

RED SEA VIII: COVETED TREASURE

**THE ECONOMY OF NATURAL RESOURCES:
EXTRACTION, PROCESSING AND TRADE**

International conference on the peoples of the
Red Sea region and their environment

University of Warsaw, 4–7 July 2017

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RED SEA VIII

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ARABIAN RED SEA ROUTE

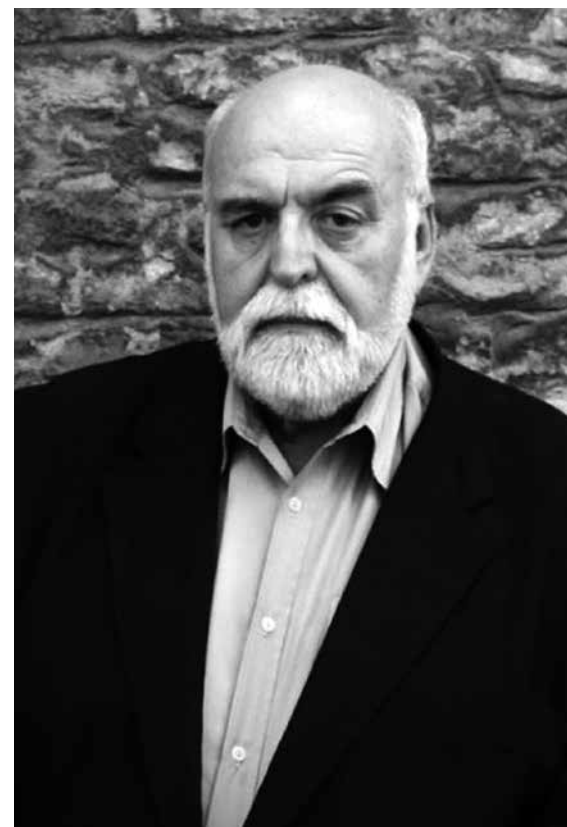
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IN MEMORIAM
PROF. MAURIZIO TOSI
1944–2017

Red Sea VIII Conference in Warsaw, 4–7 July 2017
Coveted treasure. The economy of natural resources:
extraction, processing and trade

Associated event:
 The Arabian Red Sea Route workshop in Warsaw, 3 July 2017
 (see separate program back-to-back in this volume)

	Arabian Red Sea Route WORKSHOP	PANEL 1: Natural Resources	PANEL 2: Indian Steel	PANEL 3: The Bead Road	PANEL 4: Incense Trade	PANEL 5: Current Research	Poster Session
Monday	sessions 1, 2, 3, 4						
Tuesday		sessions 1, 2				session 3	
Wednesday				sessions 4, 5, 6			Coffee in hand!
Thursday			session 7	session 8			
Friday					session 9	sessions 10, 11	

Panel 1: Natural resources on the move

Panel 2: Indian steel and other metals: reconstructing the metalworking craft

Panel 3: On the 'Bead Road'... Studying materials and techniques for the jeweler's craft in the Western Indian Ocean Basin

Panel 4: Incense trade in the Red Sea

Panel 5: Current fieldwork and recent research

POSTER SESSION

MONDAY, 3 JULY

17.00–20.00 Early registration Institute of Archaeology, University of Warsaw

TUESDAY, 4 JULY

The Old Library, University of Warsaw

8.30– Registration

10.00–10.15 Opening ceremony

10.15–10.30 Prof. Maurizio Tosi – *In memoriam*

Opening Lecture

10.30–11.30 *Eivind Heldaas Seland*
 Thirty years of Red Sea studies: insights, agendas, perspectives

11.30–12.00 COFFEE BREAK

12.00–14.00 Session 1 NATURAL RESOURCES

Chair: Chiara Zazzaro

12.00–12.30 *Steven E. Sidebotham*
 Construction materials and methods at Berenike: A Ptolemaic-Roman port on Egypt's Red Sea shore

12.30–13.00 *Kristoffer Damgaard, Ashley Coutu*
 Biomolecular approaches to ivory trade and craftsmanship in Late Antiquity and Early Islam

13.00–13.30 *Jacke Phillips*
 Kohl kit

13.30–14.00 *Marta Bajtler*
 Jar and amphora stoppers and plugs from Berenike. Distribution at the site, materials and techniques

14.00–16.00 LUNCH
Tour of the University of Warsaw Museum

16.00–17.30 Session 2 NATURAL RESOURCES

Chair: Michał Gawlikowski

16.00–16.30 *Mateusz Lisak*
 Trade in renewable and non-renewable goods on the Indian Ocean and the Red Sea in the *Periplus Maris Erythraei*; the structure of trade as a factor in economic impact

16.30–17.00 *Eivind Heldaas Seland*
The Networked Sea: visualising, analysing and modelling connectivity and movement in ancient Red Sea trade

17.00–17.30 *Laurence Smith, Shadia Taha, Jacke Phillips and Michael Mallinson*
Trade and 'Treasure': the role of Suakin in the movement of valuables, 15th–19th centuries AD

17.30–18.00 COFFEE BREAK

18.00–19.30 Session 3 CURRENT FIELDWORK AND RECENT RESEARCH
Chair: Dionysius Agius

18.00–18.30 *Iwona Gajda, Anne Benoist*
The archaeological site of Wakarida and its region, Tigrai, Ethiopia

18.30–19.00 *Joanna K. Rądkowska*
Small but significant... an Indian terracotta in Berenike?

19.00–19.30 *Ahmed Adam*
Investigating the archaeology and Islamic settlements of Khor Nubt

20.00–22.00 RECEPTION

WEDNESDAY, 5 JULY 2017 The Old Library, University of Warsaw

Keynote Lecture
9.00–10.00 *Jonathan Mark Kenoyer*
Stone bead production and trade: new insights from the Indus civilization and the early historic period of South Asia

10.00–11.30 Session 4 THE BEAD ROAD
Moderator: James Lankton

10.00–10.30 *H. Albert Gilg*
The ancient garnet trade in the Indian Ocean: beads and beyond (with K. Schmetzer, U. Schussler, A.K. Carter, J. Panjikar, T. Calligaro and P. Perin)

10.30–11.00 *Yvonne Petrina*
The supply of raw materials and their influence on fashion. Gem stones and beads from Antiquity to Byzantium

11.00–11.30 *Timothy Insoll*
The archaeology of bead making and jewellery production at Harlaa, Eastern Ethiopia

11.30–12.30 POSTER SESSION
COFFEE BREAK during the poster session

12.30–14.15 Session 5 THE BEAD ROAD
Moderator: James Lankton

12.30–13.15 *James W. Lankton, Bernard Gratuze*
Glass routes of the Southern Seas

13.15–13.45 *Shinu Anna Abraham*
On the road with the Indo-Pacific bead: spatial and temporal patterns of glass bead production and consumption

13.45–14.15 *Carolyn Swan*
From sand to sea: tracing the production and trade of glass beads from the 10th-century CE Cirebon shipwreck in the Java Sea

14.15–15.30 LUNCH

15.30–17.30 Session 6 THE BEAD ROAD
Moderator: Jonathan Mark Kenoyer

15.30–16.00 *Jonathan Mark Kenoyer*
New insights on stone bead production and trade at the site of Hajar al-Rayhani, Yemen

16.00–16.30 *Miriam Lahitte*
Beads of quartz ceramics in Gala Abu Ahmed (Sudan)

16.30–17.00 *Roland de Beauclair*
Seashells in the sand – the ornamental objects from the Neolithic graveyard of al-Buhais 18, UAE

17.00–17.30 *Alfredo Carannante*
Shell beads as indicators of identity and connectivity in the Red Sea and beyond

THURSDAY, 6 JULY 2017 State Archaeological Museum in Warsaw

Keynote Lecture
9.00–9.45 *Thilo Rehren*
Iron metallurgy around the Red Sea – some challenges and opportunities

9.45–13.00 Session 7 INDIAN STEEL AND MINING RESOURCES
Chair: Iwona Zych

9.45–10.15 *Joan Oller Guzmán*
New evidence on metallurgical production during the Ptolemaic period in the ancient harbor of Berenike (Eastern Desert, Egypt)

10.15–10.45 *Martin Hense*
Metal working and possible metal production in Berenike

10.45–11.15 *Julie Marchand, Bérangère Redon*
Gold mining in the Eastern Desert of Egypt, from New Kingdom to medieval times

11.15–11.30 COFFEE BREAK

- 11.30–12.00 *Ali Jarkhi*
Early Islamic gold mining. New insights on Arabian mining techniques
- 12.00–12.30 *Alan Lee, Ric Furrer*
Crucible steel production: an experimental study of crucible composition and structure
- 12.30–13.00 *Joan Oller Guzmán*
The emerald mining in Wadi Sikait: organization and distribution of emerald
- 13.00–15.00 **MELTING CRUCIBLE STEEL: archaeology in theory and practice**
Archaeometallurgical experiment
Marek Woźniak and Władysław Weker
- LUNCH** during the session;
visiting State Archaeological Museum galleries

The Old Library, University of Warsaw

16.00–19.00 **Session 8 THE BEAD ROAD**
Moderator: Jonathan Mark Kenoyer

- 16.00–16.30 *Giulia Tucci*
Dynamics of internationalism during the Late Bronze Age: circulation of raw materials and production between the Western Basin and the Indian Ocean and the Southern Levant
- 16.30–17.00 *Silvia Lischi*
Beads and pendants from Al Hamr al-Sharqiya, Oman
- 17.00–17.30 *Anja Prust*
Tayma and the Sea
- 17.30–18.00 COFFEE BREAK**
- 18.00–18.30 *Ann Andersson*
Beads, pendants and other ornaments as indicators of long-distance trade. Trade connections of the Dilmun trading station at Failaka Island, Kuwait, in the late third–second millennium BC
- 18.30–19.00 *Zuzanna Wygnańska*
Preliminary studies on beads from the Iron Age levels of the Polish excavations in Saruq al-Hadid, Dubai (UAE)

FRIDAY, 7 JULY 2017

The Old Library, University of Warsaw

- Keynote Lecture*
9.00–10.00 *Aylin Orbasli*
An architectural legacy of exchange: the making of the Red Sea style
- 10.00–12.30 **Session 9 INCENSE TRADE IN THE RED SEA**
Chair: Steven E. Sidebotham
- 10.30–11.00 *Julian Jansen van Rensburg*
Socotra: The forgotten island of incense
- 11.00–11.30 *Barbara Huber*
Investigating incense burners from Tayma, Northwest Arabia: an olfactory perspective
- 11.30–12.00 *Shadia Taha*
Frankincense: traditions rooted in the Sudanese DNA
- 12.00–12.30 *Alexia Pavan*
The port of Al Baleed (southern Oman) and the frankincense trade in the medieval period
- 12.30–13.00 COFFEE BREAK**
- 13.00–14.30 **Session 10 CURRENT FIELDWORK AND RECENT RESEARCH**
Chair: Julian Jansen van Rensburg
- 13.00–13.30 *Marta Osypińska*
Early domesticated cattle of Northeastern Africa – coveted treasure of Neolithic pastoralists
- 13.30–14.00 *Piotr Osypiński*
Animals in early Roman Berenike – perspectives of the livestock trade searching: Africa–Europe–Asia
- 14.00–14.30 *Marek Woźniak*
Water as a resource in Berenike
- 14.30–16.00 LUNCH - GENERAL MEETING**
- 16.00–18.30 **Session 11 CURRENT FIELDWORK AND RECENT RESEARCH**
Chair: Karol Juchniewicz
- 16.00–16.30 *Joanna Ciesielska*
Burying the dead on the Red Sea coast: burial customs in Lower Aynuna (results of the 2015–2017 excavation seasons)

- 16.30–17.00 *Marek Woźniak*
Tomasz M. Herbich
Reconstructing the nonexistent: magnetic prospection in tracing the lost Hellenistic architecture of Berenike
- 17.00–17.30 *Sara Fani*
An archaeological perspective of investigation on Islamic manuscripts from the Horn of Africa

19.00 **FAREWELL DINNER**

PANEL 1: NATURAL RESOURCES ON THE MOVE

Keynote lecture

Eivind Heldaas Seland
University of Bergen

Thirty years of Red Sea studies: Insights, agendas, perspectives

Red Sea studies have come of age. Out of venerable, but humble origins and with modest beginnings, the study of the distant past of the Red Sea has grown to a diverse, international, and multidisciplinary venture. Starting as disjoint appendices to regional, colonial, biblical and classical archaeologies and histories, the study of the Red Sea is increasingly becoming an integrated scholarly field in its own right.

While the series of Red Sea conferences starting in 2002 has been instrumental in this and might be described as a kind of take-off, their success also reflects that they met a pre-existing interest and that scholars were able to draw on an existing historiography. In my talk I argue that several important projects and publications since the late 1980s prepared that ground. I look at how the field has changed over the course of three decades in terms of major insights, changing agendas and new perspectives. Finally, I address some of the inevitable blind spots and challenges that still prevail, but that offer opportunities for new decades of Red Sea studies.



Marta Bajtler*Berenike Project***Jar and amphora stoppers and plugs from Berenike.
Distribution at the site, materials and techniques**

Amphora and jar stoppers found during the 2010–2014 seasons of the Polish–American excavations at Berenike on the Red Sea are found mainly in the early Roman trash dumps, although single finds come from all over the ancient city. Altogether 54 stoppers were studied. More than 60% were preserved fragmentarily, some were stamped and colored. As a category they are typical of the Eastern Desert. Numerous finds come from Myos Hormos and Mons Claudianus, single finds from Mons Porphyrites and Sikait. They reflect Egyptian wine production during the Roman and late Roman periods. They consist of plug and sealing mixture, made from different materials like plaster and mud, ceramic elements (bowls, lids, roudcuts, sherds), natural cork, wood or textile.

