, and a host of other products, such as medicine. It was found in only a few places in the ancient world, and in very few places could it be found in the abundance and of the quality as from Chalastra (Dotsika *et al*, 2009, p. 133). This lake can currently be identified as Pikrolimni Lake and is located roughly 24 kilometers northeast of Thessaloniki, as the crow flies.

4.2.2.3 Tar/Pitch

As stated before, the Archaeological Museum of Thessaloniki mentioned tar as an exported material. After looking into this I did not easily find any articles, books, or other relevant media that mentioned the production of tar in tandem with Macedonia or Thessaloniki. However, Borza mentions pitch, specifically pitch won from the resin of pines and fir trees, as having no equal in the construction of ships (Borza, 1987, p. 34). Coincidentally, pines and fir trees are the trees found most commonly in Macedonia, and the words for pitch and tar are often used interchangeably. Ioanna Vassiliadou, in her article *"Pierian-Macedonian pitch. A brand name agricultural product of Ancient Macedonia"* states how it was famous in the ancient world, and she talks about the pitch donation of Antigonos Doson to the earthquake-stricken Rhodos as "…the biggest known so far tar transportation in the Greco-Roman world" (Vassiliadou, 2018, p. 333). I, therefore, suspect the museum was talking about pitch rather than tar, and I will continue under that assumption. She mentions the Pierian-Macedonian pitch originally being from Pieria (roughly 54 kilometers from Thessaloniki, as the crow flies) but also attests to the fact that as Macedonia extended its rule, the pitch won in Chalcidice could also be considered part of the Pierian-Macedonian pitch (Vassiliadou, 2018, p. 335). Both Pieria and Chalcidice can be considered part of the

hinterland of Thessaloniki, supplying the city with the materials it might need. There is enough evidence that shows the pitch to be an export product, from the presence of Trade Mendean Amphorae lined with Pierian-Macedonian pitch in Italy and Athens (Vassiliadou, 2018, p. 335), to Pierian-Macedonian pitch being used to coat, glaze and purify the altar of Horns in Delos (Vassiliadou, 2018, p. 338; Glotz, 1916). Vassiliadou goes on to state that "the literary, archaeological, and epigraphical evidence allows us to conclude that pitch was produced and traded continuously for about six centuries in Macedonia, from the 5th century BC until the Byzantine era" (Vassiliadou, 2018, p. 340) making it coincide with the time frame for this thesis.

4.2.3 Manufacture centers.

"But Macedon was one of the few places that was self-sufficient" (Borza, 1987, p. 48). This small excerpt taken from the article of Borza on timber and politics is quite informative of the role of Macedonia, and therefore Thessaloniki, in the larger trade systems of the ancient world. A self-sufficient place would not need to rely on others for the base products needed for its inhabitants to survive, and even thrive. What is more, this meant that the trade could be focused on importing luxury goods, and on the export of final products for which production centers would be needed. Thessaloniki was known as a production center of luxury goods, therefore it is no surprise that these workshops were present in abundance. In fact, evidence of 112 workshops has been uncovered so far. A detailed catalog and description of all 112 can be found in "*Arts, Crafts, and Trade in Ancient and Byzantine Thessaloniki*" by Anastassios Antonaras. From these 112, a total of 53 can be considered within the timeframe of this thesis. Of these 53, I will be ignoring the ones that would not have any connection to being an export good (i.e. Lime production and the production of ceramics used for the construction of local buildings).

4.2.3.1 Metalworking

Metalworking was important in Thessaloniki, especially during the Imperial period, not only was it one of the most reliable coinage mint locations throughout antiquity, a fact that I will touch on later, but it was also one of four cities where a fabrica (state arms factory) was active. Not only were arms supplied to the state, but a funerary inscription on a fourth-century sarcophagus, which also included a relief decoration, shows that another product created by the metal smiths of the city was Gladiatorial armor (Antonaras, 2016, p. 29). A total of 9 metalsmith workshops, fitting within the timeframe, have been identified by Antonaras, of which at least one could be connected to the state mint.

4.2.3.2 coinage

Speaking of the state mint, it is stated by the Archaeological Museum of Thessaloniki that the city minted its own coinage. Starting in the first few decades of the 2nd century BCE, all the way through the imperial era and even into the Byzantine era. The earliest issue in their collection dates to 187/168 BCE, however, most could be dated to the imperial era (figure 4.7). The American numismatic society has roughly 762 coins from the Thessaloniki mint in their dataset, all dating between the late 3rd century C.E. and the late 5th century C.E. (http://numismatics.org), this coincides with the one confirmed state mint workshop given by Antonaras dating to the 4th to 5th centuries C.E. (Antonaras, 2016, p. 155).