Kristoffer Damgaard*University of Copenhagen***Ashley Coutu***University of York***Biomolecular approaches to ivory trade and craftsmanship in Late Antiquity and Early Islam**

This paper combines archaeological analysis with a range of archaeo- and biometric techniques in order to investigate the nature of usage, as well as the biological and geographical origin of a small group of ivory artifacts recently discovered in the earliest exposed cultural depositions at the Early Islamic (AD 650–1100) port of Aylah (Aqaba, Jordan). In addition to explaining the finds and the significance of their context for interpreting possible historical implications, the article uses a range of laboratory-based techniques to learn more about the morphological and biomolecular aspects of these artifacts. In combining traditional archaeological analysis with expert visual analysis and innovative biomolecular testing, fresh perspectives are provided that shed new light on the infrastructure and geographical scope of late antique and early medieval trade systems. Moreover, it informs us on the economic and commercial roles played by Red Sea ports in this period. And finally, it highlights the potential of analyzing calcified mammalian tissue (dentine) from sites in the region to reveal new details and characteristics of historical Indian Ocean trade networks.

Mateusz Lisak*Institute of History, The Jan Kochanowski University in Kielce***Trade in renewable and non-renewable goods on the Indian Ocean and the Red Sea in the *Periplus Maris Erythraei*, the structure of trade as a factor in economic impact**

The impact of Roman trade with India and the Arabian Peninsula on the Roman macroeconomy is difficult to determine. Studies concern mainly the value of income from trade taxes and the outflow of bullion from the Empire. Ancient texts and numismatic evidence cannot always be considered as a sure source of data and both require further discussion. However, an analysis of the sources touches not only on issues of their reliability and meaning. Conclusions can be drawn based on the structure of these sources as well. The aim of this paper is to demonstrate the kind of information about Roman trade with the East that can be drawn from this trade structure. In this case, the list of renewable and non-renewable trade goods mentioned in the *Periplus Maris Erythraei* is the base for this research. The conclusions would bring a new point of view about theory of the outflowing bullion as also a better understanding of the consequences associated with the Roman trade with South Arabia and India.

Jacke Phillips*School of Oriental and African Studies, University of London***Kohl kit**

Kohl is sourced from a variety of materials, including stibnite, antimony, galena and frankincense, over much of the ancient Near East, India and Northeastern Africa. Ground into powder and then a paste, it was (and still is) used both to emphasize and to protect the eyes by men and women, although mostly the latter. Kohl forms an integral part of a basic 'make-up kit' that in essence varies little either chronologically or spatially over the region, although differences are apparent. Recent work at Maryam Anza in northern Ethiopia has revealed a number of individuals interred with their 'kohl kit', combining kohl, applicator, container and sometimes mirror, which together indicate a variety of origins via the Red Sea. This paper will present the kit at Maryam Anza and discuss some implications for its presence here.

Eivind Heldaas Seland*University of Bergen***The Networked Sea: visualizing, analyzing and modeling connectivity and movement in ancient Red Sea trade**

The problem of moving from archaeological, spatial, and historical data that with few exceptions are of particular, static, or anecdotal nature, to the dynamic processes of trade, travel and transport, remains a challenge to any study of connectivity in the past. Network theory offers tools and models that focus on the relations between our data-points, and thus allows us to visualize, analyze and model the processes that once connected them.

In this paper I demonstrate how different network approaches might shed light on connectivity in the Red Sea region in the pre-Islamic period. Starting with the movement of commodities in the well-known *Periplus of the Erythraean Sea*, I go on to discuss network visualizations based on settlements and archaeological finds. The argument is made that network analysis is useful for its capacity to include different kinds of data, and because it makes assumptions and hypotheses about connections between places, artifacts and people explicit, and thus also testable.

Steven E. Sidebotham*University of Delaware***Construction materials and methods at Berenike, a Ptolemaic-Roman port on Egypt's Red Sea shore**

Construction materials and methods used in Berenike changed over the port's 800-year history (3rd century BC–6th century AD). Materials comprised stones, bricks, coral, timber and metal. Ptolemaic-era (3rd–1st century BC) construction included excavation into bedrock and use of local stone, and fired and unfired bricks. Some Ptolemaic-era constructions employed unworked stone. Larger gypsum/anhydrite ashlar, often joined using wooden clamps, also appear in Ptolemaic and early Roman structures.

Structures of early Roman date (late 1st century BC–2nd century AD) continued using earlier Ptolemaic edifices or were wharfs, breakwaters and quay walls.

The predominant late Roman-era (mid-4th century AD on) building material was local fossilized coral heads, commonly used along the east coast of Africa. Such structures had shallow foundations with recycled gypsum/anhydrite ashlar used as seating, stairs, wall quoins, altars, etc. A "stone yard" containing ashlar, basins, columns, inscriptions, etc. found in a late Roman building and adjacent street indicates a widespread practice of recycling. Timbers (cedar and teak) from dismantled ships recycled into walls provided added stability as did a large piece of iron, possibly the fluke of a ship's anchor.

Many Roman-era structures were multiple-storied as the presence of staircases indicates. Roofs and floors of upper stories were made of timber. Some walls contained basketry, matting, textiles and mud as binding materials.

Buildings included military, commercial, religious and domestic. Choices of building materials reflect availability and/or the preferences of the builders based on their own traditions.

Large and small scale-sculpture also survives in different media: stone, metal, terracotta and wood.

Laurence Smith

University of Cambridge

Shadia Taha

University of Cambridge

Jacke Phillips

School of Oriental and African Studies, University of London

Michael Mallinson

University of Cambridge

Trade and 'treasure': the role of Suakin in the movement of valuables, 15th–19th centuries AD

Port cities are places of economic exchange and gateways for the movement of people and goods. The island-port-city of Suakin, strategically located on the coast of modern Sudan, has functioned in this capacity for over a millennium. This paper examines particular items still generally considered 'valuable' or 'exotic', such as gold, pearls, ivory and high-quality ceramics (glazed pottery and porcelain), known to have been traded through Suakin in the 15th–19th centuries and even earlier. Three main aspects will be examined. Firstly, our sources of information for trade in these goods; some (e.g., gold and pearls) are known primarily from historical and ethnographic sources, while others (particularly porcelain) primarily from archaeological excavation at the site. Secondly, their origin(s) will be examined, from the African hinterland and from sea-borne trade. Thirdly, the trade routes and networks to and from Suakin will be considered. Fourthly, an attempt will be made to assess ideas of 'value' associated with these 'treasures', concentrating on the porcelains. In the case of the latter, their contexts of discovery at Suakin will be compared with finds of Chinese porcelain at other port-cities in the Red Sea and along the East African coast. The study of these 'value' items indicates the relations of the Suakin port with both its hinterland and external trade, and its role in communication and trade between Africa and the Arabian Peninsula, together with east and southeast Asia.

PANEL 2:

INDIAN STEEL AND OTHER METALS: RECONSTRUCTING THE METAL WORKING CRAFT; MINING RESOURCES

Keynote lecture

Thilo Rehren

University College London

Iron metallurgy around the Red Sea – some challenges and opportunities

The Red Sea is at the crossroads of multiple geographical, cultural and metallurgical regions. This overview looks at some recent work related to two millennia of iron metallurgy across those wider regions, drawing out common challenges and some unique opportunities for future research. I will first be looking at the early smelting of bloomery iron in three different locations to the north, southwest and southeast of the Red Sea to tease out significant differences among these sites, and their potential reasons. In the second part, I will focus on recently discovered evidence for crucible steel production both to the east and the west of the Red Sea, before summarizing the main topics where I expect that future research could be fruitfully done.

Martin Hense*Independent researcher***Metal working and possible metal production in Berenike**

Archaeological finds indicate that metal working was a regular activity in both Ptolemaic- and Roman-period Berenike. The scale of this industry is still uncertain, although the concentration of finds, comprising crucibles, droplets of spilled metal, slag and ingots, suggest that relatively small amounts of metal were worked at a time. However, this small-scale metal working was not limited to one industrial corner of Berenike. The production of metal objects seems to have taken place all over the site. The location was often determined by the nature of activities. Near the harbor, nails and lead sheeting were manufactured for ship repair. More to the center of Berenike, small copper-alloy tools and vessels were produced.

There is evidence for the production of copper-alloy objects and the working of lead. Slag found all over the site proves that metal was extracted from ore. There is, however, no convincing evidence found thus far that iron, besides copper, was produced in Berenike.

The small iron ingots found at several locations in the town could easily have been imported. To avoid dependency on the import of specific tools across the long desert routes, the working of this iron, for ship repair, workshop and mining tools, was essential in Berenike.

Ali Jarkhi*Bonn University***Early Islamic gold mining: new insights on the Arabian mining techniques**

Ancient prospectors in Arabia recognized the gold-bearing character of oxidized quartz veins located in Precambrian (volcanic) rocks of the Arabian Shield, and have actively sought these geological environments with varying degrees of success since the Iron Age. Extracting and processing gold ore at mining sites in Arabia is a phenomenon known in some detail from the account of al-Hamdani, an Arab scholar of the 10th century AD. In addition to the mines themselves, al-Hamdani's account is corroborated archaeologically by different types of hammers, grinders and furnaces found at gold mining sites in Arabia. These indicate that ore extraction and metallurgical processing technologies were significantly developed during the early Islamic period. The variety of technologies applied and an increase in the number of mining sites in this period suggest that mining was important to local and regional economies. Based on a combination of historical sources and archaeological evidence, this paper classifies the repertoire of tools used and explains the extraction techniques these tools were used for. The paper uses a broad array of archaeological evidence from several countries and spanning several decades of research, but it draws in particular on the recent excavations of Dr. Abdullah Al-Zahrani (Saudi Commission for Tourism and National Heritage) at mining sites in southwestern Arabia.

Alan Lee*University of Wisconsin–Madison***Ric Furrer***Door County Forgeworks, Wisconsin***Crucible steel production: an experimental study of crucible composition and structure**

The production of crucible steel has been successfully replicated by several leading metallurgists in the past 20 years, but replicating crucible steel production using ancient crucibles and traditional fuel has been more problematic. This paper will discuss the results of smelting experiments performed under various conditions to produce crucible steel. A variety of crucible fabrics was examined, from commercial clay graphite crucibles to traditional crucibles made of different types of clay and refractory materials such as rice husks, granite and quartz sand. Smelting was carried out using both coke fuel with continuous airflow and hardwood charcoal fuel with pulsing blasts of air. Several iron materials were smelted including magnetite sand from the Hunza River, Pakistan, Tamhangane steel from Japan, and Michigan hematite ore. Some of the post-smelt products were chemically analyzed, and the post-firing crucibles were thin-sectioned for petrographic analysis. The impetus behind this work lies in the fact that few researchers have studied the effects that raw material selection, crucible composition, and fuel choice have on *wootz* steel production and the effects on the final product. With a better understanding of the stages of steel production, archaeologists will be better able to understand the localized Indian smelting traditions that created chemically unique *wootz* steels and that allowed certain Indian communities to engage on a larger scale with the trade networks that connected India, the Red Sea and the Roman Empire.

Julie Marchand*CNRS–HiSoMA, Eastern Desert Mission***Bérangère Redon***CNRS–HiSoMA, Director of the Eastern Desert Mission***Gold mining in the Eastern Desert of Egypt, from New Kingdom to medieval times**

Gold was plentiful in Egypt and was used by the Pharaohs from the earliest times as a means of asserting their power. But the actual history and archaeology of Egyptian gold, the mining, production and circulation, is much less well known than the splendor of the country's kings.

Since 2013, the French Eastern Desert Mission, supported by the French Ministry of Foreign Affairs and the Institut français d'archéologie orientale, aims to fill in these gaps in our knowledge through the excavation of the key district of Samut, located in the Eastern Desert between Edfu and Marsa Alam.

Many structures related to gold exploitation were discovered in the course of four campaigns. They ranged in date from the New Kingdom to the 10th century AD. The largest Ptolemaic mineral processing centre of the Eastern Desert, Samut North, was located there, in the centre of the district, operating with the neighboring gold mines. The excellent preservation of the remains made possible, for the first time, a comparison between archaeological remains and the well-known treatise of Agatharchides of Cnidus, written at the end of the 2nd century BC, and exposing the awful life conditions of the miners in the gold mines of the Ptolemies. Besides these discoveries, three other sites were explored: the Pharaonic village of Samut el-Beda, dated to the New Kingdom, comprising more than 200 miner huts, and two small villages of medieval times.

Structures and artifacts associated with gold processing were unearthed on all the sites of the Samut district. They held crucial data on the technological and organizational evolution of gold exploitation over time in the Eastern Desert.

Joan Oller Guzmán*Universitat Autònoma de Barcelona***New evidence on metallurgical production during the Ptolemaic period in the ancient harbor of Berenike (Eastern Desert, Egypt)**

This presentation examines the results from trench BE14/15-102 located in the southwestern part of the ancient harbor of Berenike. The trench stratigraphy runs from late Ptolemaic through early Roman, evidencing several periods of occupation in Antiquity and shedding light on evolutionary processes in the development of this little investigated part of the harbor. Of particular significance is the identification of a metallurgical furnace from the late Hellenistic period, giving insight into the structuring of this zone at this stage. In the context of the metal-working theme of the conference, the main objective of the presentation is to offer a discussion of the preliminary results from the excavation of this trench and its place within the small-industry panorama of ancient Berenike.

Joan Oller Guzmán*Universitat Autònoma de Barcelona***Beryl mining in Wadi Sikait: organization and distribution of beryl production in Roman Egypt**

Wadi Gemal in the Eastern Desert of Egypt can be identified with the ancient emerald mining region of Mons Smaragdus, quoted by several ancient authors, such as Strabo, Pliny the Elder and Claudius Ptolemy. Sites within this area have been excavated archaeologically, but little still is known about the organization of this production which had important economic impact on the area in Roman times. In an effort to understand better the administrative and commercial structure of this production, the paper will examine the processes of beryl extraction and distribution control, what was involved in these processes and what was the purpose of these precious stones. A starting point for this discussion is the data from the most important of these sites: the mining town of Sikait, the ancient Senskis, a huge Roman mining settlement where several houses, buildings and even temples have been preserved. An analysis of these structures, combined with data coming from the mining shafts identified *in situ*, leave no doubt as to beryl being produced in this area, which is extensively documented by other mining settlements existing near Sikait, such as North and Middle Sikait, Nugrus, Wadi Umm Harba, etc. Finally, a comparison with other better known examples of Roman mines and quarries from the Egyptian area, such as Mons Porphyrites or Mons Claudianus, will help to cover gaps in our archaeological knowledge.

Marek Woźniak

*Polish Centre of Mediterranean Archaeology,
University of Warsaw*

Melting of crucible steel: archaeology in theory and practice

Reconstruction projects and archaeological experiments are gaining in importance beside regular excavations carried out by scientific institutions. This is particularly true of the production of various goods: pottery, textiles, metal artifacts, wine and olive oil. Archaeological experiments give a wide platform for such investigations. Not only do they yield unique data, not readily available, on production technology, raw materials, processing techniques etc., but they also create the opportunity for “live” shows for specialists and amateurs alike. The experiment to be carried out during the Red Sea VIII International Conference aims to reconstruct traditional Indian methods of melting crucible steel. The melting will be performed in a clay furnace using brown coal as fuel and hand bellows reconstructed on the grounds of notes and sketches made by 18th- to mid-19th-century travelers visiting the southern part of India.

**PANEL 3:
ON THE ‘BEAD ROAD’. STUDYING MATERIALS AND TECHNIQUES FOR THE JEWELER’S CRAFT IN THE WESTERN INDIAN OCEAN BASIN**

Keynote lecture

Jonathan Mark Kenoyer

University of Wisconsin–Madison

Stone bead production and trade: new insights from the Indus Civilization and the early historic period of South Asia

This presentation will provide an overview of the major techniques used to produce stone beads in South Asia, beginning during the Indus Civilization (2600–1900 BC) and continuing on to the Early Historic Period (800 BC and later). Through the careful documentation of production techniques, and particularly the use of distinctive drilling techniques, it is possible to distinguish Indus beads from ones made in other regions of the ancient world. Beads from the Indus were traded to distant regions including Mesopotamia, Anatolia, the Mediterranean and Egypt. There is also evidence for Indus or Indus-trained craftspersons producing Indus-style beads in distant Mesopotamia. During the Early Historic Period, new technologies of drilling using single and double diamond drills were introduced and new styles of beads were produced in South Asia. These beads can also be identified in more distant regions of West Asia and Africa, as well as East Asia. In addition to technological and morphological analysis, it is also possible to trace the provenience of specific stones, particularly carnelian, using chemical analysis (INAA and LAICPMS). Using these different methodologies, it is possible to use stone beads to begin to sort out the complex interactions that were taking place over vast geographic regions stretching from East Asia to Africa and the Mediterranean.

Shinu Anna Abraham*St. Lawrence University***On the road with the Indo-Pacific bead: spatial and temporal patterns of glass bead production and consumption**

Indo-Pacific beads are small drawn micro-beads, the chemical composition of which points to a South Indian production origin. These beads are found not only in South India but also throughout the Indian Ocean littoral, from Western Europe to Japan. Chronologically they range from the first centuries BC to as late as possibly the 17th century AD. This paper will synthesize the known data for this far-reaching and long-enduring artifact by mapping its spatial and temporal distribution, and seek patterns that help us understand changing patterns of production and consumption within and beyond the borders of South India.

Ann Andersson*Moesgaard Museum***Beads, pendants and other ornaments as indicators of long-distance trade. Trade connections of the Dilmun trading station at Failaka Island, Kuwait, in the late third-second millennium BC**

The island of Failaka is favorably positioned in the Persian Gulf and held a strong strategic advantage in controlling sea-bound traffic and commercial activities in antiquity. Excavations on the island have uncovered two small settlements (Tell F3 and Al Khidr), along with a temple and a so-called Palace (administrative building) at Tell F6, ascribed to different phases of Dilmun culture (approximately 1900–1300 BC). Recent excavations at Tell F6 (2008–2012) by the Moesgaard Museum and the National Council for Culture, Arts and Letters in Kuwait uncovered earlier occupation (dated approximately 2100–2000 BC). The archaeological remains are interpreted as a trading station functioning as a hub in a vigorous trading network.

The paper focuses on the substantial quantity of beads from the excavations of Tell F3 and Tell F6. These beads are made of a range of semiprecious stones, such as agate, carnelian, jasper and lapis lazuli. Semiprecious stones are not found locally on the island, thus they must have been brought to Failaka. In general, beads made from semiprecious stones are durable and easily transportable goods of high commercial value, making them good indicators of long-distance trade. This paper will examine the evidence for contacts and trade links between the Dilmun area, Egypt, Mesopotamia, regions along the Persian Gulf and as far away as the Indus region, through the bead material found on Failaka Island.

Roland de Beauclair*Independent researcher***Seashells in the sand: the ornamental objects from the Neolithic graveyard of al-Buhais 18, UAE**

At the Neolithic site of al-Buhais 18 (BHS18) in the Emirate of Sharjah, United Arab Emirates, more than 24,000 ornamental objects were unearthed, most of them in secure burial contexts. They include pierced mollusks and a range of shell and stone beads. Their detailed analysis not only gives insight into the bead industry during the fifth millennium BC, but also testifies to the great importance of the sea and its resources for this desert nomad population.

Furthermore, the large number of ornamental objects makes it possible to reconstruct some of the cultural rules and preferences governing the production or selection of beads, which resulted in a rather standardized inventory. It can be shown that at the nearby site of FAY-NE15, which is thought to be contemporary to BHS18, slightly different preferences were in force.

Alfredo Carannante*Independent researcher***Shell beads as indicators of identity and connectivity in the Red Sea and beyond**

Shell ornaments have a special importance in the studies about prehistoric cultural identities. The mollusk species that were utilized, as well as the shapes in which their shells were worked, often expressed symbolisms and semiotic meanings that were interpretable only in a specific culture. The result is that peculiar shell ornaments are characteristic of defined periods and regions. The study of their chronological and geographic distribution may contribute either to define ancient cultural identities and their dynamics or to identify the cultural connections among them.

The archaeomalacological data from Northeastern Africa and Southwestern Asia sites (4th–2nd millennium BC) are suitable for such kind of analytical approach already tested in Mediterranean Bronze Age archaeology. The distributional pattern analysis of several types of shell ornaments from Egyptian, Sudanese, Near Eastern and Omani sites revealed how these items were strongly related to regional traditions. Their discovery in archaeological contexts away from the traditional geographic area suggests sometimes the sporadic presence of foreigners on a site or, otherwise, the diffusion of a tradition from one area to another with important implications about the expansion of cultures as well as about possible migrations.

H. Albert Gilg*Technical University of Munich*with K. Schmetzer, U. Schüssler, A.K. Carter,
J. Panjikar, T. Calligaro and P. Périn**The ancient garnet trade in the Indian Ocean:
beads and beyond**

The historical site of Arikamedu, Tamil Nadu State, India, was for many centuries a significant bead-producing center. A mineralogical characterization of the garnet beads from Arikamedu reveals high almandine and moderate to low pyrope, spessartine and grossular contents, with a pronounced zoning for manganese and magnesium. Zoning of trace elements including yttrium, phosphorus and zinc is also observed. The most characteristic aspects of the inclusion pattern are sillimanite fibers and their particular concentration in a zone between an inclusion rich core and an inclusion poor rim. Our data indicate that the garnets originated from the Garibpet deposit, Telangana State, India, more than 600 km to the north-northeast. Garnet beads recovered from Iron Age sites at Porunthal, India, Tissamaharama, Sri Lanka, and Angkor Borei, Cambodia, show an identical chemical composition as those from Garibpet. The majority of garnet beads from Sri Lanka, however, have a different chemical composition with higher pyrope and grossular components suggesting rather a local origin. Most garnets used for cloisonné jewelry or as engraved ring stones at the same time in Europe and the Mediterranean are also quite distinct. Notable exceptions are an engraved Byzantine ring stone with a Christian motive and garnet inlays in a bow fibula from St. Denis, France, which suggest that Garibpet garnets were occasionally traded to the West possibly via the Red Sea.

Timothy Insoll*Institute of Arab and Islamic Studies, University of Exeter***The archaeology of bead-making and jewellery
production at Harlaa, eastern Ethiopia**

Excavations at Harlaa, Dire Dawa region, Ethiopia, have uncovered the remains of a building complex that seems to have been a jeweller's workshop. Besides structural evidence, this interpretation is supported by the significant quantities of beads, shell debris, moulds, and crucible fragments found. An extensive assemblage of faunal remains, some burnt, was also recovered, which might have been used as fuel in the various hearths recorded. Several phases of use appear to be attested with the earliest dated to the late 8th through late 10th centuries AD. This evidence will be discussed and the site of Harlaa contextualized so as to explore, first, its potential role as a key centre of trade situated between the Red Sea coast and the Ethiopian highlands, and second, the evidence for carnelian, rock crystal, shell, and glass bead-making. Finally, the implications of this material for reconstructing trade and contacts in the medieval Red Sea and western Indian Ocean will be considered.

Jonathan Mark Kenoyer
University of Wisconsin–Madison

New insights on stone bead production and trade at the site of Hajar ar-Rayhani, Yemen

The site of Hajar ar-Rayhani has produced an important collection of stone beads providing new insights into bead technologies and trade networks dating between the 10th/9th centuries BC to 2nd century AD. The site of Hajar ar-Rayhani was excavated in the Wadi al-Jubah by the American Foundation for the Study of Man in 1985 and 1987. A sample of 108 stone beads made from various raw materials was recovered and studied using a combination of different analytical techniques. This study will report on the identification of raw materials and the sourcing of carnelian using Laser Ablation–Inductively Coupled Mass Spectrometry. Additionally, the beads were examined using scanning electron microscopy (SEM) at high magnification to define manufacturing features and use indicators. Some of the beads were artificially colored and experimental studies have been carried out to determine possible techniques used on the ancient beads. The presence of unfinished beads indicates that some beads were being made at the site using local technologies. Other beads appear to have been produced in South Asia, while others may derive from Egypt or other regions in West Asia or the Mediterranean. The beads from this site and other sites in Wadi al-Jubah provide new evidence for the presence of both local and long-distance exchange networks. Further comparative studies with collections from other excavated sites are needed to better understand the changing patterns of trade over time.

Miriam Lahitte
Independent researcher

Beads of quartz ceramics in Gala Abu Ahmed (Sudan)

Quartz ceramics is one of the major material groups of beads found so far in the fortress Gala Abu Ahmed, Lower Wadi Howar, North Sudan. The fortress was excavated during the years 2008–2012 under the direction of Friederike Jesse (University of Cologne, Germany). Radiocarbon dating for the fortress ranges between the end of New Kingdom and Napatan times with an emphasis on two periods: the first from 1250 to 900 BC and the second from 750 to 440 BC in Napatan time. In this paper the focus is set on beads made of quartz ceramics and the different shapes in which they appear in the find context inside the fortress. First archaeometric analysis of quartz ceramic material from Gala Abu Ahmed helped to classify the bead finds. An overview will be presented of other bead materials found in the fortress.

James W. Lankton*UCL Qatar***Bernard Gratuze***IRAMAT-CEB, CNRS***Glass routes of the Southern Seas**

While such texts as the *Periplus of the Erythraean Sea* suggest 1st century AD trade in both raw glass and finished products from the Roman world to Asia, evidence on the ground has been less obvious, at least in part because distinctly 'Roman' objects may be difficult to identify, particularly when only small fragments remain in the archaeological record. Fortunately, the unique chemical compositions of glass produced in Egypt and along the Levantine coast, the most important glassmaking centers during the Roman period, become valuable tools to distinguish similar-appearing glass samples made with Roman glass from those made with Asian glass. For this presentation, we have explored our database of chemical analyses of over 5,000 glass samples found at possible exchange and consumption sites in Asia, and compared these to glass compositions of known Roman origin. The major and trace elements for these samples have allowed us to identify almost 500 glasses with a Roman composition, but found south and east of the Red Sea, the most likely route for the glass trade to much of Asia and East Africa. In addition, recent comparisons of Egyptian versus Levantine glass may help to distinguish between these two production zones. While most of the Roman samples found in Asia appear to have been made in Egypt, there are Levantine glasses as well, and our data for both these groups allow us to follow the trade in glass from the Red Sea to East Africa and India, and from there to Southeast Asia and as far as Korea, where Roman glass beads have been found in graves dated as early as the 1st century AD. We have identified chunks of raw glass to be transformed into the beads and bangles most sought in the Asian trade, as well as high value products like mosaic glass vessels and gold-glass beads that were shipped already manufactured

from ports along the Red Sea coast, and will discuss the types of Roman glasses found, as well as their geographical distribution and relative frequency at archaeological sites along the 'Glass Routes of the Southern Seas'.

Silvia Lischi
University of Pisa

**Beads and pendants from Al Hamr al-Sharqiya,
 Oman**

The archaeological campaigns conducted in 2016 and 2017 at the site of Al Hamr al-Sharqiya, in the area of Khor Rori (Dhofar), produced an interesting assemblage of jewellery of various materials. The characteristics of the site are exceptional because they show traces of occupation that goes from the Paleolithic to the Islamic period. The geographical position, near Sumhuram, and the socio-political situation make the bead assemblage so important. The use of particular stones indicates the presence of links with the area of the Persian Gulf and the Eastern part of the Indian Ocean. Furthermore, the discovery of some tools used for bead production demonstrates a local manufacturing tradition. The long life of the site could help to identify the typical materials of each period, allowing a more complete comprehension of Dhofar and of the international connections of the area.