4.2.3.3 Glass manufacturing

Another production process that used heat, was that of glass making, and it is no surprise that a commercial center like Thessaloniki had secondary glass workshops in abundance, there were five that can be dated to the timeframe of this thesis. In relation to these workshops, Antonaras mentions that there "....were workshops in which objects were formed from raw glass that was imported from the great glass-production centers of the Levant and Egypt and recycled glass objects..."(Antonaras, 2016, p. 22). However, with the presence of a Natron source so close by, it stands to reason that there was also primary glass production present. Current lake Pikrolimni is identified as the historical lake Chalastra, and therefore we may well have an independent tradition of glass making in the region, where they made use of locally won natron in the recipes evolved from Aegean, and ultimately Near Eastern sources (Archibald, 2007, p. 266). Regardless of where the raw glass originated from, glass vessels are still a probable export product.

4.2.3.5 Ceramics

There were some ceramic workshops focused on the creation of vessels, but I am more interested in what could have possibly been exported in those vessels. As mentioned by the museum, one of the export products leaving Thessaloniki was wine, this is further supported by the presence of two wine presses dating to the early Byzantine periods. (Antonaras, 2016, p. 192 & p. 194).

4.2.3.6 Dye

Finally, I will discuss the presence of dye workshops, specifically, the presence of a workshop where a large number of murex snail shells were found, pointing to the location creating purple-dyed fabrics. Its date ranges from the 2nd or 1st century BCE until the 1st century C.E. (Antonaras, 2016, p. 197). However, the presence of murex shells in combination with the dyeing of fabrics in Thessaloniki can be traced back to the bronze

and iron age (Veropoulidou *et al*, 2008). In antiquity, the color purple was associated with divinity and power, not only that but the creation of purple dye was very costly and labor-intensive. In order to get 1.4 grams of purple dye, a quantity of about twelve thousand *Murex Brandaris* is needed, this also meant that the price of the dye would be very high (Frangié-Joly, 2016, p. 51; Jacoby, 2004, p. 210).

4.2.3.7 Discussion: Finished products

There were a few imported finished products present at the museum, but since these objects are relatively straightforward I will keep this part relatively short. Both a *skyphos* made of molded glass and faience *Kalathos* were imported from Egypt. Furthermore, a bronze medallion depicting the goddess Athena alongside the heads of dogs and panthers, from the 2nd century BCE, can possibly be traced back to a workshop in Delos. Finally, I would like to mention some Corinthian and Black-figured Attic fine wear that are present at the museum. Even though the ones present at the museum are dated before the founding of Thessaloniki, it is possible this import of fine ware continued far into the existence of the port city.

Figure 4.5: Gold-embroidered silk piece from a funerary context. Photograph supplied by the Archaeological Museum of Thessaloniki