Yvonne Petrina
LMU Munich

**The supply of raw materials and their influence
 on fashion: gem stones and beads from antiquity
 to Byzantium**

Today's economy is based on several pillars, among the strongest are capital and the supply of raw materials. These pillars influence the market, which is nothing more than a balanced interaction between demand and supply. Availability on the market is an important vector of trends in daily life and fashion, now as well as in antiquity. From the beginning of the Hellenistic period, colorful beads and gem stones were used in jewellery, such as sapphires from Ceylon or red garnets from India. Their appearance is probably related to Alexander the Great's wars in the East and coherent trade activities across the Red Sea and the Indian Ocean. However, exotic beads and gem stones were used only occasionally. A sudden increase in the use of colorful and precious materials can be detected in the jewellery of the early Roman Republic. This phenomenon is probably the result of expansion in the Roman maritime and Red Sea commerce. Another peak can be seen in late antiquity, in the 5th and 6th centuries. These centuries saw a rise in political activity, intercultural relations, and trade. Many pieces of jewellery were now equipped with costly sapphires, amethysts, emeralds, and pearls — the more colorful, the better. At the same time, we see a trend in glass beads copying the expensive stones in color and shape. In the figurative sense, colorful jewellery was no haute couture anymore, but had turned into High Street fashion. During the reign of Justinian the Great (527–565), sapphires, amethysts, emeralds, and pearls became an imperial prerogative. This might be due to the tense political situation between Byzantium and the Sassanian Empire, a restriction of trade activities and, thus, limited access to new supplies. In addition, a general economic decline and the later Arab invasions led to a complete change in fashion: the jewellery of the later 6th and 7th centuries is monochrome rather

than polychrome. In consequence, new techniques were developed and old ones revitalized, such as pierced-work and filigree. However, there was need for polychromy, and it was satisfied by the further development and an increased use of enameling. Enamel would never have become one of the most popular techniques in the 9th and 10th centuries and beyond, if there had been no restrictions in trade and a limited supply of gem stones. In addition, most beads and gem stones in pieces of jewellery and other objects from these centuries are *spolia* and show traces of primary use. This indicates that there was less trade and, thus, fewer available raw materials than in the flourishing 5th and 6th centuries.

Beads and gem stones, therefore, provide a good case study for ancient economy. They are not only fashion objects, but also symbols of trade activity. With an analysis of antique jewellery and gem stones, I hope to offer a fresh art historical perspective on trade activity, with a focus on objects and the narratives they can tell.

Anja Prust

German Archaeological Institute Berlin, Orient-Department

Tayma and the sea

The oasis of Tayma in the northwestern part of the Arabian Peninsula, alongside the major routes of the exchange networks, was one of the significant economic, political and cultural centers of the region. A multidisciplinary joint project started in 2004 by the German Archaeological Institute (DAI, Orient Department) and the Saudi Commission for Tourism and National Heritage (SCTNH), and funded by the German Research Foundation (DFG), enabled investigations of the history of the oasis. Continuously settled since the Early Bronze Age and still nowadays, the site acted as a settlement for a sedentary society, a station for pastoral nomads and caravans, and a hub for traded goods from South Arabia, Syro-Mesopotamia, Egypt and the Levant. Marine goods can be found in different contexts during several occupation periods, roughly 300 km east from the coast of the Red Sea. Artificial modified marine gastropods dominate the assemblages considerably in the Bronze Age and Early Iron Age, while in later periods a shift in exploitation of marine mollusks as adornment can be detected. The importance of these natural goods raises questions concerning availability, purchase, regional trading networks, as well as cultural and economic changes. This lecture will principally present the more than 20 taxa of marine mollusks used as beads. Moreover some thoughts on trading of raw material and crafted beads as well as local processing shall be discussed.

Carolyn Swan*UCL Qatar***From sand to sea: tracing the production and trade of glass beads from the 10th century AD Cirebon shipwreck in the Java Sea**

Sometime around the year AD 970, a merchant ship carrying an array of goods from East Africa, Persia, India, Sri Lanka, and China foundered and sank to the bottom of the Java Sea of Indonesia. Glass objects – finished vessels, raw chunks, and beads – were in the cargo, and these items provide unique clues as to the production origins and intended recipients of some of the ship's trade goods. Thousands of beads made from many different materials (ceramic, hardwood, coral, banded stone, lapis lazuli, rock crystal, sapphire, ruby, garnet, pearl, gold, and glass) attest to the long-distance movement and trade of these small, often precious, objects throughout the Indian Ocean world. The glass beads are of particular interest, as well-dated examples from archaeological contexts are not numerous. How were the glass beads made? Where were they produced? Where were they going? How were they valued? What part did they play within the larger glassmaking industry? This paper examines 20 varieties of glass beads from a typological, archaeological, and chemical perspective within the wider context of the Indian Ocean trading network and glass production in the Middle East and South-east Asia during the 10th century.

Giulia Tucci*"La Sapienza" Università di Roma***Dynamics of internationalism during the Late Bronze Age: circulation of raw materials and production between the western basin of the Indian Ocean and the Southern Levant**

Although distant from the Western Indian Ocean basin, the Southern Levant can be considered fairly included into the trading dynamics regulating the movement and the use of exotic goods, especially luxury raw materials, frequently representing the final destination of this kind of items.

During the Late Bronze Age, southern Levantine jewelry enumerates a wide eclectic group of very differentiated artifacts, witnessing a remarkable level of artistic talent and technical expertise. A greater part of these products is manufactured in gold and silver, using the decorative share of precious and semiprecious stones originating from eastern Africa and the Indus Valley.

The wealth of the jewelry art and in particular the large use of stones has given rise to a number of hypotheses that will be briefly discussed in the paper, analyzing the origin of the raw materials, the archaeological contexts of finished products and the specialized production of personal ornaments with particular attention to the actors and the ultimate goal of their production.

Zuzanna Wygnańska

*Polish Centre of Mediterranean Archaeology,
University of Warsaw*

Preliminary study on beads from the Iron Age levels of the Polish excavations at Saruq al-Hadid, Dubai (UAE)

Saruq al-Hadid is a site located in the Emirate of Dubai, on the northern fringe of the Rub al-Khali desert. The site has been excavated since 2002 by several teams from Dubai and abroad, bringing each season an extensive variety of material, jewelry among them. A striking and unique phenomenon observed at Saruq is a huge quantity of beads deriving from contexts other than funerary. A collection of 50 beads dated to Iron Age II (IA II) was obtained from trenches explored by the Polish mission during the initial season, in 2016/2017. Despite being a fraction of the finds from the Polish sector of the site, the beads are of interest for studying and understanding the assemblage. The collection is dated to IA II and includes semi-precious stones, shells, various kinds of vitreous materials and silver. Metal ornaments, beads included, were most probably produced at the site. There is some faint evidence that this observation may pertain also to some of the glassy beads. Other ornaments were most probably imported. The ornaments came from caches or were dispersed in the sand dunes. An intriguing feature of the bead collection is its uniform character suggesting that the beads were brought to the site in big quantities during a relatively short time span. One theory is that most beads were either brought to be traded or were deposited as vota.

**PANEL 4:
INCENSE TRADE IN THE RED SEA**

Barbara Huber

German Archaeological Institute, Berlin

Investigating incense burners from Tayma, Northwest Arabia: an olfactory perspective

Dried resins obtained from the trees in the family of *Burseraceae*, such as frankincense or myrrh, have been important commodities in antique societies due to their pleasant scent when burned. The creation of an aromatic fragrant smoke used for a variety of different functions is attested by textual sources from Egypt and Mesopotamia as well as by iconographic depictions. Since ephemeral phenomena such as odors or smells can be studied only through their indirect effects, the investigation of objects used to produce them provides important insights. Excavations at the oasis of Tayma, carried out by the Saudi Commission for Tourism and National Heritage and the German Archaeological Institute, funded by the German Research Foundation (DFG), revealed several vessels and cuboid containers, interpreted as incense burners, with traces of burning and preserved residues.

This paper presents the results of a current interdisciplinary study on incense burners from Tayma. Organic residue analysis has been performed (and is still in progress) on ancient residues adhering to the interior of the burners to identify the nature and origins of the used organic remains. The results have led to determining the kind of aromatics used in Tayma from the Early Iron Age (1200–900 BCE) until Late Antiquity, as well as the possible provenance of the traded resins, giving grounds for conclusions about trade networks as well as mobility and transport patterns in the Arabian Peninsula. Chromatographic and mass spectrometric analysis of the ancient residues from Tayma, carried out at the laboratories of the Technical University of Berlin, will be compared with samples from modern *Boswellia*, *Commiphora* and *Pistacia* species.

Julian Jansen van Rensburg*Freie Universität, Dahlem Research School, Topoi***Socotra: The forgotten island of incense**

Situated at the entrance to the Red Sea, the island of Socotra has been known to Indian Ocean seafarers and merchants from the 1st century BC as one of the principal producers of incense, aloes and dragon's blood. Despite the island's rich historical record demonstrating its involvement in the incense trade, it has been largely forgotten by scholars. While early archaeological work has hinted at Socotra's role within the incense trade, it has not been until recently that we have been able to glimpse the true nature and scale of this trade. The aim of this paper is to bring Socotra back into the scholarly discourse by demonstrating the island's importance within the incense trade, focusing on its roles as a producer and supplier, and the impact this had locally and regionally. To achieve this I will be looking at the nature and scale of the agricultural and water management systems that were put in place to support the intensification of incense production. Moreover, I shall look at what we know about how this intensification was socially, politically and ritually managed. Finally, I will demonstrate the impact this intensification had on Socotra's distribution network within the Red Sea and beyond.

Alexia Pavan*Office of the Adviser to His Majesty the Sultan for Cultural Affairs***The port of Al Baleed (southern Oman) and the trade of frankincense in Medieval period**

Along the southern coast of the Arabian peninsula, in the southernmost region of the Sultanate of Oman, lies the ancient port of Al-Baleed, known under the name of Zafar in medieval times. Placed in a strategic position for its geographical location, climate, availability of water and abundance of fodder, the port has a long history dating back to the Bronze Age. The settlement, however, reached its peak in the medieval period when it was a nodal point for international trade. Many commodities were exported or passed through the site. Among them, a number of regional products: madder root, indigo, ambergris, aloes and dragon's blood, the most important being, however, Arabian horses and frankincense. The study of the frankincense trade in medieval times is a topic barely studied despite the importance of this commerce and the great incomes it generated also during the Islamic period. The paper will present a general overview of the site of Al Baleed and its importance in the trade of frankincense, mainly in relation to the Far-Eastern markets.

Shadia Taha*University of Cambridge***Frankincense: traditions rooted in the Sudanese DNA**

Frankincense is an ancient forest produce which continues to be one of the major commercial products of Sudan. There are several varieties of *Boswellia* species which grow on hilly and stony grounds. They are found in the northeastern province of Kassala, in the Eastern Sudan Red Sea hills and desert, Central Sudan, the western provinces of Kordufan and Darfur and the Blue Nile region. Gum resins remain an important commodity in everyday use and a source of income. Frankincense and myrrh serve as a living link between the past and the present that is rich in religious, social, cultural and economic history. Resins are used for medicinal purposes, and in cultural, religious and funerary practices in ancient and present times. Yet, despite Sudan's considerable contribution to the long distance trade in incense and aromatic plants; this area has largely been understudied and overlooked. It is not until very recently that archaeologists started to pay attention to Sudan's part in the incense trade.

This study is based on ethnographic research as well as my own and my family's experiences. The paper examines the use and trade of incense from the ancient past to the present and investigates the contemporary uses of frankincense in Sudan. The research demonstrates Sudan's substantial contribution to the incense trade in the past and present. The study suggests that we need to re-evaluate the role played by this region. This is a more pressing issue owing to threats to archaeological sites caused by development projects, residential expansion and mineral exploration in Eastern Sudan and along the Red Sea coast.

CURRENT FIELDWORK AND RECENT RESEARCH*Keynote lecture***Aylin Orbasli***Oxford Brookes University***An architectural legacy of exchange: the making of the Red Sea style**

The purpose of this presentation is to explore Red Sea trade and cultural exchange through the study of architectural styles and expressions that flourished on both sides of the Red Sea in the late Ottoman period. Vernacular architecture is often difficult to date, as settlements evolve over centuries and dwellings are upgraded or replaced as needs demand. The evolution of maritime technology, the ebb and flow of global trade routes or geographic conditions determined the port towns that flourished. Those that became redundant have become the remit of archaeological explorations; in the case of places that have continued to remain centres of activity, historic layers are regularly subsumed by later growth and development. The exact dating of surviving domestic architecture of many of the Red Sea port cities still requires more research. We do know, however, that much of the elaborate and distinct architectural expression that has survived to this day is one that was honed in the 19th century and influenced by architectural styles of the Empire (transmitted through Egypt and possibly also the Levant) supported by a growth in trading fortunes following the opening of the Suez Canal in 1869. Nonetheless, the architecture remains clearly embedded in and influenced by geographical and climatic conditions of the Red Sea, built out of coral stone in compact forms that maximise land use and the most effective capture of sea breezes. Urban layouts, too, often evolved around the port function and the waterfront, with public commercial zones much more integrated with the private residential uses than is typical of Islamic cities.

While the archaeological studies of the ancient ports on both coasts of the Red Sea have tended to contextualise their findings in the context of the Red Sea and its cross-coastal networks borne out

of trade, the study of the latter day settlements and their domestic/vernacular architecture has often taken political and geographic land boundaries as their framework. In this presentation I will examine the shared legacy of this architectural form and its potential influences. In doing so, I will highlight the similarities of stylistic and decorative features that are sometimes more profoundly shared between settlements across the water than those only a short distance apart on the same coast.

It is clearly evident that the study of these towns and their role in commercial and artisanal exchange will contribute to the understanding of the Red Sea as a distinct and connected geographic entity in more recent times. Yet, late 20th century modernisation and a desire for improved living conditions, has rendered many of these historic districts redundant. Lack of maintenance, rapid urbanisation and associated development pressures, and infrastructure projects such as the building of new ports and roads have compounded their degradation and loss. The presentation will conclude with an overview of current conservation efforts, implications for preservation and emergent tourism interests.