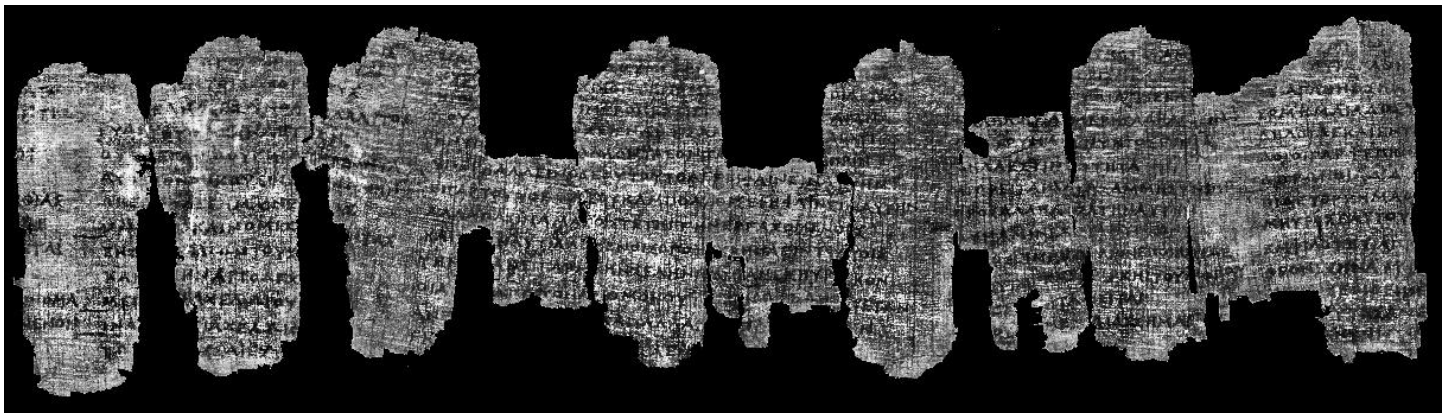

Figure 4.6: The Derveni papyrus, uncovered during the excavation of the tomb of a Macedonian warrior in 1962. Photograph supplied by the Archaeological Museum of Thessaloniki

Figure 4.7: Coins minted in Thessaloniki. Photograph supplied by the Archaeological Museum of Thessaloniki

Chapter 5: Discussion

In this part of the thesis, I will discuss the findings based on the comparative analysis, and my interpretation of their meaning. The discussion will follow the variables I have identified, these being the presence of non-local cults in the port sites, both the non-local and local materials present in the archaeological record, followed by the evidence of production centers and possible warehouses (figure 5.1).

	Diversity in Religion	Non-Local Materials	Local Materials	Production Centers	Warehouses
Berenike	Present	Present	Not present	Not Present	Present
Thessaloniki	Present	Present	Present	Present	Not present

Figure 5.1: Table showing the identified variables and their presence in the sites. Created by Noud Visser (2023)

5.1: Diversified religion

In the introduction of this thesis when discussing how integral trade is to the human experience, I state that besides bringing in profit and products, it is also the highway along which ideas and peoples travel. These ideas include a way to understand the world they live in, a ship on an ocean as it were, namely religion. Therefore we would expect a node or hub in trade systems, where a lot of peoples and ideas mix, to show at least some diversity in their religion with the presence of what could be called non-local cults. As expected, this is the case in both Berenike and Thessaloniki. In the latter, this takes the shape of Graeco-Egyptian hybrid deities, like Serapis and Isis, being widely worshipped with abundant votive statues being uncovered during the excavation of the Serapeum in 1939. Additionally, historical texts discuss the worship of these deities and how they were brought to the city through merchants of mostly Italic origin, and a multitude of funerary inscriptions also point towards the worship of Isis. At Berenike, there is ample evidence pointing to the worship of different deities not originating from Egypt or even the Mediterranean. The presence of Buddhist practice is based on three statues depicting a Buddha and the literary and archaeobotanical evidence of Indian merchants staying at the site. Furthermore, Zoroastrianism is present in the archaeological record in the form of a broken glass cameo depicting a fire altar, and the influence this religion had on the Greek dualistic view of the world. It needs to be stated, however, that due to the lack of further available evidence, the presence of these two religions is only speculation, even if it seems likely. More certain is the presence of two religious traditions, which can be considered non-local. The first is the worship of the Palmyrene deity, known as either Hierobol or Yarhibol, who was worshipped in the “Palmyrene shrine”, and was mentioned in a surviving Greek-Palmyrene inscription and a statue of the god. The

second is the presence of South-Arabian religions, specifically the worship of the Yemeni deity *Almaqah*, who was worshiped in modern-day Yemen and in the kingdom of Aksum, modern-day Ethiopia. This is largely based on the layout of the Northern Shrine, and some of the artefacts it contained.

5.2: Non-local materials.

Both Berenike and Thessaloniki have an abundance of what could be considered non-local material, however, there is an inherent difference between what the materials can be classified as. In Berenike, the non-local material is mostly organic in nature, foodstuffs like rice and sorghum, with the biggest find being roughly 7.55 kilograms of black pepper, a trade product also discussed in the *Periplus*. Some traces of wood not native to the area, like teak and bamboo, may be connected to the maintenance and repairs of ships hailing from the Indian subcontinent. While some of the ceramic and glass finds, all of which were non-local, were luxury products (think of Terra Sigillata for ceramics or millefiori and cameo for glass), most were transport vessels like amphoras. These trade vessels and their contents were mentioned in numerous *Ostraca* from Berenike and in the *Periplus* as a trade good intended for the subcontinent and beyond. Where I would classify the non-local material in Berenike as largely foodstuff and material intended for the transit of products, the non-local material in Thessaloniki is of a more luxurious nature, that had found its final destination in the possession of the inhabitants of the city. I base this assessment on the type of artefacts found, like the gold-embroidered silk cloth, and their contexts which were mainly funerary in nature.