[Session 3]

Ahmed Hussein Abdelrahman Adam

University of Khartoum

Investigating the archaeology and Islamic settlements of Khor Nubt: proposal for consideration for the Red Sea VIII Conference

This paper seeks to determine the nature of the Beja tribe settlement patterns in Khor Nubt County in the Sudan Red Sea area. The area lies about 120 km southwest of Suakin. The problem, among others, is that the Khor Nubt site has not benefited from much archaeological investigation in spite of important finds by earlier investigators. The reasons for these are to be found in the remoteness of the location and the difficulty of the terrain. Despite this, the whole Khor Nubt area is evidenced to have been more populated by far than it is now. Indeed recent archaeological reconnaissance carried out by our team has confirmed long human habitation of the region in the past. This initiative aims to bring to the fore and to open a discussion of the potential of the Khor Nubt site by interrogating its archaeological potentials alongside studying some already identified important Islamic inscriptions found at the site. The work will draw attention to the Khor Nubt area as a point of Islamization in that part of Sudan when the area was well inhabited. This has implications for the reevaluation of the history and culture of the entire Khor Nubt region.

Joanna A. Ciesielska*Institute of Archaeology, University of Warsaw***Burying the dead on the Red Sea coast: Burial customs in Lower Aynuna, results of the 2015–2017 excavation seasons**

The archaeological site of Aynuna, located in north-western Saudi Arabia, is believed to be the ancient Leuke Kome, a port linked by a caravan route with the Nabatean capital Petra. Architectural remains suggest that it may be identified as an *emporion*, a trading outpost receiving freight from foreign lands to be transmitted further north. Archaeological excavations conducted by the Saudi-Polish Archaeological Mission have revealed the existence of multiple burials, not only within the cemeteries, but also inside buildings dated from the 1st to the 7th century AD. Testing at the cemetery has proved rather uninformative, most of the tombs having been ransacked and the burials almost entirely destroyed. Although Necropoleis 1 and 2 exhibit some internal uniformity when it comes to the architectural outline of the tombs, the two cemeteries show no mutual similarities, which may indicate different dating or cultural affinity. Meanwhile, better preserved human remains from within the buildings can probably be dated to the early Islamic period. Two large stone cairns, containing three burials, were erected in the middle of the courtyard of Khan 1. However, most of the burials were interred directly on the walking level in Khans 1, 4, and 5, and covered with stone rubble. While three out of four burials were extended on the back, facing southeast and provided with some kind of stone installation to protect the body, the fourth, belonging to a pregnant woman, was found lying face down, calling into question the intentionality of the burial.

Sara Fani*Cross-Cultural and Regional Studies, University of Copenhagen***An archeological perspective of investigation on Islamic manuscripts from the Horn of Africa**

As it is well known, the Red Sea has historically played a crucial role in the relations between North Eastern Africa and the Arabian Peninsula and it is through it that Islam reached the region of the Horn in the very first century of the Hijra, where it was later assimilated and characterized by local peculiarities. The network between the two shores of the Red Sea is evident not only in the religious and intellectual assimilation of new ideas emerging from the Islamic literary heritage, but also in the material support of this transmission (model of the codex, paper...) and in its graphic manifestation.

The perception of a manuscript not only as a mere medium for a textual content, but also as an archeological object in itself, allows in fact a wider and more precise analysis of the cultural transmission and contacts across the Red Sea. The study of specific manuscript collections from the eastern part of the Horn of Africa, and especially the city of Harar and the region of Awsa in Ethiopia, together with Djiboutian collections seems in fact to confirm this cultural interchange. This paper will focus on some specific evidences of the commercial and cultural network between Arabia and the Horn of Africa. In particular, it investigates the structural characteristics of the Islamic manuscript codices in relation with the Christian ones; particular attention is given to the materiality of the writing supports and to their origin. In addition, it seems that graphic and epigraphic models from the eastern shore of the Red Sea reached the Horn and in some way influenced the local scribal practices.

Iwona Gajda*CNRS / UMR 8167 - Orient et Méditerranée***Anne Benoist***Maison de l'Orient et de la Méditerranée***The archaeological site of Wakarida and its region,
Tigrai, Ethiopia**

The site of Wakarida is situated near the eastern edge of the Tigrai plateau, dominating the Afar depression. The site, covering 9 ha, was a small city or a village during the Aksumite period. Excavations carried out in three areas from 2012 to 2014 unearthed typically Aksumite buildings accompanied by abundant ceramic material, with a significant proportion of fine ceramics, dated between the 3rd and the 7th century AD. A survey of the region has enabled a study of the landscape, mostly shaped by man, and the discovery of other archaeological sites.

Though distant from the kingdom's capital and its main roads, Wakarida was linked to Aksum. The buildings excavated at Wakarida closely resemble the ones in Aksum and Matara in both plan and construction techniques. Their study presents an opportunity to examine the hardly explored vernacular architecture of the Aksumite kingdom.

A further purpose was to extend the regional chronology to before the Aksumite period. Trial trenches were carried out on two sites near Wakarida in 2015. The ¹⁴C dating and comparative study of the material let us place these sites in a period older than Wakarida, in the 4th–3rd centuries BC. This result allows us to reconstitute a territory already organized and complex, well before the Aksumite period, and the terracing of the hills could thus be ancient. The development of the Wakarida site appears as result of a change in the organization of an ancient settlement pattern in this region, during a period of expansion of the Aksumite Kingdom.

Marta Osypińska*Institute of Archaeology and Ethnology,
Polish Academy of Sciences***Early domesticated cattle of Northeastern Africa:
coveted treasure of Neolithic pastoralists**

The site of Wadi Khashab in the mountains of the Eastern Desert in Egypt revealed ceremonial animal burials from the 5th millennium BC. The ritually buried herd included both cattle and sheep. The discovery has contributed to the growing body of evidence on the migration zone of African pastoralists, at the same time bringing the most significant data on the morphological details of early forms of domesticated animals. Burials of whole animals supported a series of osteometric measurements and statistical analyses of animal morphology compared against the cattle and sheep population from a broadly understood prehistory and early history of northeastern Africa. Data from Wadi Khashab have been analyzed by the point-scale method applied for the first time to African animals. The results reveal a population with well developed characteristics, like long-leggedness, overall slenderness and humpedness in cattle.

Piotr Osypiński*Independent researcher***Animals in early Roman Berenike. Research perspectives on the livestock trade: Africa–Europe–Asia**

The early Roman port of Berenike in Egypt is commonly recognized as one of the important centers connecting the ancient civilizations of Europe, Africa and Asia. Live animals were also among the “goods” passing through Berenike. Regular archaeozoological study during archaeological excavation in recent years has demonstrated a broad range of domestic animals as well as “associated” ones, like cats, dogs and monkeys. A new project, funded by a grant from the Polish National Science Center, addresses civilizational ties seen through the case of imports of live animals. In the first centuries AD the Romans were instrumental in bringing to Europe the buffalo and hen from India and exotic animals from Africa. The cat from Egypt also became widespread. In this light, the finds from Berenike take on unexpected significance and demonstrate scientific potential, especially the specimens from the animal cemetery on the northern fringes of the town.

Joanna K. Rądkowska*Polish Centre of Mediterranean Archaeology,
University of Warsaw***Small but significant... an Indian terracotta in Berenike?**

A small terracotta found in Berenike several years ago has been interpreted ever since its discovery as a representation of a Roman auxiliary soldier. However, a detailed study of its appearance has suggested an Indian rather than Mediterranean origin. Indian objects – pottery, textiles, writing and coins – are well represented in Berenike, an important port city on the Ancient Spice Route, but the terracotta would be the first art object. Many features of this small figurine, starting from the facial look, armament and similarity to other representations of warriors are evocative of Gandharan style. This paper proposes a new approach to this terracotta in search of a different interpretation.

Marek Woźniak

*Polish Centre of Mediterranean Archaeology,
University of Warsaw*

**Water more precious than gold? Supply, storage
and exploitation systems in Hellenistic Berenike
Trogodytika**

Several years of archaeological excavations in Berenike, conducted from 1994 to 2001 by an American-Dutch team and since 2008 by a Polish-American one, have provided a substantial body of evidence on the shape and function of the city, as well as its extensive commercial contacts. The results have also shed light on everyday life in the extremely difficult conditions of the Red Sea desert coast. Drinking water was a key resource. Providing it and protecting it required considerable effort and money. A well organized system of hydremas was located at the mouths of nearby wadis and guarded by small garrisons. Hundreds of early Roman ostraca discovered in Berenike yielded information on the military involvement in water transport from wellsprings to Berenike and its distribution in the city.

Similar solutions are to be expected for the Hellenistic period. Recent excavations in Berenike showed the existence of a fortress of this date, uncovering also an underground maze of shafts, tunnels and chambers for storing water. Indeed, water proved to be more common on site than expected, even forcing action to protect the weaker walls from an excess of rainfall water. Substantial open pools or cisterns existed inside the fort, near the fortified gate and in the courtyard of a large “warehouse/workshop/defense” building. It is even probable that a bath was operated in the town.

Marek Woźniak

*Polish Centre of Mediterranean Archaeology,
University of Warsaw*

Tomasz Herbich

*Institute of Archaeology and Ethnology,
Polish Academy of Sciences*

**Reconstructing the nonexistent: magnetic
prospection in tracing the lost Hellenistic
architecture of Berenike**

Magnetic surveys have proved their effectiveness in archaeological research on dozens of sites investigated in Egypt, Sudan and several other Near Eastern countries by Polish archaeological geophysicists from the Institute of Archaeology and Ethnology of the Polish Academy of Sciences. The results have facilitated the precise location of archaeological features invisible on the ground surface, allowing a considered selection of sites for invasive archaeological investigation, that is, excavation. More importantly, they have helped to place uncovered structures (usually in trenches covering only a small area of the ancient site) in a much broader urban and/or geomorphological context. Years of experience with the application of geophysical methods have made it possible to locate and interpret many structures and features not visible to the naked eye: architecture, but also water infrastructure, harbors, waterways etc. To specialists working in Berenike on the Red Sea coast it came as a surprise, however, that the magnetic survey was able to map also structures that no longer existed, having been robbed out or destroyed during later rebuilding. The Hellenistic fortifications of Berenike, various buildings and domestic installations, mere “ghosts” of the original structures that served as a ready source of invaluable stone building material, can now be traced by analyzing the results of a site-wide survey carried out in 1999 and between 2008 and 2015 by the Polish-American team working under the auspices of the Polish Centre of Mediterranean Archaeology University of Warsaw and the University of Delaware (USA). The paper will seek to reconstruct the original layout and form of the fortifications based on spot excavations and a magnetic map of the site.

Wednesday, 5 July
POSTER PRESENTATION

Alfredo Carannante

Independent researcher

Chiara Zazzaro

Universita di Napoli "L'Orientale"

**Onycha incense production at Galala (Eritrea)
in the 1st century BC-1st century AD. An
ethnoarchaeological approach**

The hills of Galala situated some 5 km to the south of Adulis (Zula bay, Eritrea), hub of the maritime trade among the Mediterranean and the Indian Ocean in the first millennium AD, were islands once and were used as landing places serving the town.

Archaeological surveys conducted in the area, and a test trench excavation revealed that one of the hills was occupied in the 1st century BC-1st century AD. A large concentration of shattered large gastropod shells was found on these hills. An archaeomalacological analysis of these finds strongly suggests that the reason why they were collected was an interest towards the mollusk opercula. These opercula were an important component of incense production in antiquity and they are still exploited today for the same purpose in the Red Sea-Indian Ocean region. The authors will analyze this evidence using an ethnoarchaeological approach.

Julie Marchand

CNRS-HiSoMA

Steatite ware in medieval Egypt

Steatite, also called soap-stone, is a rock known and extracted in Egypt in the Eastern Desert since Pharaonic times and especially during the Ptolemaic period. Its soft texture makes it quite easily exploitable and has very often been used for statuary, small objects (beads and trinkets), but also for cooking wares.

Research in geology, archaeology as well as medieval literary sources and modern ethnographical testimonies point to the localization of a great number of quarries in an area located between Quft and Aswan in the eastern part of the desert. At the beginning of the medieval period steatite seems to have been extracted specially for the production of vessels and pots for use with fire, such as cooking pots, cooking bowls, pans, incense burners and oil lamps. The few reliable contexts in which they have been found as well as recent geological work in the area demonstrate that the quarries were used extensively starting from the 8th century AD. The aim of this poster is to present the main production area, Egyptian vessel typology and vessel usage in the context of other stone and ceramic products of the same period, and the general economy of steatite in the Red Sea.

Chiara Zazzaro

Università di Napoli "L'Orientale"

Romolo Loreto

Università di Napoli "L'Orientale"

An eighteenth-century merchantman off the Red Sea coast of Saudi Arabia

In September 2015 and 2016, a team from the Saudi Commission for Tourism and National Heritage (SCTH) and the Università di Napoli "L'Orientale" started an underwater survey in the area comprised between Yanbu and Umm Lajj on the Red Sea coast of Saudi Arabia. The main focus of the survey was to locate and survey an 18th-century merchantman wrecked on a reef off the Umm Lajj coast.

The wreckage area is 22 m below the sea surface; parts of the shipwreck are exposed and clearly visible. The preserved cargo includes around one thousand jars, large storage jars, some blue and white Chinese porcelain cups, glass bottles, coconuts and metal vessels. The hull is also visible: frames and stringers running perpendicularly to each other emerge from the sandy bottom suggesting a massive hull structure.

Surveying methods adopted during the first two field seasons included the use of video recording and 3D reconstruction methods. Handmade measurements and drawings have been used for small objects, such as single pottery artifacts and isolated elements of the hull. A preliminary analysis of the Chinese porcelain cargo suggests that it was a merchant ship dating from the first half of the 18th century. The ship was sailing to the north of the Red Sea, carrying exotic products from the Far East, but perhaps also coffee from Mocha. According to historical sources and comparative archaeological evidence, such as the Sharm el-Sheikh and the Sadana shipwreck, the final destination of the ship may have been Egypt.

The Umm Lajj shipwreck carries great potential both for conducting long term scientific investigation and underwater excavation training for archaeologists and students. The cargo, and the ship in itself, are of immense historical value considering that it represents one of the latest evidence of the Egyptian-Arabian trade circuit in the Red Sea before the opening of the Suez Canal.

Iwona Zych

Polish Centre of Mediterranean Archaeology,
University of Warsaw

Berenike's riches: natural resources and materials in the archaeological record

The presentation lists primarily natural resources and other commodities represented in the archaeological record derived from 20 seasons of excavations between 1994 and 2015 at the harbor site of Berenike on the Red Sea, first by a Dutch-American and then by a Polish-American team. Categories include spices/condiments, incense/frankincense, minerals and metals (gold included), precious and semiprecious stones, cameo blanks, ivory, cowry shells, turtle shell, raw glass, as well as botanics (foodstuffs) and exotic and domestic animals, not to mention human slaves. The less obvious resources that are attested indirectly in the archaeological record include water, wine and olive oil. A separate category are the building materials: stone of different kind and wood, both locally procured and imported.

The main objective of the project is to work toward a network visualization of the resources (and other commodities) in the archaeological record from the different, currently excavated sites in the trade network and to compare it in the future to the existing network visualization of the list of goods extracted from the *Periplus Maris Erythraei*, a 1st century AD sailing and trading guide.

Iwona Zych

Polish Centre of Mediterranean Archaeology,
University of Warsaw

Michał Krueger

Institute of Prehistory, Adam Mickiewicz
University in Poznań

Monika Wiech

Institute of Mediterranean and Oriental Cultures,
Polish Academy of Sciences

The lamps of Berenike: a project of identification

Like any city in antiquity Berenike was lighted up at night with the flickering flames of terracotta or bronze oil lamps. On one hand, lighting devices were extremely common and these were usually plain and cheap products of little beauty or intricacy. On the other hand, the upper ranks of society, and there were plenty of wealthy people – merchants, officials and military men of rank – in town who preferred fine and valuable lamps. All or almost all the lamps in Berenike were brought in from other markets. The assemblage of clay oil lamps from the excavations at the Hellenistic and Graeco-Roman harbor consists of almost 600 recorded fragments, many of these either not diagnostic or difficult to identify. But they are well dated contextually in many cases and can be identified by traditional typological and iconographic classificatory methods. The Berenike Lamp project undertakes to confront the traditional humanist approach with nature science methodologies: macroscopic clay observation and pXRF examination of chemical composition in an effort to identify lamp origins and production technology. Taken together, the results will demonstrate the range of markets that supplied Berenike with products of everyday utility.

LIST OF SPEAKERS AND PARTICIPANTS

Dr. Shinu Anna ABRAHAM

Department of Anthropology, St. Lawrence University
Canton, New York, USA
sabraham@stlawu.edu

Dr. Ahmed Hussein Abdelrahman ADAM

Department of Archaeology, University of Khartoum
Sudan
ahmedaba77@yahoo.com

Prof. Dionisius AGIUS

Institute of Arab and Islamic Studies, University of Exeter
Great Britain
d.a.agius@exeter.ac.uk

Ann ANDERSSON

Moesgaard Museum
Copenhagen, Denmark
msz800@alumni.ku.dk

Awet Teklehimanot ARAYA

Northern Red Sea Regional Museum, Eritrea
University of Evora, Portugal
awtekarch@gmail.com

Marta BAJTLER

Berenike Project
Warsaw, Poland
mbajtler@wp.pl

Dr. Roland de BEAUCLAIR

Independent researcher
Tuebingen, Germany
roland.db@gmx.net

Prof. Anne BENOIST

Laboratoire Archéorient – Maison de l'Orient et de la
Méditerranée, Lyon
France
anne.benoist@mom.fr

Saskia BUECHNER

German Archaeological Institute
Berlin, Germany
saskia.buechner@yahoo.de

Dr. Alfredo CARANNANTE

Independent researcher
Naples, Italy
alcarann@yahoo.it

Joanna A. CIESIELSKA

Institute of Archaeology, University of Warsaw
Poland
j.ciesielska@onet.eu

Dr. John P. COOPER

Institute of Arab and Islamic Studies, University of Exeter
Great Britain
j.p.cooper@exeter.ac.uk

Dr. Ashley COUTU

Marie Skłodowska-Curie Research Fellow, Cape Town
Department of Archaeology, University of York
Great Britain
ac609@york.ac.uk

Dr. Kristoffer DAMGAARD

Department of Cross-Cultural and Regional Studies
University of Copenhagen
Denmark
kd@hum.ku.dk

Sara FANI

Department of Cross-Cultural and Regional Studies
University of Copenhagen
Denmark
dqn826@hum.ku.dk

Ric FURRER

Door County Forgeworks, Wisconsin
USA
@RicFurrer on Facebook

Dr. Iwona GAJDA

CNRS / UMR 8167 – Orient et Méditerranée, Mondes
sémitiques, Ivry sur Seine
France
iwona.gajda@cnrs.fr

Prof. Michał GAWLIKOWSKI

Polish Centre of Mediterranean Archaeology, University
of Warsaw, NCN grant UMO-2014/14/M/HS3/00795
(PCMA UW)
Poland
m.gawlikowski@uw.edu.pl

Prof. H. Albert GILG
 Technical University of Munich
 Germany
agilg@tum.de

Prof. Bernard GRATUZE
 Institut de recherche sur les archéomatériaux, Centre
 Ernest-Babelon (IRAMAT-CEB) UMR 5060
 CNRS, Orléans University
 France
bernard.gratuze@cnrs-orleans.fr

Martin HENSE
 Independent researcher
 Rotterdam, The Netherlands
martinhense@hotmail.com

Tomasz HERBICH
 Institute of Archaeology and Ethnology,
 Polish Academy of Sciences, Warsaw
 Poland
tomasz.herbich@gmail.com, herbich@iaepan.edu.pl

Barbara HUBER
 German Archaeological Institute Berlin
 Germany
b.huber@fu-berlin.de

Prof. Timothy INSOLL
 Institute of Arab and Islamic Studies, University of Exeter
 Great Britain
T.Insoll@exeter.ac.uk

Dr. Julian JANSEN VAN RENSBURG
 Freie Universität, Dahlem Research School, Topoi
 Berlin, Germany
rabbobi@zedat.fu-berlin.de

Ali JARKHI
 Bonn International Graduate Schools-Oriental and
 Asian Studies (BIGS-OAS), Bonn University
 Germany
a.jarkhi@gmail.com

Dr. Karol JUCHNIEWICZ
 Research associate, Polish Centre of Mediterranean
 Archaeology, University of Warsaw
 NCN grant UMO-2014/14/M/HS3/00795 (PCMA UW)
 Poland
karol.juchniwicz@gmail.com

Prof. Jonathan Mark KENOYER
 Department of Anthropology, University of Wisconsin-
 Madison
 United States of America
jkenoyer@wisc.edu

Miriam LAHITTE
 Independent researcher
 Berlin, Germany
MiriamLahitte@web.de

Dr. James W. LANKTON
 UCL Qatar
 Doha, State of Qatar
jamesyuri@gmail.com

Alan LEE
 University of Wisconsin-Madison
 United States of America
aflee@wisc.edu

Mateusz LISAK
 Graduate student,
 Institute of History, Jan Kochanowski University in Kielce
 Poland
yeniceri@interia.pl

Silvia LISCHI
 Archaeology Department, University of Pisa
 Italy
silvialischi@msn.com

Romolo LORETO
 Asia, Africa and Mediterranean Department, Università
 di Napoli "L'Orientale"
 Italy
romololoreto@gmail.com

Michael MALLINSON
 McDonald Institute for Archaeological Research, University
 of Cambridge
 Great Britain

Julie MARCHAND
 Post-doctoral Fellow, CNRS- Laboratoire HiSoMA
 (Histoire et Sources des Mondes Antiques), Lyon
 France
julie.mj.marchand@gmail.com

Dr. Joan OLLER GUZMÁN
 Universitat Autònoma de Barcelona
 Spain
joan.oller@uab.cat

Dr. Aylin ORBASLI
 School of Architecture, Oxford Brookes University
 Great Britain
aorbashi@brookes.ac.uk

Dr. Marta OSYPIŃSKA
 Institute of Archaeology and Ethnology,
 Polish Academy of Sciences (Poznań)
 Berenike Project; NCN grant DEC-2016/23/B/HS3/03576
 (IAE PAN-PCMA UW)
 Poland
marta.osypinska@iaepan.poznan.pl; archeozoo@o2.pl

Dr. Piotr OSYPIŃSKI
 Berenike Project; NCN grant DEC-2016/23/B/HS3/03576
 (IAE PAN-PCMA UW)
 Poznań, Poland
piotr.osypinski@gmail.com

Dr. Alexia PAVAN
 Office of the Adviser to His Majesty the Sultan for Cultural
 Affairs
 Sultanate of Oman
alepavan@yahoo.com

Dr. Ralph K. PEDERSEN
 The Red Sea Institute for Anthropological Research
 Lansing, Michigan, United States of America
pedersen@redseainstitute.org

Dr. Yvonne PETRINA
 Institute of Byzantine Studies,
 Ludwig-Maximilian University of Munich
 Germany
yvonne.stolz@yahoo.co.uk

Dr. Jacke PHILLIPS
 School of Oriental and African Studies,
 University of London
 Great Britain
jp39@soas.ac.uk

Anja PRUST
 German Archaeological Institute Berlin,
 Orient-Department,
 Germany
anja.prust@gmail.com

Joanna K. RAĐKOWSKA
 Polish Centre of Mediterranean Archaeology, University
 of Warsaw
 NCN grant UMO-2014/14/M/HS3/00795 (PCMA UW)
 Poland
radkowska@gmail.com

Dr. Bérangeère REDON
 CNRS/Laboratoire HiSoMA, Lyon
 France
berangere.redon@gmail.com

Prof. Thilo REHREN
 Institute of Archaeology, University College London
 Great Britain
th.rehren@ucl.ac.uk

Prof. Eivind Heldaas SELAND
 University of Bergen
 Norway
eivind.seland@uib.no

Prof. Steven E. SIDEBOTHAM
 Department of History, University of Delaware
 United States of America
ses@udel.edu

Dr. Laurence SMITH
 McDonald Institute for Archaeological Research, University
 of Cambridge
 Great Britain
ls101@cam.ac.uk

Dr. Carolyn SWAN
 UCL Qatar
 Doha, State of Qatar
c.swan@ucl.ac.uk

Dr. Shadia TAHA
 McDonald Institute for Archaeological Research, Uni-
 versity of Cambridge
 Great Britain
st446@cam.ac.uk

Dr. Joanna THEN-OBŁUSKA
Polish Centre of Mediterranean Archaeology, University
of Warsaw
Poland
j.then-obluska@uw.edu.pl

Dr. Giulia TUCCI
"La Sapienza" University of Rome
Italy
giuliatucci@live.it

Dr. Norbert WEISMANN
Honorary Research Fellow, Institute of Arab and Islamic
Studies, University of Exeter
Great Britain
norbert.weismann@helimail.de

Marek WOŹNIAK
Polish Centre of Mediterranean Archaeology, University
of Warsaw
Berenike Project; NCN grant UMO-2015/17/N/HS3/00163
(PCMA UW)
Poland
wozniakarcho@gmail.com

Dr. Zuzanna WYGNANŚKA
Polish Centre of Mediterranean Archaeology, University
of Warsaw
Poland
zjwygnan@uw.edu.pl

Dr. Chiara ZAZZARO
Asia, Africa and Mediterranean Department, Università
di Napoli "L'Orientale"
Italy
chiarazazzaro@gmail.com

Iwona ZYCH
Polish Centre of Mediterranean Archaeology, University
of Warsaw
Poland
i.zych@uw.edu.pl

MONDAY, 3 JULY

Pre-registration from **17.00 to 20.00**
Institute of Archaeology, First-floor

At your leisure, visit current PCMA UW poster presentations:

- * *EDFU IS WHERE IT ALL BEGAN... 80 YEARS OF POLISH ARCHAEOLOGY IN EGYPT* (Polish/English),
The University of Warsaw Museum
- * *NOT JUST PYRAMIDS... 80 YEARS OF POLISH ARCHAEOLOGICAL RESEARCH IN EGYPT and
POLAND-EGYPT IN THE 1920s AND 1930s. 90TH ANNIVERSARY OF POLISH-EGYPTIAN
DIPLOMATIC RELATIONS* The Old Library Building foyer
- * *POLISH CENTRE OF MEDITERRANEAN ARCHAEOLOGY: EXCAVATIONS AND RESEARCH IN
2016/2017*, Institute of Archaeology, Gallery in the Corridor

THE OLD LIBRARY

The University Library building was inaugurated in 1894 and immediately acclaimed as a very modern and innovative construction. The huge skeletal grille of iron (part of it is on display back of the main auditorium) was an innovative storeroom design. Renovation in the early 21st century restored the traditional form of the interior decoration, including the splendid hardwood floors, wall décor and wrought iron grills, based on old photographs, while adapting the building to its new role as the University's conference center. Nobel Literature Prize laureate Czesław Miłosz used to work here as a janitor.

Read more: www.en.uw.edu.pl/wp-content/uploads/2014/08/main-sites-of-the-uw.pdf

INSTITUTE OF ARCHAEOLOGY (old Main School)

Designed by the famous architect Antonio Corazzi in 1841, it housed auditoria, assembly hall for the School's Council, professors' reading room and the Rector's Office. The facade was styled on a Greek temple, including a 19th century relief in the tympanum with figures of Aristotle and Plato surrounded by their disciples. For many decades it housed the nature sciences – liquid oxygen was first condensed in these walls by Karol Olszewski and Zygmunt Wróblewski. It is now the seat of the archaeological institute, one of the few University buildings spared from destruction during World War II.