5.3: Local material.

When comparing the local materials present in Berenike and in Thessaloniki, a discrepancy seems to emerge. Berenike has almost no local materials produced by the hinterland that could possibly be intended for trade, while Thessaloniki has an abundance. Most of the organic material that was locally produced in the Eastern Desert is connected to local consumption, with the only possible exception being the palm date. It should be mentioned, however, that the hinterland of Berenike was rich in precious and semi-precious stones, and it is known that this is a local material that was traded within the Roman empire. The hinterland of Thessaloniki, on the other hand, was highly productive, in part due to its geography and climate and produced materials that were highly suitable for trade. Especially its timber and pitch sources were used in abundance, and there is evidence, mostly textual in nature, that point to Natron originating from Lake Pikrolimni (Chalastra) being very popular in the Ancient world due to its quality and abundance.

5.4: Manufacture centers and warehouses.

When comparing the two port sites of Berenike and Thessaloniki, a clear difference we can see is the presence, or in the case of Berenike the lack thereof, of clear archaeological evidence pointing towards production. While Sidebotham does denote an area at the western edge of the site as a Ptolemaic industrial area, the actual evidence of production centers throughout the existence of the port is flimsy at best. There is evidence of some metalworking, specifically cold-working, plus a significant amount of cordage remains pointing towards the local production of rope and cordage. However, in my opinion, this points to the production being focused more on the repair and maintenance of ships, rather than on the production for export which was the case in Thessaloniki. Macedonia, and therefore Thessaloniki, was self-sufficient which in turn made large-scale production centers possible. So far, based on excavations and literary sources, Antonaras managed to identify a grand total of 112 workshops. A large portion of these workshops made products that could have been exported ranging from the minting of coins to glass and ceramic production, and even some dye workshops where the presence of murex snails hint towards the creation of purple-dye and purple-dyed fabrics.

Something I could find no evidence for in Thessaloniki, possibly due to its continued habitation and the function of the site, but did find ample evidence for in Berenike, both in literary sources as well as in the archaeological record, is the presence of storage warehouses. The clear presence of storage warehouses and lack of production centers in Berenike is, in my opinion, an indication of the function of Berenike as a transit harbor, where sufficient storage facilities would be needed when awaiting further transport to their final destination.

5.5: Variables and interpretation

The variables identified in this thesis and discussed in this chapter may be able to identify two different types of nodes and hubs in larger trade systems, based on relatively limited information. If there is an abundance of evidence for all the variables, it is likely that a site would have functioned as a hub that functioned both as a production center, as well as a final destination for products from non-local places, alongside its function as a transit hub. The example of this type of hub in this thesis is Thessaloniki, discussed in chapter 4, where evidence points to the presence of both local and non-local materials, production centers and a diverse religious palette that is not inherently native to the area.

For the second node it is not necessarily required to have an abundance of local materials, but the presence of non-local materials and a diversity in religion is required. Furthermore, these “transit ports”, of which Berenike is an example as we can see in

chapter three, usually lack clear production centers but rather has clear evidence for warehouses where products can be housed temporarily. Speaking on these types of sites, especially in the case of Berenike, it seems likely, to me at least, that production present was mostly focused on the repair and maintenance of ships and other transport vessels, as well as for personal use like the garden plants.

Chapter 6: conclusion.

"*How does the archaeological record compare to relevant textual sources?*", the first of three sub questions for this thesis as discussed in the opening chapter, can be answered as follows. We can deduce that while the relevant textual sources do support the importance of both harbors in the trade systems of the ancient world, their archaeological record points to a higher degree of importance than previously assumed. Especially in the case of Thessaloniki, it seems that the site was already involved in extensive "international" trade long before the Byzantine period. Therefore I would say that although the archaeological record and textual sources do support one another, on their own they are not sufficient in creating a clear picture of the human past, and as such it is important that both kinds of data are taken into account.

In trying to answer the second question, posed as "*How does the lack of focus on archaeology in previously performed research affect the methodology used?*", I found that the lack of clearly published archaeological research led me to switch methodologies and theoretical frameworks. I initially planned on using Globalization Theory as a way to understand the sites, however, as I started reading I quickly realized that the relative lack of research would not be sufficient for a top-down approach. It became increasingly clear to me that I had to understand the site and its data before placing it within a narrative, due to this reason I shifted my focus from Globalization Theory to Network Theory and its more bottom-up approach, while keeping my initial methodology of a comparative analysis and basing it less on databases and catalogues.