Read more: www.en.uw.edu.pl/wp-content/uploads/2014/08/main-sites-of-the-uw.pdf

TUESDAY, 4 July

* 15.00–16.00

Guided Tour of the University of Warsaw Museum
The Tyszkiewicz-Potocki Palace, Krakowskie Przedmieście 32

* 20.00–22.00

Cocktail offered by
the Rector of the University of Warsaw
and the Director of the Polish Centre
of Mediterranean Archaeology University of Warsaw
The Kazimierzowski Palace Gardens
Main Campus, Krakowskie Przedmieście 26/28

THE UNIVERSITY OF WARSAW MUSEUM

In 2016, the University of Warsaw celebrated its bicentennial. A new display in the University Museum highlights the academic development of the institution as well as its dramatic fate reflecting turbulent Polish history in the 19th and 20th centuries. The Tyszkiewicz-Potocki palace, in which it is located, is a jewel of late 18th century residential architecture in Warsaw. In the 1930s, it housed the Polish Academy of Literature and the National Library. The building with its rich stucco decoration of the interior, especially the Ball Room, was meticulously restored for the University's bicentennial.

Read more: www.en.uw.edu.pl/wp-content/uploads/2014/08/main-sites-of-the-uw.pdf

THE KAZIMIERZOWSKI PALACE and GARDENS

Constructed before 1643, the Kazimierzowski Palace is the oldest building of the University. It was a royal country residence standing high on an embankment overlooking the Vistula. In 1765–1766, the last Polish king Stanislaus August Poniatowski remade it into an educational facility, a college for noble youth called The Knights' School. Polish and American hero Tadeusz Kościuszko studied here. Today it is the seat of the Rector of the University and houses offices of the administration. To the right is the Former Rectory Building where professors had their flats. Among others, the Chopin family with the young Frederic used to live there.

Read more: www.en.uw.edu.pl/wp-content/uploads/2014/08/main-sites-of-the-uw.pdf

WEDNESDAY, 5 July

Join us for an informal evening on the Vistula
(assuming it's not raining)

We propose to meet after the sessions, at 18.30, in front of the University Library and then take a stroll down to the river for a quiet drink in one of the pubs near Warsaw's cultural and scientific attractions: the Copernicus Science Center and the Museum on the Vistula.

THE COPERNICUS SCIENCE CENTRE

One of the largest science centres in Europe with over 450 exhibits in six interdisciplinary sections that intersect, intermingle, and complement one another. And the opportunity to watch over ten million stars at the Heavens of Copernicus planetarium.

"The important thing is not to stop questioning. Curiosity has its own reason for existing", wrote Albert Einstein. What better motto than this for a conference of Red Sea Studies?

Read more: www.kopernik.org.pl/en/visit-us/copernicus-whats-it-all-about/

THE UNIVERSITY LIBRARY

The ultramodern building of the University Library in the Powiśle district, designed by architects Marek Budzyński and Zbigniew Badowski and built in 1999, is also the largest. It houses one of the largest collections of academic books in Poland accommodated on a floor area of 57,000 m². The fuschia-colored iron structure against the facade is a memento of the Old Library, a unique 19th century book storage construction. The rooftop garden with its two parts joined by a cascading stream is one of the largest roof gardens in Europe (more than 1 ha). Visit to enjoy the four different parts: golden, silver, crimson and green, each with plants reflecting their names, as well as a great panorama of Warsaw and the Library interiors seen from the top.

Read more: www.en.uw.edu.pl/wp-content/uploads/2014/08/main-sites-of-the-uw.pdf

THURSDAY, 6 JULY

* from 13.00 to 16.00

Visit the galleries of the **State Archaeological Museum** in Warsaw
The galleries will be open to conference participants for the duration of the archaeometallurgical experiment.

* 15.30–18.30

(right after the archaeometallurgical experiment)

Tour **Old Warsaw** with our Guide

Start: State Archaeological Museum in Warsaw, ul. Długa 52

Read more: <http://www.warsawtour.pl/en/zabytki-i-inne-atrakcje.html>

* 19.00–21.00

Evening in the **Faras Gallery**
at the National Museum in Warsaw

STATE ARCHAEOLOGICAL MUSEUM IN WARSAW

Since 1928 the Museum has discharged its tasks of promoting prehistoric archaeology of Poland through the collection, interpretation and scientific publication of artifacts representing the oldest chapters in the history of mankind (through the early Middle Ages) living in the territories of the modern state of Poland. Since 1957 it is housed in the historic Warsaw Arsenal.

Read more: www.pma.pl/nowe/en/index.html

THE FARAS GALLERY

A collection of 67 wall paintings from a medieval Nubian cathedral excavated in Faras by Professor Kazimierz Michałowski and his team during the UNESCO Nubia Campaign in the early 1960s and transferred to Warsaw to create Europe's only major exhibition of Nubian art from the 8th–14th centuries. The tempera paintings are displayed in the context of elements of architectural decoration from the cathedral, as well as epitaphs of local clergymen, ceramics and other artifacts. A digital reconstruction of the cathedral (Faras 3D Project) is part of the new gallery, opened in 2014, which was **the winner of Sybilla Grand Prix 2014, Sybilla 2014 and MUSE Awards** (American Alliance of Museums).

Read more: www.mnw.art.pl/en/collections/permanent-galleries/faras-gallery/

FRIDAY, 7 JULY

* 14.30–16.00

General Meeting

Pros and cons of setting up of a society for Red Sea Studies

A complimentary lunch will be served.
Cafeteria at the Kazimierzowski Palace
University of Warsaw Main Campus
Krakowskie Przedmieście 26/28

* 19.00

Farewell Conference Dinner

“Aleje 3” Restaurant

National Museum in Warsaw

Al. Jerozolimskie 3

Live Music by the Folkers Band

NATIONAL MUSEUM IN WARSAW

Founded in 1862, it is currently one of the oldest art museums in the country. The Modernist building in which it currently resides was erected in 1927–1938. Today, the National Museum in Warsaw boasts a collection numbering around 830,000 works of art from Poland and abroad, from ancient times to the present including paintings, sculptures, drawings, prints, photographs, coins, as well as utilitarian objects and design.

Read more: www.mnw.art.pl/en/about-the-museum/

THE NEOLITHIC FLINT MINES

The Neolithic mines of striped flint in Krzemionki (discovered in 1922) are one of the most valuable monuments of prehistoric mining in the world. The perfectly preserved cavities, mine tips and pi-shaft hollows form a unique industrial landscape from before 5000 years. The exploitation field includes 4000 mines in an area from 20 m to 200 m wide, stretching out for 4.5 km. Here prehistoric man excavated the flint that he then used to make his tool kit. Four different kinds of mines can be distinguished depending on the depth and excavation system. The largest and most complex chamber mines went down to 9 m. The height of the underground cavities ranges from 55 to 120 cm.

Read more: www.krzemionki.pl/en/museum/about-us/

SANDOMIERZ

"A picturesque location and an impressive wealth of finely preserved historic monuments have earned Sandomierz a reputation as one of the most beautiful towns in Poland. At one time it played a role of great importance in the life of the country, but nowadays it is simply a rural town of great beauty. The surroundings of Sandomierz are known for their scenic charm and an abundance of fascinating historic remnants."

Read more: www.staypoland.com/about_sandomierz.htm

THE "WIELICZKA" SALT MINE

A UNESCO World Cultural and Natural Heritage site since 1978, it is visited by more than a million tourists each year. Today, the "Wieliczka" Salt Mine combines many centuries of tradition and modernity, the history of several hundred years and an underground metropolis with extensive infrastructure. The mine is a product of work of tens of generations of miners, a monument to the history of Poland and to the Polish nation – a brand, present in Polish consciousness for centuries.

Read more: www.wieliczka-saltmine.com/about-the-mine

WEEKEND TRIPS**Saturday, 8 July**

Day trips

Neolithic **flint mines** in Krzemionki and **Sandomierz** in the Holy Cross Mountains

The **Wieliczka** Salt Mine and **Kraków**

Morning train to Kraków, return by evening train

NOTE: The trips will be organized depending on interest – please check with the Registration Desk.

Sunday, 9 July

Chilling out!

Visit The Museum of King Jan III's Palace at **Wilanów** in Warsaw

Meet us at the Historic Reconstruction Army Camp by the entrance at 11 a.m.

THE PALACE MUSEUM AT WILANÓW

See the historic Palace and its scenic gardens, the residence of King John III Sobieski and the location of one of the oldest public museums of antiquities, established by Stanisław Kostka Potocki in the late 18th century.

The reconstruction camp is a tourist attraction presenting the original royal tent of King John III Sobieski at the famous Battle of Vienna in 1683 where he commanded an array of European troops in a victorious battle against invading Turks. The camp also reconstructs the royal mint and the royal forge, demonstrating historic blacksmithing techniques and a selection of 17th century armaments.

Read more: www.wilanow-palac.pl/en/palac/palace_and_park

Zofia KOWARSKA
Research associate, Polish Centre of Mediterranean
Archaeology, University of Warsaw
Poland
zofiakowarska@wp.pl

Matysz LISAK
Graduate student, Institute of History, The Jan Kochan-
owski University in Kielce
Poland
yenicerr@interia.pl

Prof. Marta LUCIANI
Institute for Oriental Studies, University of Vienna
Austria
marta.luciani@univie.ac.at

Dr. Laila NEHME
CNRS, Laboratoire d'études sémitiques anciennes,
Collège de France
France
laila.nehme@cnrs.fr; laila.nehme@college-de-france.fr

Dr. Ralph K. PEDERSEN
The Red Sea Institute for Anthropological Research
Lansing, Michigan, United States of America
pedersen@redseainstitute.org

Zeeshaan SHAIKH
Graduate student, Centre for Maritime Archaeology,
University of Southampton
Great Britain
zas1g10@soton.ac.uk

Marcin WAGNER
Institute of Archaeology, University of Warsaw
Poland
wagnerm@wp.pl

LIST OF SPEAKERS

Dr. Rupert BRANDMEIER
Ludwig-Maximilians-Universität München, Germany
The Red Sea Institute for Anthropological Research
Lansing, Michigan, United States of America
rupert.brandmeier@dell.com

Dr. Caroline DURAND
Research associate, CNRS/HISOMA, Lyon
France
caroline.durand@yahoo.fr

Dr. Zbigniew T. FIEMA
Department of World Cultures, University of Helsinki
Finland
zbigniew.fiema@helsinki.fi

Dr. Iwona GAJDA
CNRS/UMR 8167 – Orient et Méditerranée, Mondes
sémitiques, Ivry sur Seine
France
iwona.gajda@cnrs.fr

Prof. Michał GAWLIKOWSKI
Polish Centre of Mediterranean Archaeology, University
of Warsaw, NCN grant UMO-2014/14/M/HS3/00795
(PCMA UW)
Poland
m.gawlikowski@uw.edu.pl

Prof. Ali Ibrahim al-GHABBAN
Saudi Commission for Tourism and National Heritage
Kingdom of Saudi Arabia
ghabbana@scth.gov.sa

Dr. Karol JUCHNIEWICZ
Research associate, Polish Centre of Mediterranean
Archaeology, University of Warsaw
NCN grant UMO-2014/14/M/HS3/00795 (PCMA UW)
Poland
karol.juchniewicz@gmail.com

fine wares (that is, terra sigillata, thin plain or decorated Nabataean ware) and cooking wares form only a small percentage of the collected material. Fragments of wasters and malformed vessels with hard green surfaces, especially big storage jars, found in all the excavated trenches indicate that pottery production was carried out locally. This local fabric is characterized by coarse fragments of limestone and grains of quartz. Localization of the site on the northern Red Sea coast at the head of a caravan road presumes contacts with other regions and this is observed in the pottery assemblage. Most of the imported vessels come from the Agaba region in the north with some sherds originating from South Arabia.

Red Sea, such as availability of water, weather conditions, natural hazards and dangers while sailing, etc. Therefore major questions such as what were the challenges navigators had to encounter while navigating via the Red Sea route, or how they planned their voyages or chose routes for navigation, remained unanswered. Thus, there were constraints these navigators had to consider while sailing the Red Sea, about which current scholarship knows very little. By visualizing ancient voyage from a time geography perspective this study explores, in real time, various constraints faced by sailors while navigating the Red Sea. In doing so it tries to answer some of the most challenging questions still enduring in the Red Sea maritime studies. For example, why sailors choose the route they choose or why some routes proved better than others. Could these constraints of navigation be one of the reasons that there were more archaeological sites along the African coast of the Red Sea than on the Arabian side during the Roman period?

Marcin Wagner

Institute of Archaeology, University of Warsaw

Zofia Kowarska

Polish Centre of Mediterranean Archaeology,

University of Warsaw

Pottery from Aynunah on the northern Red Sea coast (Saudi Arabia)

A team from the Polish Centre of Mediterranean Archaeology University of Warsaw has excavated since 2015 in Aynunah, a site situated on the northern Red Sea coast. Two areas of archaeological interest have been identified: the lower town where four seasons of excavations were carried out, and the upper town which was surveyed in 2016, producing a surface collection of potsherds.