This bottom-up approach combined with a comparative analysis of the sites, allowed me to identify four variables, five if you count the presence of warehouses as separate from production centers, that could aid in the identification of nodes in trade systems. The identified variables are the answer to the third sub question "*Can we identify certain variables for port hubs based on a comparative study of archaeological data?*", and can be summarized as diversity in religion, the presence of local and non-local materials, and the presence of production centers and warehouses.

So, to conclude with an answer to the main research question "*What patterns emerge from a comparison of the archaeological evidence from two main Mediterranean ports, Berenike in Egypt and Thessaloniki in Greece?*". The comparison led to the identification of a set of variables that can serve as an indication for trade hubs and nodes, variables that lead to a pattern that can be tested, confirmed, or disproven by further research. Not only that, it also became increasingly clear which patterns are applicable to the different kinds of nodes and hubs, and as such can help us define either a hub focused on transit or one

that is both the final destination, as well as the starting point for products, relatively early on in a study.

Future research.

As stated before, the variables identified in this thesis can be tested, and can form the basis for possible future research, but what would this look like? During future research we can make a more broad comparison, using more data and different sites, first to test the variables, and if they are repeatable they can be used to further identify nodes and hubs. Other than the identification of nodes and hubs, possible future research could also include a chemical analysis to see how widespread Pierian-Macedonian pitch in Amphoras is, or a botanical analysis for Berenike focusing more on pollen and seeds. Therefore we can see the research performed in this thesis as a node from which multiple connections can be made (Figure 6.1). This thesis also shows how Network Theory can be useful as an interpretative tool, and can have a broad application.

Figure 6.1: A mind map showing connections for future research based on this thesis. Created by Noud Visser, using SimpleMind Pro (2023)

Abstract.

In this thesis, the trade activities of two port sites, Berenike in Egypt and Thessaloniki in Greece, from their respective founding (275 BCE for Berenike and 316 BCE for Thessaloniki) until the early Byzantine era (~C.E. 700) have been researched through a comparative analysis. Both sites were important nodes in the trade networks of the ancient world, Berenike serving as a transit port between the areas of the Indian Ocean and the Mediterranean, and Thessaloniki focusing more on the creation, export, and import of luxury goods. While research into these networks has been growing in popularity in recent years, there has been a distinct lack of variables that can be used to identify nodes and hubs. The development of a set of variables is an important step in identifying these key features of ancient trade networks and will contribute towards a more complete understanding of complex systems like this. Therefore, the aim of this thesis was to investigate, identify, and codify a set of variables that can be used for this express purpose. The variables were identified through a comparative analysis using the aforementioned port sites as case studies, taking an interdisciplinary approach, using sources like excavation reports, relevant literature, and museum exhibitions to create a clear picture. The theoretical framework applied to this research is Network theory, initially I intended to use Globalization theory but found that the latter did not fit the research as well as the former.

This process resulted in the identification of five variables – *diversity in religion, local material, non-local material, production centers, and warehouses* – highlighting the importance of both ports, while at the same time not shying away from their differences. While most of the results were expected like Berenike having the transit of goods as its main objective, an unexpected result is that it seems likely that Thessaloniki took part in extra-Mediterranean trade before the Byzantine era, and thus earlier than previously assumed.

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Figures.

Cover image. *The Arch of Galerius, colloquially known as the Καμάρα, in Thessaloniki.* Image by Ελευθερία Παυλίδου (2023).

Figure 2.1: *Location of Berenike; South of Ras Banas at the easternmost edge of the Eastern Desert.* Noud Visser, Google Earth.

Figure 2.2: *The layout of Ancient Thessaloniki over the contemporary city.* Noud Visser, Google Earth.

Figure 2.3: *Graph of the world wide web circa 2004. Internet map 2004.* From Math Insight. http://mathinsight.org/image/internet_map_jurvetson_2004

Figure 3.1: *Bronze Bull's head welded to a bronze plate.* Photograph by Steven E. Sidebotham.

Figure 3.2: *Front view and top view of the stone Buddha head found in Trench BE19-126 (scale = 5cm).* Photograph by Steven E. Sidebotham.

Figure 3.3: *Emptying of the Dolia containing 7.55 kg of Piper Nigrum.* The photograph was taken from "Roman Foodprints at Berenike" (2006).

Figure 3.4: *Glass uncovered during the excavations at Berenike.* Photographs were taken by Steven E. Sidebotham.