The ceramic material, both fragmented and complete vessels, covers pottery dated to early Roman–Byzantine times. Two phases of the functioning of the site were identified based on a provisional study of this material: 2nd–1st century BC? – 2nd–3rd century AD (Hellenistic and early Roman) and 4th–7th century AD (late Roman/ Byzantine). The assemblage consists of fragments of mainly storage vessels and amphorae. Table wares,

This paper aims to visualize the constraints and complexities encountered by navigators sailing the Red Sea. This is done by simulating a path of a voyage, as described by the author of the Periplus Maris Erythraei, in a time-space framework introduced by Torsten Hag-erstrand in 1968. The Periplus Maris Erythraei, a travel guide of the 1st century AD, provides an account of the Red Sea trading network. It talks about trade routes and commodities that were traded but limited emphasis was placed on the constraints sailors faced while sailing the

Placing ancient sailors in a time-space framework: visualizing ancient voyages of the Red Sea from a time geography perspective

Zeeshan A. Shaikh
Centre for Maritime Archaeology, University of Southampton

The Red Sea is a deep rift between Africa and Asia, yet as an aquatic “highway” it links Europe to the Indian Ocean world. While the existence of Greco-Roman trade down the Red Sea to the wider eastern world is relatively well-known, we are still investigating the harbors and destination points along the shores of the Red Sea. Understanding the geographical, and indeed geological, aspect of the sea is a key factor in the finding of ancient harbors and anchorages. Coupled with this is the need to discern the technology of the maritime tools — navigation, ship-building technology, sailing practices — of the various eras and cultures of the Red Sea. This paper explores these aspects through the growing body of evidence and theory of Red Sea maritime endeavors, as well as by the author’s own archaeological investigations in Eritrea and Saudi Arabia.

“Whither sailedst thou?” Red Sea origins and destinations through the lens of ship technology

Ralph K. Pedersen
The Red Sea Institute for Anthropological Research USA

Oriental desert versus Arabian desert. Reflections on the connections between the Egyptian and Arabian shores in the northern Red Sea in Antiquity

Laila Némé
CNRS, Paris

This paper aims at exploring some research avenues on the connections between the Egyptian and Arabian shores in the northern Red Sea in Antiquity. Indeed, the author is exploring the possibility of launching on this subject an ERC project, which would group together various research teams and scholars interested in the subject. The core of the latter is the idea of connection, i.e., any general or particular topic which connects Egypt with Arabia. The idea emerged after the discovery, in Madâ in Salih, ancient Hegra, of Latin inscriptions which mention the presence, in the Roman period, of stationarii, a term which is also used in ostraka found in the Egyptian Eastern Desert. The North-South itineraries, stations along them, commercial networks, etc., are however not the only parallels which can be drawn between the two regions. This paper will present briefly some of the aspects which may be explored, such as the possible Egyptian influence in Northwest Arabia in the Ptolemaic period, the presence of people carving Nabataean and Minaic inscriptions on both sides of the Red Sea, the possible connections between the ports as well as the navigation routes and techniques, the presence in Arabia of Roman military detachments coming from Egypt, the question of the origin of the Arabs mentioned in the ostraka from Egypt, etc. While not a specialist in the field of material culture studies, the author will undertake to address key categories: apart from the pottery, also glass beads, textile weaving techniques, units of measurements and a possible comparison between oasian agricultural systems. She would like to share with the colleagues present at the workshop a provisional inventory of points to discuss that she has been making for some time now.

Matysz Lisak
Institute of History, The Jan Kochanowski University in Kielce

The conditions and circumstances of the discovery of a sea route to India: issues of open-sea travel and the Bab el-Mandeb barrier

The issue of the discovery of a sea route to India is one of the most important questions about Indo-Roman trade relations and it has yet to be resolved. Historians tend to focus on who made the first open-sea journey and when, and whether it was a sudden change or a process drawn out in time. The conditions essential for the discovery of a new route are not considered, nor the circumstances that would have made this journey possible. Another issue is the case of the Arabia Eudaimon port. The 1st-century AD Periplus Maris Erythraei states that the port had been ransacked and there was no direct connection between India and Egypt, but that all ships were forced to stop there. Thus the resumption of active trade with India necessitated the lifting of the tentative blockade of Arabia Eudaimon and discovering the trans-oceanic route. The nautical guide, however, does not describe the new route in the context of the troubles in Bab el-Mandeb, but can we be really sure that these two events were not related? What were the circumstances and conditions that had to be met for it to be possible to discover the new pathway?

Marta Luciani
Institute for Oriental Studies, University of Vienna
Bronze Age precursors on the Red Sea

The size and position of the ancient oasis of Qurayyah have prompted its identification with the capital of the Medianites, a people attested in the Bible, Classical sources and the Qur'an. Moreover, its location on the eastern fringes of the Hisma range in the Northern Hejaz has resulted in Qurayyah being proposed as one of the main stops along an early overland Incense Road, beyond and besides the Red Sea Route. The contribution will review the archaeological evidence for these claims, as well as the materials and settlement patterns in the region in the Bronze Age in order to understand incipient networks of communication and exchange in the Northern Hejaz-Red Sea system.

Introduction. The first account of the Aynunah Project

Michał Gawlikowski
Polish Centre of Mediterranean Archaeology, University of Warsaw

New archaeological evidence on the location of Ampeloni in the Island of Farasan, Saudi Arabia

Saudi Commission for Tourism and National Heritage

Ali Ibrahim al-Ghabban

The role of Aynuna on the Red Sea trade route: preliminary conclusions

Polish Centre of Mediterranean Archaeology, University of Warsaw

Aynunah's location in the northernmost extremity of the main body of the Red Sea offers an excellent connection with the rest of northern Arabia, avoiding the hardships and dangerous waters of the Gulf of Aqaba. Recent archaeological research at the site has supplied new information on Aynunah's possible role as a port of trade in the northern Hijaz in the Roman and late pre-Islamic periods. This contribution will address several issues: the nautical challenges in the Red Sea and the impact on maritime trade in the region, the importance of Aynunah as a port in northern Arabia and the tentative function of the trade facility on the mercantile route connecting southern and northern Arabia.

When the merchants from Roman Egypt meet the Nabataean caravaneers: recent finds from al-Qusayr (al-Wajh, Saudi Arabia)

The ancient site of al-Qusayr is located approximately 40 km south of al-Wajh, about 6–7 km from the Red Sea coast. It is known since the mid-19th century when the explorer R. Burton described for the first time the remains of a monumental building, the so-called al-Qasr. In March 2016, a new survey of the site was undertaken as part of the al-'Ula-al-Wajh Survey Project directed by Dr. Zbigniew Fiemma. This survey focused not only on the Qasr, but also on the surrounding site corresponding to the ancient settlement. A surface collection of pottery sherds revealed a striking assemblage of Mediterranean and Egyptian imports on one hand and of Nabataean products on the other. This pottery material is particularly homogeneous from a chronological point of view, suggesting a rather limited occupation period for the site. We will present in detail these pottery finds and will discuss their significance regarding the contacts between Mediterranean merchants, Roman Egypt and the Nabataean kingdom. These new data, among other elements, allow a complete reassessment of the importance of this locality in the Red Sea trade routes during Antiquity.

Zbigniew T. Fiemma
University of Helsinki

To Hegra through al-Qusayr. The al-'Ula-al-Wajh Survey Project

The al-'Ula-al-Wajh Survey Project is the archaeological investigation of potential ancient trade and communication routes and associated archaeological sites between the ancient settlements of al-'Ula and Madā' in Sāliḥ (ancient Hegra) and the Red Sea littoral in the area of al-Wajh. This investigation is related to the economics of long distance maritime and caravan trade and the utilization of the "Incense Route" which served to convey frankincense and other commodities from South Arabia to the Medi-

terranean during the Hellenistic and Roman periods. The Project is also concerned with the localization of potential Nabataean seaports on the Red Sea coast, such as Leuke Kome and Egra Kome, mentioned in ancient sources. The presentation will include the results of two fieldwork seasons (2013, 2016), concentrating on the potential caravan route along the Wādī al-Ḥāmd, leading to Hegra. Among the highlighted sites is the Nabataean al-Qusayr. The finds from that site clearly indicate a significant participation in the long-distance trade between the Mediterranean, Egypt and the Red Sea region. The presentation will conclude with the reassessment of the Red Sea trade, sites and communication routes.

Iwona Gajda
CNRS / UMR 8167, Orient et Méditerranée

Contacts between South Arabia and the Roman Empire

Ancient South Arabia was rarely and only during short periods dominated by foreign powers. The country, though distant from the main civilizations of Antiquity and protected by natural borders, was not completely isolated, as it was involved in long distance trade. Incense and myrrh, collected in the south of the country and diverse goods transported by sea from India and Southeast Asia and also from the Horn of Africa contributed to the legendary prosperity of South Arabia in the first millennium BC. In 26/25 BC, Augustus, who desired to control the regions where incense and myrrh were produced, sent an army which conquered some South Arabian cities but could not take the Sabaean capital, Mārib, and had to withdraw.

In the 2nd century AD, a Roman army gained control of the Farasan Islands in the Red Sea and left there a garrison as a Latin inscription reveals. Some recently published inscriptions refer to the Roman presence in the Red Sea at that time. If the contacts with Rome are rarely mentioned in South Arabian inscriptions, many objects of Roman art have been found in Yemen, some are imports, some are Roman imitations locally produced, often bearing South Arabian inscriptions. However, Rome never really conquered South Arabia. This paper proposes to re-examine the question.

THE ARABIAN RED SEA ROUTE

Workshop

Warsaw, 3 July 2017

Rupert Brandmeier
LMU Munich

Roads of Arabia: new finds of Aqaba amphorae in the Red Sea

The Thesis "Roads of Arabia: new findings of Aqaba amphorae in the Red Sea" concerns a probable shipwreck cargo of Aqaba amphorae, which was discovered during the second season of the survey project along the Saudi Arabian coast, initiated by nautical archaeologists of Philipps-University Marburg and conducted in cooperation with members of the Saudi Commission for Tourism and Heritage in autumn 2013. Nautical archaeology in Saudi Arabia is still in its infancy and to understand the challenges of archaeological research, the geographical and historical circumstances have to be taken into account, particularly the area between Jeddah and Al-Shu'aybah with its particular setting of shoals, shams and coral reefs. Seafaring and sea trade was, according to the few ancient sources and modern research activities, a hazardous endeavor in antiquity. Transport containers like the Aqaba Amphorae played a major role in sea trade, a significant number of which have been detected on various sites along the Red Sea coast and its hinterland. The chronological classification as well as the application is far from complete, and recent archaeological investigations help to clarify the logistical aspects of manufacturing and distribution of Aqaba amphorae. Finding a number of remains of Aqaba amphorae at a supposed shipwreck site close to Jeddah delivers new insight into the maritime routes and activities along the western coast of Saudi Arabia. The documentary material currently available is the baseline for further research in the field of maritime archaeology as it pertains to trade in the Red Sea.

Chair: Zbigniew T. Fiema

17.00-18.30	Session 4
17.00-17.30	Ralph K. Pedersen "Wither Sailedst Thou?" Red Sea origins and destinations through the lens of ship technology
17.30-18.00	<i>Zeeshan Shaikh</i> Placing ancient sailors in a time-space framework: visualizing ancient voyages of the Red Sea from a time geography perspective
18.00-18.30	<i>Matusz Lisak</i> The conditions and circumstances of discovery of a sea route to India: the issues of open-sea travel and the Bab el-Mandeb barrier
18.30-20.00	Discussion
20.00	GFT-TOGETHER

THE ARABIAN RED SEA ROUTE workshop, Warsaw, 3 July 2017

MONDAY, 3 JULY Institute of Archaeology, University of Warsaw

9.00-9.30 WELCOME COFFEE – REGISTRATION

9.30-11.00	Session 1	Chair: Laila Nehmé
9.30-10.00	<i>Michał Gawlikowski</i>	Introduction. The first account of the Aynunah Project
10.00-10.30	<i>Ali Ibrahim al-Ghabban</i>	New archaeological evidence on the location of Ampeloni in the Island of Farasan, Saudi Arabia
10.30-11.00	<i>Karol Juchniewicz</i>	The role of Aynunah on the Red Sea trade route: preliminary conclusions
11.00-11.30	COFFEE BREAK	
11.30-13.00	Session 2	Chair: Ali Ibrahim al-Ghabban
11.30-12.00	<i>Iwona Gałda</i>	Contacts between South Arabia and the Roman Empire
12.00-12.30	<i>Laila Nehmé</i>	Oriental desert versus Arabian desert. Reflections on the connections between the Egyptian and Arabian shores in the northern Red Sea in Antiquity
12.30-13.00	<i>Marta Luciani</i>	Bronze Age precursors on the Red Sea
13.00-14.30	LUNCH	
14.30-16.30	Session 3	Chair: Michał Gawlikowski
14.30-15.00	<i>Zbigniew T. Fiema</i>	To Hegra through al-Qusayr. The al-'Uia-al-Wajh Survey Project
15.00-15.30	<i>Caroline Durand</i>	When the merchants from Roman Egypt meet the Nabatean caravaneers: recent finds from al-Qusayr (al-Wajh, Saudi Arabia)
15.30-16.00	<i>Rupert Brandmeier</i>	Roads of Arabia: new findings of Aqaba amphorae in the Red Sea
16.00-16.30	<i>Marcin Wagner, Zofia Kowarska</i>	Pottery from Aynunah on the northern Red Sea coast (Saudi Arabia)
16.30-17.00	COFFEE BREAK	

ARABIAN RED SEA ROUTE WORKSHOP

Organized in cooperation with the RED SEA VII CONFERENCE by the Polish Centre of Mediterranean Archaeology University of Warsaw

and the Aynunah Project (National Science Center Grant UMO-2014/14/M/HS3/00795).

Organizing Committee

ARABIAN RED SEA ROUTE
Dr. Karol Juchniewicz

RED SEA VIII

Iwona Zych
Joanna K. Rądkowska
Dr. Zuzanna Wygnańska
Marta Mierzejewska



NATIONAL SCIENCE CENTRE POLAND

Research on both sides of the Red Sea, in Berenike (Egypt) and Aynunah (Saudi Arabia) under the auspices of the Polish Centre of Mediterranean Archaeology University of Warsaw: National Science Center grants UMO-2014/14/M/HS3/00795 (Aynunah) and UMO-2015/17/N/HS3/00163 (Berenike)

3 JULY 2017

UNIVERSITY OF WARSAW

WORKSHOP

ARABIAN RED SEA ROUTE